

A QUALITATIVE ANALYSIS OF AMATEUR BODYBUILDERS'  
PERCEPTIONS OF SUPPLEMENTS

by

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I dedicate this research to my mother. Thank you for everything. I love you, Mom.

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## ABSTRACT

The modern sport of bodybuilding in Western fitness culture has been uniquely defined as a way to assert self identity. The sport has long been based on aesthetic appearance and creating a perfected sculpture of muscular mass (Masedu, Ziruolo, Valenti, & Di Giulio, 2012). Sociocultural pressures on males have seen them attempt to assert their identities through hypermasculinity (Mason, 1992). As a result, male bodybuilders use supplements at a high frequency (Hackett, Johnson, & Chow, 2012). The purpose of this study was to investigate the nutritional supplementation perceptions, knowledge, and attitudes among amateur bodybuilders. Methods: The sample consisted of thirty ( $N = 30$ ) adult male amateur bodybuilders who ranged in age from 20 to 34 years ( $M = 22.93$ ,  $SD = 3.42$ ). The number of years involved in bodybuilding ranged from 2 to 15 years ( $M = 3.31$ ,  $SD = 2.82$ ). Results: Interviews with these amateur bodybuilders indicate that bodybuilders take nutritional supplements for three primary reasons: (1) to help achieve an ideal body; (2) to increase strength and enhance performance; and (3) because they believe the positive benefits outweigh the possible negative consequences. Conclusion: The body image the sport represents, and the body image Western fitness culture characterizes, promotes both positive and negative behaviors in supplementation. For this reason, amateur bodybuilders feel required to supplement in an effort to compete and succeed in reaching the image they desire.

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## CHAPTER I

### Introduction

The dietary supplement industry is a continuously evolving and developing field that offers a multitude of products for non-athletes and athletes alike. Dietary supplements, also regarded as nutritional supplements, come in the form of powders, liquids, softgels, gelcaps, capsules, and tablets (Froiland, Koszewski, Hingst, & Kopecky, 2004). In 2012, sales of nutritional supplements in the United States reached \$11.5 billion (Brown, 2012). The prevalence of dietary supplement use is expected to increase. By 2017, estimated sales are expected to reach \$15.5 billion in the United States (Brown, 2012). Ahrendt (2001) found that an estimated 76% to 100% of athletes use some kind of supplement to enhance health or sport performance. Similarly, bodybuilders have been found to use supplements at a high frequency (Hackett, Johnson, & Chow, 2012). Further exploration of the supplementation behavior of amateur bodybuilders is warranted as few studies have addressed the perceptions, knowledge, and attitudes of amateur bodybuilders as they relate to their choice to use supplements.

Bodybuilding has generated cultural significance by enhancing the ideology of hypermasculinity (Mason, 1992). This has led the modern world sport of bodybuilding and the Western fitness culture it exists in to be uniquely defined. Men have used bodybuilding to assert their self-identity through the development of their bodies (Weigers, 1998). Essentially it is a “cultural phenomenon that affects men’s body images and shapes their sense of masculinity” (Weigers, 1998). The professed hypermasculine image in bodybuilding has formed the aesthetic ideal in Western fitness culture (Pope,

Phillips, & Olivardia, 2000) as in recent decades bodybuilding has reshaped contemporary notions of aesthetic beauty through fitness (Sherman, 2011).

Bodybuilding has long been a sport based on aesthetic appearance and creating a perfected sculpture of muscular mass (Masedu, Ziruolo, Valenti, & Di Giulio, 2012). The muscular body represents those who endure personal sacrifice and transcend physical and psychological pain in order to attain an aesthetically pleasing physique (Weigers, 1998). Bodybuilders desire perfectly proportioned body with minimal fat that has clearly defined muscular structures in mass, symmetry, and definition (Peters & Phelps, 2001). Achieving this stature requires an individual's management and awareness about the aesthetics for their anatomy (Weigers, 1998). Unconditionally, the end goal all bodybuilders seek is the production of an extreme mesomorphic physique (Ryckman, Dill, Dyer, Sanborn, & Gold, 1992).

The aesthetics of these physiques, while seen as extreme and prodigious, has become the standard in which their bodies are assessed. As such, competitors will resort to a win-at-all-cost approach in an effort to attain their image (Moore, 1997). Given the pressure to succeed, bodybuilders often use nutritional supplements in conjunction with their training to reach their goals. By exploring the perceptions, knowledge, and attitudes of supplementation behaviors this paper hopes to shed light on the decision making practices of amateur bodybuilders.

#### *Purpose of the study*

The primary objective of this study was to investigative nutritional supplementation perceptions, knowledge, and attitudes among amateur bodybuilders. The bodybuilder's

depiction and knowledge of supplement use will allow for a greater understanding of why they choose, or not, to engage in nutritional supplementation behavior. Limiting examination to amateur bodybuilders helps define a more homogeneous group in efforts to make the traits most evident. Studies have shown the effects of supplementation on bodybuilders, but less effort has been made to address the perceptions, knowledge, and attitudes, of supplement use among amateur bodybuilders.

*Research question*

What are the perceptions, knowledge, and attitudes of amateur bodybuilders regarding supplementation usage?

*Significance of the study*

Due to the widespread use of supplements among bodybuilders, this research hopes to increase the understanding of perceptions, knowledge, and attitudes about supplementation. Research studies have documented which supplements amateur bodybuilders use (Brill & Keane, 1994; Kuo, 2010; Karimian & Esfahani, 2011; Parent & Moradi, 2011; Masedu et al., 2012; Hackett et al., 2012), but few have addressed why bodybuilders use supplements and what knowledge, perceptions, and attitudes they have regarding supplementation (Klein, 1993; Peters & Phelps, 2001; Carman, 2001; Parish et al., 2010). The readily accessible availability of supplements to amateur bodybuilders as they seek an ideal image warrants further investigation into their current supplementation behaviors. Ideally, the present study will serve as a tool in understanding amateur bodybuilder supplementation patterns.

### *Assumptions*

The following assumptions were made by the researcher:

1. All participants will answer any question and provide answers honestly.
2. All participants have perceptions, knowledge, and attitudes regarding their usage of supplements.

### *Limitations*

Specific limitations of this study are listed below:

1. Data will consist of participant's response to questions and how they answer those questions.
2. Participants may evaluate and respond to each question differently based on their knowledge of supplements, experience they have had with supplements, or attitudes that they have towards supplements.
3. The data may be manipulated due to any participant withholding information in an effort to be perceived as giving an answer for what the researcher would desire.

### *Delimitations*

Specific delimitations of this study are listed below:

1. Participants of this study are amateur bodybuilders who have not previously won a state, regional, or national bodybuilding competition and plan to compete in a sanctioned event in two years.
2. Response to the interview questions is based upon interest of the participants and time to respond.

### *Definition of terms*

The following terms were used operationally for the purpose of this study:

*Bodybuilding.* The primary purpose of creating muscle mass and definition in an effort to be judged on muscular size, volume, definition, and symmetry in a competition *International Federation of Bodybuilders (IFBB)*. The creation of Joe and Ben Weider which oversees the sport of professional bodybuilding by using professional committees and judges to evaluate athletes in competition (IFBB, 2013).

*National Physique Committee (NPC).* The world's premier amateur physique organization used to oversee the sports of bodybuilding, fitness, figure, bikini, and physique competitions (NPC, 2013).

*Professional bodybuilder.* A bodybuilder found to have participated or won in at least one or more sanctioned IFBB state, regional, or national competition in which they received a professional card (Carman, 2001).

*Amateur Bodybuilder.* Individuals that participate in weight training at least three times a week with plans to compete in a sanctioned IFBB competition in a 12-month period in an attempt to become a professional (Pickett, Lewis, & Cash, 2005).

*Supplement.* A dietary supplement that is, "orally consumed product intended to supplement one's diet" (Dietary Supplement Health and Education Act (DSHEA), 1994).

*Protein Supplement.* Traditionally found in the form of whey, casein, soy, or egg which has been found to be effective in building lean muscle (Bosse & Dixon, 2012).

*Carbohydrate Supplement.* A dietary supplement usually consumed before, during or after exercise to enhance sport performance (Kreider et al., 1995).

*Ergogenic Aid.* Any pharmacological aid that improves sports performance.

*Creatine.* An organic compound used, “to increase strength and improve training by reducing fatigue and enhancing post workout recovery” (Baechle & Earle, 2008).

*Anabolic Steroid.* Hormones used that exhibit anabolic and androgenic properties such as muscle building (Clark & Henderson, 2003).

*Prohormone.* A testosterone precursor, such as DHEA, that mandates a physician’s prescription (Baechle & Earle, 2008).

*Human Growth Hormone.* A protein secreted from the pituitary gland used to enhance bone and muscle growth while maintaining blood glucose levels, increase the uptake of amino acids into muscle cells, and release fat cells (Baechle & Earle, 2008).

*Body Dysmorphic Disorder.* A disorder centered on the preoccupation of extreme body image dissatisfaction (Crerand & Sawyer, 2010).

*Qualitative Research.* A qualitative approach to research problems utilizes theory to provide an in-depth exploration of inquiry into the meaning that individuals or groups ascribe to a social or human problem (Creswell, 2007).

*Collective Case Study.* The selection of multiple case studies to illustrate one issue or concern by showing different perspectives on the issue (Creswell, 2007).

*Domain Analysis.* The process of reviewing interviews and observations as the researcher seeks to discover the specific details of the domains of lives being studied (Spradley, 1980).

*Open Coding.* The examination of fractures of data such as individual words, phrases and sentences used to identify categories (Strauss & Corbin, 1990).

*Axial Coding.* The step after open coding that involves data being put back together through connections between categories and subcategories (Strauss & Corbin, 1990).

*Selective Coding.* The final step in coding that validates the relationship between the core category and systematically relating it to the other categories (Strauss & Corbin, 1990).

## CHAPTER II

### Review of Literature

#### *History of bodybuilding*

The novelty of sport and rise of its existence in the late nineteenth century is a direct result of the favorable view of the body and supports why bodybuilding exists today. Although there had been a concern for the body among various figures in the early nineteenth century, it was not until the late 19<sup>th</sup> century that an ideal body image became desired and signified a proof of health (Mrozek, 1983). The model image became that of the Greek heroic ideal of masculinity, strength, and health as the example by which Americans' should espouse and compare themselves (Mrozek, 1983). A strongman by the name of Eugene Sandow (pictured to the right) personified these traits. He began the tradition of living people emulating artistic images from ancient Greek sculptures.

“Strongest Man” competitions are at least distantly related to artistic traditions of the ancient Greeks centuries ago, but it was Sandow who became the world’s first recognizable bodybuilder (Kennedy, 2008). Sandow’s physique lent convincing evidence that the human body could become a shape of balance and beauty to be created at will (Mrozek, 1983). A shift in focus had occurred from merely extraordinary strength to the image of a perfect combination combining muscularity and aesthetics (Weigers, 1998). Sandow typified the perfected human form so much that he was regarded as having, “Nothing in excess, all muscles of his body had been brought to fullness and balance in such a way it was a miracle of physical balance, order, discipline, and

organization” (Mrozek, 1983). In competitions, Sandow would wear only a fig leaf to cover his physique (Kennedy, 2008) and he was so revered that people at the time said he resembled a living Greek statue (Schwarzenegger & Dobbins, 1998).

Sandow became a hero to sport culture and body image as he became known for his actions more than his words (Mrozek, 1983). Sport culture saw his actions as a celebration of body image from the result of intensive training and dedication (Mrozek, 1983). Measurements of Greek statues were taken to competitions to be compared with Sandow (Kennedy, 2008) as he represented the classical aesthetic in body image for the public masses (Mrozek, 1983). Sandow’s popularity started a revolution in the sale of dumbbells and barbells to individuals (Schwarzenegger & Dobbins, 1998) as the perfection of body image came to be defined as an individual “ideal condition” of the human body that could be judged in development (Mrozek, 1983). After Sandow’s unexpected death, Bernarr Mcfadden, served as the forerunner of the bodybuilding culture.

Mcfadden started contests held at Madison Square Garden in New York to select the “Most Perfectly Developed Man in the World” (Schwarzenegger & Dobbins, 1998). These contests grew in popularity by celebrating the muscular ideal body image as the contests judged not only the competitor’s strength, but also the quality of their physique (Schwarzenegger & Dobbins, 1998). In 1921, Charles Atlas won McFadden’s competition for what was then a record sum of money, a prize that suggested a cultural shift away from health, feats of strength, and body image signifying a connection

between an ideal image and monetary compensation. Atlas is also credited with the start of turning bodybuilding into the commercial sport it is presently (Kennedy, 2008).

Like other strongmen and physique title winners who gave exhibitions and lectures to economically better themselves, Atlas was motivated by profit. Atlas took this process one step farther, however, when he pioneered the placement of advertisements in the back of popular comic books. One particularly well known ad featured a young skinny boy being humiliated by a bully on the beach in front of a girl (Kenendy, 2008). The ad then showed the boy months later appearing stronger with a chiseled, muscular physique chastening the bully (Kennedy, 2008). The ads, which stated, “Don’t get sand kicked in your face,” gave way to a seismic shift in Western fitness culture by influencing the involvement of youth towards building a better body image. So not only did Atlas influence the marketing of bodybuilding as a business, he also influenced American culture to accept the idea of the physically endowed man as an aesthetic end in itself.

The sport of bodybuilding continued to grow in popularity in the 1930s in Western fitness culture, and the term “bodybuilding” emerged with the advent of the Mr. America contest (Kennedy, 2008). In 1945, Clarence Ross became the world’s first recognized modern bodybuilder in Western fitness culture (Schwarzenegger & Dobbins, 1998). This signified how the bodybuilder’s physique was now recognized as something achievable, concrete, and desired in image to the general public and not specifically to individuals fascinated by the unique image of competitors.

In 1946, the International Federation of Bodybuilders (IFBB), founded by Joe and Ben Weider, became the first organization to officially sanction competitive

bodybuilding (Schwarzenegger & Dobbins, 1998). However, even with increased Western fitness popularity, the recognition of the modern bodybuilder as a desired image, and the creation of the IFBB, bodybuilding still remained a relatively obscure sport within the larger American sporting culture. This status began to change in the 1950s (Schwarzenegger & Dobbins, 1998). The entrance of Steve Reeves signified the arrival of a masculine body image that transcended the cultures of sport, bodybuilding, and pop.

Many experts to this day still consider Reeves' physique to be the epitome of early sport culture and Greek ideals for proportion and development (Kennedy, 2008). After winning both the Mr. America and Mr. Universe titles within bodybuilding, Reeves used his ideal body image as an instrument by inspiring a new pop culture image of body and strength by becoming an international star acting as the titled character in the film, "Hercules." This film signified a time of transition for bodybuilding, and led to an explosion of bodybuilding in Western fitness culture in the 1960s. At this time it was common to have two or three Mr. America and Mr. Universe contests per year (Kennedy, 2008). The debate in bodybuilding became how to determine the best bodybuilder in the world (Kennedy, 2008). This was solved when Joe Weider created the Mr. Olympia contest. The importance to bodybuilding culture is it allowed the sport to showcase one specific individual to Western fitness culture as the personification of the muscular ideal. Also, at this time the Weider organization began offering contracts that allowed bodybuilders to make a living in the sport while simultaneously building their image. These two events intersect with the rise of the athlete considered by many to be the greatest bodybuilder of all time, Arnold Schwarzenegger.

Schwarzenegger dominated the sport unlike any before him and led bodybuilding to become fashionable in sport in the 1970s with the emergence of the health and fitness industry in Western culture (Weigers, 1998). During 1975, one of bodybuilding's most significant events in history took place when two filmmakers, George Butler and Jerome Gary, produced the documentary "Pumping Iron" (Kennedy, 2008). The film starred the charismatic Schwarzenegger, future TV star Lou Ferrigno, introduced the sport to various pop culture markets, and at the time became the highest grossing documentary in cinema (Kennedy, 2008). This film allowed the general public to see and identify with previously unavailable personalities of desired body images, and in so doing moved bodybuilding from a relatively obscure sport to a cultural event that helped change attitudes toward the male form. Around the time of the film, a cultural shift in bodybuilding image occurred as muscularity and minimal body fat content became the winning factor, requiring a scientific approach to training and diet that is still present in Western fitness culture today (Carman, 2001).

The 1980's witnessed explosive growth to the culture of bodybuilding as a competitive sport and saw two separate events impact the sport (Kennedy, 2008). The first major change was the IFBB renaming the bodybuilding titles to "championships" (Kennedy, 2008). The only title that retained the "Mr." designation was the Mr. Olympia. The second major event that transpired was the recognition of the power of Schwarzenegger's name. Jim Lorimer and Schwarzenegger decided to rename the Mr. Universe title to the "Arnold Classic" (Kennedy, 2008). Presently, the Arnold Classic

has been expanded from not only men, but to women bodybuilders, fitness competitions, martial arts competitions and exhibits, as well as becoming a major fitness trade show.

The 1990s also saw change in the muscular image and ideal as the type of competitive bodybuilder evolved. Competitors were now on stage competing at weights of 260 to 280 pounds as opposed to 240 in the 1970s. The media began to focus on the phenomenon of this new muscular physique (Weigers, 1998). An explosion in the popularity of men's bodybuilding magazines providing knowledge of the sport along with advances in nutritional and pharmacological supplementation led to a substantiated growth in popularity for the sport (Kennedy, 2008). Forty years ago bodybuilding images were cartoons and supplementation meant the use of multivitamins and raw eggs. In the 1990s, bodybuilding magazines connected with supplement companies that mainstreamed ads offering hundreds of performance-enhancing products with images of professional bodybuilders (Kennedy, 2008).

As a result of the changes in the 1990s, current bodybuilding is no longer considered a fringe activity (Parish, Turner, & Baghurst, 2010). The sport of bodybuilding continues to grow in popularity among both males and females, with an estimated professional participation rate of 85%-90% males and 10%-15% females (Carman, 2001). Currently, the IFBB estimates their annual membership grows by 1,500 members annually (IFBB, personal communication, April 6, 2013). Further, they estimate bodybuilding membership, including those that compete in the National Physique Competitions, to be over 25,000 (NPC, personal communication, April 6, 2013). These numbers comprise active professionals and inactive professionals.

Estimates for amateur bodybuilders are unknown due to the growing popularity of the sport and due to every bodybuilder being deemed amateur until receiving a professional card.

#### *The media, magazines, movies, and Arnold Schwarzenegger*

The perspective of body image for both male and female is evolving in sociocultural norms. The role of the media in culture has shifted body image to focus on muscularity for men and thinness for women. The media also influences perceptions and attitudes of body image and body esteem in culture (Vartanian et al., 2001). Thus ideal body image and consumption of supplements by bodybuilders is influenced via media, magazines, movies, and Arnold Schwarzenegger.

#### *Media.*

Morrison and Halton (2009) found that media adoption of a more muscular and aesthetically pleasing body type is now the cultural ideal for men. Even changes in the ideal body type for action toys have been documented (Pope, Olivardia, Gruber, & Borowiecki, 1999). Modern action figures have been found to be more muscular and larger than their predecessors (Pope et al., 1999). Muscle is viewed as being desirable, attractive, and a sign of health (Weigers, 1998). Cook (2000) found that the media portrays a strong and rapidly intensifying disciplining of the male body centered on heroic and athletic feats. Hatoum and Belle (2004) also note that it has become increasingly important to understand how the media affects image in men. The influence of appearance related images in media have been found to be the most important predictor of men's overall body satisfaction (Vartanian et al., 2001). Further, the media

has been found to emphasize this image as the physique of Arnold Schwarzenegger (Vartanian et al., 2001).

*Magazines.*

As alluded to previously the inclusion of bodybuilding into mainstream culture consists of hundreds of magazines being published pertaining to fitness. Bodybuilding magazines have become the unofficial journals of the bodybuilding world (Kennedy, 2008). The content in bodybuilding magazines are designed to cater for men and women. Most magazines are published on a monthly basis. They promote the top bodybuilders in the world while providing information on training, nutrition, and supplements.

Professional and amateur bodybuilders strive to be on the cover or in the magazines in efforts to catapult their career to the top of the bodybuilding world (Kennedy, 2008). Individuals who are able to attain such a feat are often extolled in the bodybuilding community (Ryckman, Dill, Dyer, Sanborn, & Gold, 2001). Mason (1992) stated the male image of professional bodybuilders within the magazine becomes the idyllic media representation reinforcing masculinity for both amateur and professional bodybuilders. Klein (1993) noted amateur and professional bodybuilders waiting to see themselves in the new issue of a magazine at a commercial gym, “No one had purchased a copy of the magazine, but bodybuilders draped over the glass counters were staring at the photographs of themselves and others in the issues for sales.” The image portrayals are often designed to show a sign of power and dominance while providing oneself with esteem and confidence (Cook, 2000).

Information within the magazines includes text concerning how to become a competitive or professional bodybuilder. The magazines include diet recipes so the consumer can achieve what one feels as their desired image. They include routines with advice on exercises, sets, and reps for the novice to attain the same look. They advise descriptively how to follow the routine and train like professional bodybuilders such as Arnold Schwarzenegger, Dorian Yates, Phil Heath, and others. Frequently, articles will show how exercises affect your anatomy in order to achieve any bodybuilding goal (Mason, 1992).

Besides training and nutrition articles, bodybuilding magazines also contain advertisements for bodybuilding merchandise. Often the magazines are littered with full page glossy ads for supplements. These ads are vital to the bodybuilding magazine publishers the primary source of the magazine's operating revenue are derived from supplement manufacturers (Kennedy, 2008). These advertisements also serve another purpose as they provide consumer culture with images that makes individuals desire to be more attractive through the lure of achieving an ideal masculine body and the promise of future perfection (Weigers, 1998). In a survey of five bodybuilding magazines, Grunewald and Bailey (1993) found 624 advertised products with over 800 individual performance claims. A similar study by Philen and Ortiz (1992) surveyed twelve bodybuilding magazines to determine the extent of advertising revealed:

- A total of 89 companies, 311 products, 235 unique ingredients, and 914 instances of ingredients being mentioned
- Only 77.8% listed ingredients

- An average of 26 products were advertised in each magazine
- Amino acids were the most frequently mentioned ingredients
- Products were promoted for muscle growth, increasing testosterone levels, energy enhancer, fat reduction, enhanced strength, and as a growth hormone releaser
- 9% of products contained steroid type ingredients being advertised.

Males that read fitness magazines were found to take more nutritional supplements to build muscle, spend more time exercising, have a strong desire to improve muscularity, and endorse behaviors that may achieve muscularity (Hatoum & Belle, 2004). This may contribute to the widespread use and sales of sports nutrition customers. Leit, Gray, and Pope Jr. (2001) found that exposure to muscular figures in advertisements produces body dissatisfaction as reflected in the ideal level of muscularity versus what muscularity levels they perceive themselves to have. Further, the dissatisfaction dealt primarily with muscularity and not an amount of body fat (Leit et al., 2001). The ideal levels of masculinity directed at men by magazines and men's perceptions of these images have been found to almost be impossible for most men to achieve (Hatoum & Belle, 2004). This masculine ideal image purported by the media may be dangerous as some physiques are not attainable without drugs such as anabolic steroids (Pope, Phillips, & Olivardia, 2000). Sobal and Marquart (1994) discovered that younger athletes were particularly vulnerable to media images. Younger athletes who read fitness magazines were significantly more likely to enhance their bodies (Skemp-Arit, 2006).

*Movies.*

There is little doubt that the mass media of movies pervades the everyday lives of culture in Western societies. Hollywood films have been known to shape and express the way individuals see their bodily image (Holmland, 2002). Mainstream culture was exposed to the muscular and ideal bodybuilding image in 1977 through the film “Pumping Iron,” which starred Arnold Schwarzenegger. Soon after, Lou Ferrigno as The Incredible Hulk brought bodybuilding into people’s homes (Weigers, 1998). The muscular image was permeated into society through successful action films in the 1980’s. Action films starring Arnold Schwarzenegger such as: Predator, Conan, Terminator I and II were found to all have an effect on the culture surrounding the ideal body image (Weigers, 1998). A study on action movies during the 1980’s through 1990’s by Morrison and Halton (2009) yielded the following result:

- Male central characters and secondary characters were overwhelmingly muscular and lean
- Characters’ muscularity and leanness were associated with romantic involvement and sexual activity
- Muscular males are more likely to experience a positive outcome
- The importance of the muscular mesomorphic ideal is apparent.

These findings imply the culture underlining of masculinity have resulted in subjective qualities about muscular and non-muscular men. The image of males has shifted to muscular, lean, physically aggressive entities rather than as whole complete persons (Morrison & Halton, 2009). The male body must now conform to the ideal

mesomorphic body image of increased muscularity and decreased body fat. As a result the cultural meanings surrounding what constitutes “male-maleness” have shifted the context of the male action film and established a profound body image change in Western culture (Morrison & Halton, 2009). Body image now drives whether one is capable of having success or failing. The muscular man is considered good and capable of success whereas the non-muscular man is deemed incapable and a failure (Morrison & Halton, 2009).

*Arnold Schwarzenegger.*

Figures from entertainment and sport are most apt to be well known and as a result are capable of creating an ideal image (Boorstin, 1961). A hero has been defined by his achievement and a celebrity by his image (Boorstin, 1961). Further, the hero created himself and the media creates the celebrity (Boorsin, 1961). Schwarzenegger, embodied both of these aspects in his career as he has been able to create the cultural ideal body image through bodybuilding, film, and politics.

Arnold’s participation in bodybuilding, “An oddball sport” by his own admission and still at present a stigmatized sport in mainstream Western fitness culture, Schwarzenegger created himself as the hero of bodybuilding. It was not until the success of “Pumping Iron,” starring Schwarzenegger, which resulted in the rise of bodybuilding and its acceptance into mainstream Western culture (Moseley, 2009). The cause in the sport’s success is largely attributed to Schwarzenegger, because as bodybuilding dates back over 100 years the sport did not enter mainstream Western culture until the 1960s and 1970s (Parish, Baghurst, & Turner, 2010) coinciding with Schwarzenegger’s

emergence. This period is when Schwarzenegger indirectly began to change how Americans, bodybuilders and average citizens, view body image. As Boyle (2010) suggests this about Schwarzenegger's influence:

“This is because of ideological overlaps among bodybuilding and mainstream notions of what constitutes ideal body types, which then gets mapped onto notions of American masculinity and citizenship.”

Schwarzenegger's unparalleled success in Western bodybuilding culture at this time modeled the embodiment of a more vivid and persuasive image for Western culture. Arnold proclaims:

“I'm the most experienced bodybuilder, the one who has had the most success. For many, I'm the hero and that is why I've become a caretaker of bodybuilding” (Schwarzenegger & Hall, 1977).

His including of the word hero is a unique choice. His cultural status and image affected culture as he transcended from hero into celebrity by creating such an image that men were found to desire a physique like that of Arnold Schwarzenegger (Vartanian et al, 2001).

Roselini noted:

“He is a seven-time Mr. Olympia, a multimillionaire, a top Hollywood box-office draw. Arnold is a hero, a 21st-century John Wayne whose celluloid courage, strength and playfulness reflect America's exemplary ideals.”

Schwarzenegger's role was also that of a big man as well as a big name in Western culture. Schwarzenegger emphasized fitness to the public in person, on film, and through political motivations (Stoddard & SerVaas, 1990). Politically, Schwarzenegger played a role in the national fitness of children before his governorship of the state of California. He asked Bush to name him head of the fitness council as he pledged to make the 1990s the Fitness Decade (Krucoff, 1992). This tapped into a broader governmental discourse about self-responsibility for health resulting in using a bodybuilding icon as the embodiment of health. Schwarzenegger using this platform affirmed the identity of a muscular body image with participation in fitness for children.

Schwarzenegger further used this platform to market bodybuilding principles to mainstream fitness culture through his book, "Arnold: education of a bodybuilder," (Boyle, 2010) and later through his "Encyclopedia of Modern Bodybuilding." Through text Arnold discusses and proclaims the health benefits of building muscle to live healthier lifestyle (Schwarzenegger & Dobbins, 1998). Schwarzenegger uses himself as an example of the benefits of bodybuilding and offers illustrations throughout the texts about his decision making in how he changed his life, body, and image through bodybuilding (Boyle, 2010).

Schwarzenegger states:

"Whatever I thought might hold me back, I avoided. I crossed girls off my list-except as tools for my sexual needs. I eliminated my parents too. It seemed they always wanted to see me, then when I was around they had nothing to say. I grew accustomed to hearing certain questions: "What's wrong with you, Arnold? Don't you feel anything? Don't you have any emotions?" How can you answer that? I always let it pass with a shrug. I knew that what I was doing was not only justifiable, it was essential. Besides, if I did miss out on the emotional thing because I was so

dedicated, I believe I benefited in other ways that finally brought everything into balance. One of these was my self-confidence, which grew as I saw how much control I was gaining over my body. In two or three years I had actually been able to change my body entirely. That told me something. If I had been able to change my body that much, I could also, through the same discipline and determination, change anything else I wanted. I could change my habits, my whole outlook on life” (Schwarzenegger & Hall, 1977).

### *The desire for the ideal male body*

Body type in society is divided into three classifications: ectomorph, endomorph, and mesomorph (Baechle & Earle, 2008). The relevance to body classification and bodybuilding is there is a direct relationship between muscle mass and skeletal size (Kennedy, 2008). An individual with smaller bones will have more difficulty packing on muscle mass than that of a large-boned individual. An ectomorph is a person that does not easily gain body fat, but has a very difficult time in building muscle (Kennedy, 2008). Endomorphs are individuals that have large bones, build muscle more easily than an ectomorph, and tend to have more fat cells which results in them struggling to lose body fat (Kennedy, 2008). Mesomorphs are the idyllic bodybuilding candidate as they have large bones and easily build muscle mass to create the muscular ideal image (Kennedy, 2008).

The axiology of bodybuilding tells one the mesomorphic ideal of a muscular man as it is seen in the Western fitness culture of bodybuilding, is a stark contrast to the view of masculinity of the average exercise enthusiast or average American (Klein, 1993). However, it has been found that all men desire to be more mesomorph in nature with muscularity connecting wide shoulders, a massive chest, and a narrow waist (Heinberg and Thompson (1992), the traits Arnold Schwarzenegger, the ideal mesomorphic

bodybuilding image, was known to embody. Bodybuilders incapable of attaining this desired body image may suffer from body dissatisfaction or distortion as a result.

Moseley (2009) found that even as the popularity of bodybuilding grows, data implies that an increasing number of males within the sport are becoming dissatisfied with their overall appearance. These findings corroborate with (Peters & Phelps, 2001) who found that male bodybuilders suffer from body image dissatisfaction and distortion. The former is the result of unhappiness with one's shape or specific parts of their body (Slade, 1994). The latter is the misinterpretation of one's body size (Altabe & Thompson, 1992). Bodybuilders are without a doubt like all men (Klein, 1993) so one could presume that bodybuilders may also suffer the same body image issues as those of regular males or male athletes.

Men have been found to have body image dissatisfaction and distortion in those that rate a muscular physique as their personal ideal (Raudenbush & Meyer, 2003). An example may be a male's desire to have a muscular, vascular, and defined body while knowingly being inactive and overweight (Peters & Phelps, 2001). These findings support the drive for muscularity as a desire to achieve an idealized image of a muscular body type (Morrison, Morrison, & Hopkins, 2003). Vartanian et al., (2001) discussed how males reflect significant discomfort about having sufficient muscularity in efforts to not look scrawny or wimpy. Results showed that 2% of men found themselves to be too muscular and 85% of men wanted to be more muscular (Vartanian et al., 2001). Leit, Gray, & Pope, (2001) found that males have a dissatisfaction with respect to muscularity rather than body fat. These earlier findings match research by Ridgeway and Tylka

(2005) who detailed five characteristics that appear concerning ideal body image in males: definition, large size, strong, athletic, and big. The following data was attained in describing men's perceptions of ideal body image and composition:

- Referred to themselves as heavy, overweight, round soft, and flabby
- Do not prefer to be called short, skinny, weak, scrawny, and bony
- Desired large thick muscles
- Wanted to appear strong and powerful
- Wanted to have definition
- Wanted to be muscular
- Areas they primarily wanted to change were the abdominal region, arms, and chest
- Wanted to be thin and have defined “six-pack” abs
- Wanted strong, big toned biceps and triceps with a thick, strong chest

(Ridgeway & Tylka, 2005).

These findings in men, athletes and non-athletes, allow speculation about body image ideals in male bodybuilders. Certainly, body image dissatisfaction and distortion is more prominent due to participation in a sport where aesthetics is a substantial function of the culture. Research on body dissatisfaction in male bodybuilders reported participants as feeling fat with a desire to be slimmer, indicated perceptions of being smaller than ideal, and a strong desire to enhance the size of various upper body parts that reflect masculinity (Peters & Phelps, 2001). Body dissatisfaction and distortion in bodybuilding culture is also seen when competitors compare their offseason body image

to that of their opponent's ideal dehydrated, muscular and vascular image to set a standard for which all bodybuilders use as judgment (Peters & Phelps, 2001). The detailed and dieted physique of a bodybuilder at the time of a competition is dehydrated to a capacity that cannot be maintained for long periods of time for health reasons. This allows bodybuilders to only achieve brief ideal body image satisfaction. Cook (2000) describes the dehydrated image:

“Here is a body which aims to text itself: to demonstrate its own internal workings, outside itself... sinews, tendons, ligaments, veins and arteries are shown beneath the skin’s surface.”

However brief this moment lasts, the ideal muscular image still resonates in the mind of all bodybuilders. Additionally driving the muscular ideal is the concept of “Bigness” which permeates bodybuilding culture (Mason, 1992). This is evidence in research by Klein (1993) as he recalls an encounter with a professional bodybuilder:

“I had not the slightest idea of what was good or bad, just that bigger was probably better. Sam still did not pull his pants up; instead he flexed his thighs, looking at them the way someone would watch a prize German shepherd go through its repertoire of tricks. As his veins strained to break through his skin, it dawned on me that he was merely making a visual report of his condition. Nothing sordid or questionable, just an athlete asking for confirmation of his readiness.”

The “Bigness” concept is a synthetic image in bodybuilding culture. It is planned to serve a purpose and make a certain impression. Boorstin (1961) states that an image must be believable as it will serve no purpose if people do not believe it. An image is simplified yet vivid and concrete yet ambiguous (Boorstin, 1961). The ideal image lies somewhere between reality and expectation, between the imagination and the senses

(Boorstin, 1961). “Bigness” provides an ideal image in the mind of a bodybuilder, whether amateur or professional, to attempt. It is a concept of which bodybuilders use to train mentally and physically. It also furthers the drive to do whatever it takes to be as big as the muscular ideal is in one’s mind.

The drive to appease “Bigness” and any other perceived body dissatisfaction may indicate bodybuilders will use anabolic steroids or other performance enhancing substances. Research shows that a male’s desire for muscularity has been linked with dangerous use and abuse of anabolic steroids (Wright, Grogan, & Hunter, 2000). Peters and Phelps (2001) found that bodybuilders that use steroids aspire to have more muscle mass than those not using steroids. This is of note as bodybuilders have been found to continually set higher and higher goals for themselves and as a result begin to suffer from perceived muscular ideal (Peters & Phelps, 2001). No matter how genetically gifted you are, it is unrealistic to expect to look like an ideal muscular image in a short period of time (Kennedy, 2008). All bodybuilders should understand that muscles like the elite bodybuilders in history take years of hard work and proper nutrition (Kennedy, 2008) with the use of performance enhancing substances.

#### *The supplement industry and bodybuilding*

The explosion in the growth of bodybuilding has spawned a billion dollar industry in the emergence of nutritional products, health clubs, apparel, equipment, publications and media, physical therapy, personal training and coaching, and other areas (Schwarzenegger & Dobbins, 1998). The supplement industry has also affected Western culture as supplement use by the general public has increased with time as 52% use at

least one nutritional supplement and 18% use between 2 and 5 supplements (Eliason & Myszkowski 1996). According to Nutritional Business Journal, Americans spent \$800 million on sports supplements, excluding sports nutrition bars and electrolyte replacement drinks (Brown, 2012). As of 2013, the use of herbal supplements by athletes has increased 4.5% in one year to reach \$5.3 billion in sales (Senchina, 2013).

The increased popularity in supplement use by athletes and non-athletes parallels the rise in supplement use by bodybuilders. Over the last ten years the acceptance of nutritional supplementation has accelerated in bodybuilders (Kennedy, 2008). Protein supplements date back to the 1940s (Kennedy, 2008), but the evolution of sports nutrition science in recent decades has made it increasingly common in the widespread use of supplementation products to enhance performance and training (Bosse & Dixon, 2012). Creatine and whey protein are the highest grossers, but a host of other supplements including nitric oxide, glutamine, and fat burners sell millions for manufacturers (Kennedy, 2008). One manufacturer in particular, Joe Weider, has made billions from sales of supplements to bodybuilders.

Bodybuilding promoter, publisher, and founder of the IFBB, Joe Weider was the first to recognize the potential of the supplement industry in the 1940's (Kennedy, 2008). Weider created bodybuilding magazines with articles and photos detailing bodybuilding competitions, how-to training articles, and personality profiles of the top physique competitors (Schwarzenegger & Dobbins, 1998). Weider placed many of these bodybuilding icons under contract making sure they could only endorse his products, no matter how much money other companies offered (Kennedy, 2008). Classic

advertisements saw Schwarzenegger endorsing Weider protein powder as he was surrounded by a bevy of beach babes (Kennedy, 2008). Weider also gathered and preserved enormous amounts of training information from all bodybuilders to use in his magazines, books, and videotapes making this information available to each new generation of bodybuilders (Schwarzenegger & Dobbins, 1998). The current Weider organization is synonymous with health and fitness worldwide providing magazines, nutritional supplements, sporting events, equipment, and brand licensing in over 120 countries (Weider, 2013).

Similar companies followed Weider's lead in the supplement industry. Every year supplement companies spend millions of dollars on marketing research trying to determine which bodybuilder, which image, and what approach has the greatest impact on sales. Companies frequently pursue and offer contracts to popular bodybuilders with the ideal muscular aesthetics that routinely place high in competition. Given the industry's competitive nature it is no surprise that promoting and endorsing supplements is the most lucrative form of financial reward for bodybuilders (Kennedy, 2008). While the professional bodybuilders under contract are monetarily compensated, the perception to the general public and amateur bodybuilders is that the endorsed product is credible or consuming the product will allow one to attain the masculine aesthetic ideal of the professional.

Amateur bodybuilders are on an endless quest to enhance their physique and are frequently barraged by endorsed products that purport to contribute to various components of performance enhancing. These advertisements feature well-known

personalities providing claims of success by using the product (Tian, Ong, & Tan, 2009). Amateur bodybuilders, like most athletes that follow a sport and want to become a professional, quite naturally are attracted to the largest and most visible in the industry (Roundtree, 2005). They see professional bodybuilders promoting pills and powders with promises to increase muscle mass, strength, faster recovery, and improve endurance (Tian et al., 2009). Thus athletes and bodybuilders believe a higher consumption of nutritional supplements is required to maximize recovery, improve training intensities and performance, and maintain health (Juhn, 2003). However, many of the products are poorly regulated and have limited research to support the claims (Josephs and Reinmiller). They provide misleading claims and ignore the training or nutritional practices that led to the athlete's success (Tian et al., 2009). Schwarzenegger (2005) stated a sensible and responsible advancement in the development and usage of dietary supplements would be to educate the general public, media, bodybuilders, and government bodies about their effects.

Related to the topic of the supplement usage in bodybuilding is the subject of performance-enhancing drugs. While at one time there was a definite distinction between the two, the supplement companies muddled the water in the late 1990's by releasing a new category of supplements called pro hormones (Kennedy, 2008). Prohormones are not anabolic steroids, but rather they are hormone precursors that the body converts to anabolic substances (Kennedy, 2008). Anabolic substances such as dianabol, nandrolone (Deca-Durabolin), and others have been used in bodybuilding since before they were illegal and before bodybuilders knew any better (Schwarzenegger & Dobbins, 1998). Of

course, the use of anabolic steroids still exists among avid amateurs and professional bodybuilders alike (Carman, 2001). In order to maximize muscle growth and reduce body fat, bodybuilders have been found to experiment with human growth hormone (Schwarzenegger & Dobbins, 1998). The use of these performance enhancing drugs may be a result of an amateur bodybuilder's desire to achieve the muscular ideal image in their mind or by knowing professionals use these substances.

The growth of bodybuilding has paralleled the increased awareness and growth in the amount of weight training in mainstream Western fitness culture (Schwarzenegger & Dobbins, 1998). There are now training facilities in schools and universities, military bases, YMCAs, hotels, corporate office buildings, and upscale apartment complexes (Schwarzenegger & Dobbins, 1998). People pay annual dues for gym memberships ranging from occasional to the twice-daily devotee along with thousands of walk-ins, who pay to train for a day, a week, or a month (Klein, 1993). More than likely the majority of these people supplement their workouts. Bodybuilding and the supplement industry have become so entrenched into mainstream Western fitness culture that the term of bodybuilding will likely replace all fitness trends in the long run (Schwarzenegger & Dobbins, 1998).

#### *Prevalence of supplement use*

Research has shown that countless athletes believe supplements are essential for good sport performance and therefore use them very commonly. Lun, Erdman, Fun, and Reimer (2012) found the greater the weekly training hours for an athlete, the significantly greater the prevalence of dietary supplement use. Due to the form of training a

bodybuilder endures, supplement and power enhancer agents have been widely used by bodybuilders and around since the 1940s (Kennedy, 2008). The drive for the muscular ideal image has intensified supplementation practices among all bodybuilders. The pressure to reach a peak, muscular physique creates an insatiable desire for supplements and drugs to make bodybuilders slimmer, fitter, and more aesthetically appealing (Peters & Phelps, 2001). Several studies have investigated the prevalence of supplement use among amateur and professional bodybuilders, all indicating high percentages of supplement use.

The evidence of the number of nutritional supplements, exercise programs, and books about fitness doubled in the 1980s (Brownell, 1991). This trend continued into the 1990s and 2000s as bodybuilders sought new advanced supplements to augment training. During the 1990s, Walberg-Rankin, Edmonds, and Gwazdauskas, (1993) reported supplement use in 100% of bodybuilders. Brill and Keane (1994) reported that 94% of bodybuilders took some kind of supplement. More recently, 84.7% to 100% of bodybuilders have been found to use supplements (Morrison, Grizis, & Shorter, 2004; Pickett et al., 2005; Karimian & Esfahani, 2011; Hackett et al., 2012). A study on dietary supplement usage at a commercial gym reported 93.4% of subjects took a supplement for at least one consecutive year, 94.5% consumed supplements during the year, and only 5.5% quit taking supplements during specific seasons (Morrison et al., 2004). Examining further in supplementation practices shows usage may be determined by which training phase a bodybuilder is currently within.

Bodybuilding has two distinct phases: bulking (the systematic attempt to gain weight and muscularity) and cutting (removing body fat and minimizing muscle loss to achieve a defined aesthetic physique). Brill and Keane (1994) found that fat burners were more popular in the cutting phase than any other supplement. Current research also shows that fat burners are still the most prevalent supplement used when attempting a cutting phase (Karimian & Esfahani, 2011). Steen (1991) documented bodybuilder usage of other supplements to burn fat during the cutting phase such as choline and inositol. More recently, amateur and professional bodybuilders commonly use diuretics, which act as a cutting agent in efforts to lose weight (Kennedy, 2008).

In the bulking phase, protein powder and amino acids have been found to be more popular (Brill & Keane, 1994). Benardot (2000) had related findings as protein powder, creatine, and amino acids were most commonly used when gaining weight or bulking. Another study found that male bodybuilders were more likely use a protein or weight gain supplement while attempting to bulk (Karimian & Esfahani, 2011). Additional research on bodybuilders shows the majority believe supplement usage is required to achieve hypertrophy, strength, and an aesthetic appearance (Walberg-Rankin et al., 1993; Pickett et al., 2005; Karimian & Esfahani, 2011; Hackett et al., 2012). One possible explanation for the prevalence of supplement usage in bodybuilders is the popularity of supplements and frequency of usage by athletes overall.

Studies on amateur and elite athletes have shown supplementation patterns that mimic the same practices of amateur and professional bodybuilders. Investigations into athlete supplement usage found most take vitamin and mineral supplements, ergogenic

aids, creatine, and weight gain products (Krumbach, Ellis, & Driskell, 1999; Swirzinski Latin, Berg, & Grandjean, 2000; Slater, Tan, & Teh, 2003). A study on nutritional supplements involving athletes competing in thirty various sports revealed that, 77% of respondents used at least one form of supplement (Slater et al., 2003). Another study, involving college athletes, revealed that approximately 23% regularly used supplements at greater than five times per week, 86% reported using an energy-type supplement, 73% reported using energy drinks, and 61.4% reported using calorie replacement products that included drinks or powders and bars (Froiland et al., 2004). Athletes have also been known to supplement exercise with amino acids (Tscholl, Alonso, Dollé, Junge, & Dvorak, 2010). Elite athletes preferring to gain muscular mass and weight are more likely to use protein and amino acids (Tian et al., 2009). Among all athletes, creatine is the most popular and commonly ingested supplement (Taylor et al., 2011).

While athletes predominantly consume the same supplements as bodybuilders, bodybuilders have a higher prevalence of anabolic steroid usage (Kennedy, 2008). With increased emphasis on muscularity, symmetry, and aesthetic development it is logical to assume that many bodybuilders consider using performance-enhancing substances to enhance their physiques (Peters & Phelps, 2001). However, most of the anabolic steroid users if not the majority, are not professional bodybuilders, but instead amateur bodybuilders who wish to be more muscular (Parent & Moradi, 2011). The usage of anabolic supplements has been found to be consumed more frequently in a bulking phase (Brill & Keane, 1994). Durateston, deca-durabolin, and emogenin are the most frequent anabolic steroids used by male bodybuilders in order to elevate physical development,

enhance aesthetics, obtain a massive well-defined body, to be admired for physical qualities, and prevent dissatisfaction with physical appearance (Santos, A., da Rocha, & da Silva, 2011).

Yesalis, Barsukiewicz, Kopstein, & Bahrke (1997) found that anabolic steroid use amongst females was on the rise. Goldfield (2009) revealed results concerning competitive female bodybuilders showing 40% of respondents used anabolic steroids. Female bodybuilders use anabolic steroids in an attempt to counter estrogen production and enhance masculinity. The trend in performance-enhancing usage has continued as a greater number of female bodybuilders report using anabolic steroids. Female bodybuilders have also been found to use anabolic substances more frequently in the cutting phase to remove fat (Karmian & Esfhani, 2011). These findings correspond with previous research as female bodybuilders were found to consume more fat burning supplements than males in order to enhance their physique (Brill & Keane, 1994). Other types of supplements female bodybuilders have been found to take are vitamins and minerals (Karimian & Esfahani, 2011). A study on dietary supplement usage disclosed female athletes reported taking multivitamins, vitamin C, calcium, and iron (Krumbach et al., 1999). Another study found that 65% of female athletes regularly took multivitamins or minerals containing iron.

The competition level of the athletes taking part in the studies varied, but this may indicate an increased reliability in the investigations. The supplement industry and products available is wide ranging and appeals to many athletes. Bodybuilders and non-bodybuilding athletes, males and females, were found to have similar traits in

supplementation practices. As a result one may be able to generalize amateur bodybuilder perceptions, knowledge, and attitudes toward supplementation practices as the majority of athletes have previously or currently use nutritional supplements suggesting ubiquitously popularity among all athletes.

### *Supplement types and benefits*

The term supplements is all inclusive of the following: vitamins, minerals, herbs, amino acids, extracts, or concentrates in the form of tablets, capsules, liquids, powders, bars, soft gels, or gel caps (U.S. Food and Drug Administration, 2009). Supplements and ergogenic aids such caffeine, creatine, electrolyte replacement supplements, glucosamine, meal replacements, multivitamins, minerals, sport bars, drinks and gels have been discovered to enhance performance of athletes (Burke & Deakin, 2002). Even for individuals outside the realm of athletics, dietary supplements may be useful (Schwarzenegger, 2005). This study will address the types and benefits of supplements used by bodybuilders and athletes. The following will be discussed: vitamins and minerals, proteins, carbohydrates, proteins and carbohydrates combined, ergogenic aids, then anabolic steroids, prohormones, and human growth hormone.

#### *Vitamin and mineral supplements.*

The most popular supplement used by the general public is the multivitamin (Kennedy, 2008). Within vitamins and minerals, vitamin C and E supplementation may reduce muscle soreness, although the effects have not been found to be significant (Thompson, 2001). Typically, athletes only supplement vitamins and minerals if they have a nutritional deficiency as there is considerable debate as to whether or not extra

vitamins and minerals boost exercise performance (Kennedy, 2008). Most nutritionists and researchers indicate that healthy eating practices will supply more than enough vitamins and minerals (Kennedy, 2008). Unlike protein, for which there is evidence to suggest that hard-training athletes need more, no such evidence exists regarding vitamins and minerals (Kennedy, 2008).

### *Proteins.*

Protein supplements come in powder form and come in the form of whey, casein, soy, and egg (Bosse & Dixon, 2012). Whey protein is the most popular commercially dietary protein supplement due to its amino acid profile supporting protein synthesis and muscle growth (Whey Protein, 2008). Whey proteins have a high concentration of branched-chain amino acids (BCAAs) which are important in tissue growth and repair. Whey is considered superior to most other protein sources for bodybuilders because of its digestibility, bioavailability, and high concentrations of such proven muscle-builders as branched-chain amino acids (Kennedy, 2008).

Research has shown bodybuilders that train in intensive rigorous programs, whether they are an amateur or professional bodybuilder, have an increased dietary protein needs (Lemon, Tarnopolsky, MacDougall, & Atkinson, 1992; Bahrke & Yesalis, 2002; Bosse & Dixon, 2012). Choosing to supplement with amino acids and protein immediately after exercise produces a positive outcome on the rate of muscle protein formation (Antonio et al., 2008). Cribb and Hayes (2006) found that protein and essential amino acid intake immediately before or after resistance training may promote muscle hypertrophy. Simiarly, Hulmi, Lockwood, and Stout (2010) found that pre and

post resistance training protein or essential amino acid ingestion can increase muscle mass.

Debate has been made about the recommended effective dosage of protein. The amount most used in bodybuilding literature is one gram per pound of bodyweight per day (Kennedy, 2008). Some supplement manufacturers and 300 pound bodybuilders suggest higher at a ratio of two to three grams per pound of bodyweight, but this is probably overkill (Kennedy, 2008). Research by Bosse and Dixon (2012) recommended the dosage of one gram of protein per pound of bodyweight a day while resistance training is desired for changes in strength and body composition. Athletes that consumed grams of whey protein equal to or greater than their bodyweight gained significantly greater strength and muscularity over those that did not (Lands, Grey, & Smountas, 1999; Burke et al., 2001; Cribb, Williams, Stathis, Carey, & Hayes, 2006; Hoffman, Ratamess, Kan, Falvo, & Faigenbaum, 2007). Further benefits of whey protein have been found in its effectiveness to aide in weight loss. Individuals who received a whey protein drink twice daily over a 12-week period lost significantly more body fat and lost significantly less lean muscle mass than those who did not (Frestedt, Zenk, Kuskowski, Ward, & Bastian, 2008).

### *Carbohydrates.*

Certain nutritional supplements containing carbohydrates have proved to help athletes achieve their nutritional goals for performance (Kennedy, 2008). These supplements are often seen in the form of bars, drinks, and powders at supermarkets and vitamin stores. Carbohydrate supplements may be taken pre, during and post exercise to

increase workout intensity, improve performance, and aid in recovery (Kennedy, 2008). Studies have also shown that carbohydrate replacement during results will increase energy and decrease fatigue (Kreider et al., 1995). However, protein has been shown to be more effective than carbohydrate replacement at increasing muscle mass (Kersick et al., 2006) the desired goal of bodybuilders. Idyllic, the combination of sufficient dietary protein with resistance training followed by post-exercise carbohydrate intake provided optimal glycogen replacement and muscle hypertrophy (Roy, Tranopolsky, & MacDougall, 1997).

*Proteins and carbohydrates combined.*

The intense training regimen a bodybuilder exudes creates a demand in the body for glycogen replacement after workouts (Schwarzenegger & Dobbins, 1998). Liquid meal supplements, including carbohydrates and proteins are products desirable for athletes undergoing heavy training, with a high energy requirement (Burke & Deakin, 2002). A study on the use of protein and carbohydrate supplementation together after resistance training can enhance muscle hypertrophy (Hulmi, Lockwood, & Stout, 2010). Similarly, protein supplements taken in conjunction with carbohydrate supplements have been found to improve performance and speed up exercise recovery (Bean, 2007).

*Ergogenic aids.*

There is evidence in research that ergogenic aids such as caffeine and creatine offer potential performance benefits in sport. Caffeine has been used as performance enhancer for more than thirty years and is one of the few ergogenic aids that may be used to an equal extent by bodybuilders, professional athletes, amateur athletes and the general

population (Baechle & Earle, 2008). During short-duration, high-intensity exercise, caffeine supplementation enhances power production (Baechle & Earle, 2008). Caffeine may also be used by bodybuilders during a cutting phase in an effort to shed fat (Benardot, 2000).

Creatine is another supplement that is commonly ingested by bodybuilders. Along with protein, creatine has been considered to have the highest perceived impact on bodybuilders' performance (Kuhn, Swartzwelder, & Wilson, 2000). Creatine is a proven performance enhancer that is normally taken before the exercise or after a training session (Schwarzenegger & Dobbins, 1998). Greenhaff and Bodin (1994) found that creatine molecules serve as a phosphate donor which allows high power muscular output in high intensity exercise sessions. Taylor and Poole (2011) stated the role of creatine in the phosphocreatine system garners it a promising position in supplementation regimens of weightlifters. Delivery of creatine to muscles activates the sodium-potassium pump and results in the support of hypertrophy for muscles that have been exercised (Baechle & Earle, 2008).

Taylor and Poole (2011) reported participants taking 5g creatine with 70g dextrose demonstrated significant increases in lean muscle mass, bench press one rep max, and leg press one rep max during resistance training. This correlates with previous literature as that individuals using creatine monohydrate with 33g carbohydrate had a 50% increase in bench press 1 rep max than those who did not (Stout, Eckerson, Noonan, Moore, & Cullen, 1999). Further, Taylor and Poole (2011) found that creatine with fenugreek is an effective strategy in improving resistance training. Evidence supports

that fenugreek transports creatine in the same manner as carbohydrates to increase insulin sensitivity (Taylor & Poole, 2011).

*Anabolic steroids, prohormones, and human growth hormone.*

The use of anabolic steroids is widely spread in non-competitive bodybuilders and competitive bodybuilders. These powerful muscle building drugs are now ingrained in the consciousness of bodybuilders and athletes everywhere (Kennedy, 2008). It is assumed that virtually all competitive bodybuilders that are amateur or professional use steroids. For every pro or national competitor who uses steroids, there are probably a thousand recreational bodybuilders using them who will never even compete (Kennedy, 2008). The most popular administration of steroid usage is done through a pyramid cycle (Kennedy, 2008). In a pyramid cycle, a bodybuilder will start a low dosage steroid while gradually increasing the potency before letting the dosage peak and then subsequent decline. A steroid free time period follows after a cycle before starting again. Bodybuilders using steroids normally administer them orally or through injection.

Prohormones are a result of the reclassification of anabolic steroids as illegal substances in 1990 (Kennedy, 2008). Prohormones were designed to have steroid like effects without side effects or legal issues. The difference between prohormones and anabolic steroids is prohormones are converted into testosterone in the body whereas anabolic steroids are synthetic versions of testosterone (Carman, 2001). The reason bodybuilders are attracted to prohormones is the ability it has to act as a direct hormonal predecessor of testosterone (Kennedy, 2008). The Anabolic Control Act was amended

in 2004, placing prohormones on the same level as anabolic steroids as illegal substances (Baechle & Earle, 2008).

Human growth hormone (HGH) is a polypeptide hormone produced by the pituitary gland (Baechle & Earle, 2008). HGH is known as the “Master Hormone” and is known to help regulate tissue growth, increase muscle growth, promote fat breakdown, and control energy levels (Kennedy, 2008). As you age, HGH is still present in the body, but at a lower level (Roundtree, 2005). By itself, HGH does very little, but when stacked with steroids and insulin the results are immense (Kennedy, 2008). By using HGH, bodybuilders are hoping to promote the effect of increased muscle growth while reducing fat stores which are both key contributors to a bodybuilder’s success. Bodybuilders have used HGH for decades, but it only became popular more recently in the 1990’s as it became more affordable. As such, it is still expensive and the cycle length is usually determined by how long a bodybuilder may be able to afford the drug. Some bodybuilders are able to cycle year round while others only a minimum of weeks. Presently, there is no method of detection for HGH in any sport.

#### *Risks of supplement use*

As time goes by, we are influenced by the culture of peer groups, leaving us vulnerable to anything that promised a new life in a new body in a few days or weeks. On every side, we bombarded by propaganda that eventually makes us believe in a world full of miracle-packaged drugs (Columbu & Fragomeni, 1985).

The increased usage and popularity of nutritional supplements has led to concerns regarding the safety of their use and potential health risks (Timbo, Ross, McCarthy, & Lin, 2006). The misconception about supplements is that many believe because they are

being sold in health stores or supermarkets, then it has been proven safe, and the company that manufactures the supplement is legitimate and reputable business. The basis of this is simply not true. At present, Food and Drug Administration (FDA) restrictions do not apply to dietary supplements as the Dietary Supplement Health and Education Act 1994 states that supplements, which do not claim to diagnose, treat, prevent or cure diseases, are not subject to regulation. Because of this, supplements are not thoroughly tested for safety and retailers place unproven claims on products. In fact, companies that sell supplements will usually state that their product is not regulated by the FDA on the product.

Monitoring the situation of supplement use in athletes is the U.S. Anti-Doping Agency (USADA), which is the national anti-doping organization for Olympic sports in the United States. The USADA states their mission is to preserve the integrity of competition, inspire true sport, and protect the right of U.S. athletes (USADA, 2013). Any athlete that uses dietary supplements must understand that there are issues associated with supplement use. The use of nutritional supplements may lead to inadvertent doping as there confusion association with what constitutes a dietary supplement as well as potential side effects.

Confusion over supplement usage is a result of supplement manufacturers as they have been known to use misleading names when labeling ingredients, choose not to state the ingredient in the supplement, and inadvertently mislabel because of contamination (USADA, 2013). Products are promoted as being organic and natural, but most ingredients in supplements are far from manufactured or chemically derived sources

(Philen & Ortiz, 1992). Therefore, athletes must be aware when reading labels or advertisements on supplements before consuming any additive and trusting a manufacturer's claim. However, Senchina (2013) found that athletes will trust a manufacturer's claim when it comes to making decisions about whether to take supplements or what supplements to consume. Placing misguided faith in a product places the athlete in a disadvantageous position by not only wasting financial resources, but may expose them to other dangers such as inadvertent doping or other side effects (Tian et al., 2009).

Burke and Deakin (2006) found that when supplements are inadequately administered it may lead to side effects causing serious health problems. Further, there is a concern about the risks for high performance athletes taking dietary supplements and possible health concerns (Maughan, Depiesse, Geyer, & International Association of Athletics Federations, 2007). Tian et al., (2009) found that most athletes were concerned about potential side effects. Further, they found that 86.4% of athletes were unaware that supplements can adversely affect their health and 29.5% were certain they did not violate anti-doping regulations (Tian et al., 2009). These numbers could be even higher in bodybuilders as many pro and amateur bodybuilders engage in anabolic steroid, herbal, and protein supplement usage among others.

Kanayama, Hudson, and Pope (2008) found that the drive for muscularity correlates with anabolic steroid usage and puts men's mental and physical health at risk. The use of anabolic steroids may cause hypertension, cardiomyopathy, aggression, depression, and suicidal ideation (Kanayama et al., 2008). Similarly, the efficacy and

safety of herbal supplements is under scrutiny (Senchina, 2013). Herbal supplements may improve both human health and athletic performance, but the potential benefits are influenced by preclinical factors (Senchina, 2013). Research has indicated that adverse events in supplement usage and prescription drugs have been found. A study by Timbo et al., (2006) concerning risk of supplement use and prescription drugs found:

- More adverse events for individuals that used nutritional supplements with prescriptions drugs than those that did not
- There are potential adverse interactions when supplements are taken with prescription drugs
- Individuals that consumed both supplements and prescription drugs needed to report the use of dietary supplements to health care professionals
- Individuals taking nutritional supplements and prescription drugs do not always inform health care professionals
- One out of three supplement users with adverse events used supplements instead of prescription drugs to prevent a health condition
- One out of five used supplements over prescription drugs without adverse events
- Multivitamins caused 13% of the adverse events to be reported.

Supplement use in protein has come under scrutiny over the regarding how much is actual usable protein in the product. Columbu and Fragomeni (1985) specified that the average content of most brands ranges between 40 and 70 percent protein, some higher-

quality products may supply as much as 65-75 percent. This is because the remaining product that is not protein consists of ingredients to stabilize the protein and prevent it from spoiling (Columbu & Fragomeni, 1985). As of today, this continues to be the trend in sports drinks and jugs of protein. Further issue concerning risks of protein is the dosage level. Dosages of whey protein published in clinical trials range anywhere from 30 grams to as much as 90 grams daily (Whey Protein, 2008). However, Metges and Barth (2000) found that the effects of high protein nutrient intake for long-term periods of time may have difficult consequences to judge due to relative short term research studies. Further toxicity of whey protein concerns individuals with milk allergies as it may not be suitable (Whey Protein, 2008).

#### *Reasons for supplement use among amateur bodybuilders*

Research investigations indicate that a wide range of factors influence an athlete's decision to use nutritional supplements. Survey results have shown that nutritional supplements have been taken to improve performance, increase strength, stimulate muscle growth, increase strength, improve performance, provide recovery after intense exercise, boost energy levels, aide in weight loss, and provide special nutrient demands for high levels of activity (Ziegler, Nelson, & Jonnalagadda, 2003; Slater et al., 2003; Morrison et al., 2004; Froiland et al, 2004, Dascombe, Karunaratna, Cartoon, Fergie, & Goodman, 2010; Lun et al., 2012). As the research indicates, individual supplement use occurs for a variety of reasons. Differences in supplementation practices may exist depending on age, gender, and reason for exercise. Societal pressure has also been found

to influence the supplementation practices of athletes in Western fitness culture (Mullis, 2000).

Sociocultural contexts that idealize muscularity may encourage an image of aesthetic muscularity (McCreary & Sasse, 2000). Smolak, Murmen, and Thompson (2005) documented that media and peer influence the image and behaviors regarding the drive and tendencies for developing muscularity. Given the connections between low self-esteem and public health (Vartanian et al., 2001), one can assume that supplementation usage is affected in amateur bodybuilders as bodybuilding is a sport centered on an aesthetic ideal. Bodybuilders, amateur and professional, will utilize any means necessary to win, often disregarding physical health or emotional wellbeing in a “win at all costs” philosophy (Heywood, 1998). This philosophy parallels a rise in anabolic steroid use (Pope et al., 2000) and also coincides with a rise in bodybuilding popularity, participation, and supplement usage. With an increasing use of supplements, it is vital to realize the fundamental motives for adoption of this behavior.

A study on gym users found that 49.1% chose them to build muscle, 38.4% to prevent future illness, 36.1% to increase energy, 24.4% to improve performance in a sport, 22.4% to gain strength, and 20.5% to aid in recuperation (Morrison et al., 2004). Another study found that 48% have attributed growth to the use of supplements, 44% for health purposes, 31% to enhanced performance, 28% percent to reduced tiredness, and 28 percent to muscle development (Bean, 2007). Parish et al., (2010) documented that bodybuilders engage in the sport for health, self-esteem, and emulation purposes. Thus, it appears central reasons in amateur bodybuilder supplementation usage are: aiding

health, increasing muscular mass to appear aesthetically pleasing, improving performance, energy, and recovery, prevention against nutritional deficiencies, as well as self-esteem purposes, emulation and steroid usage.

*Aiding health.*

Individuals involved in bodybuilding believe the sport to be healthy and cite health reasons for participation (Parish et al., 2010). Research shows that bodybuilders often use the sport as a health related motivator to gain and lose weight, add muscle mass, and reduce body fat (Perine, 2008). Marangopoulos (2008) supported this noting that bodybuilding diets and supplements serve as a motivation for participation in the sport. Individuals that used supplements and followed a bodybuilding diet believed it leads to a healthier physical state (Andersen, Barlett, Morgan, & Brownell, 1998).

Karimian & Esfhani (2011) reported that as many as 45% of bodybuilders cited health as a reason for involvement and 40% cited using supplements to enhance their immune system. Previous studies, found similar results as athletes and bodybuilders have reported using minerals, vitamins and other supplements for health related reasons (Sobal & Marquart, 1994; Froiland et al., 2004; Antonio et al., 2008). Bodybuilders or athletes may use supplements in an effort to combat the physical stress of exercise which forces the body to adapt by increasing muscle mass, optimizing metabolism, and improving motor performance (Senchina, 2013).

*Increasing muscularity.*

A perceived benefit of supplement use for bodybuilders is the ability to increase muscular attractiveness (Moore, 1997). Parent and Moradi (2011) documented that the

pursuit of the male muscular ideal is not exclusively attributed to athletic competition, but may also be influenced by personal motives. Adding muscularity requires both an effective training program and precise supplementation. A bodybuilder's appetite naturally increases with training and satisfying it by indiscriminately eating calories will add size. Athletes typically use protein and weight gain supplements to improve muscularity (Froiland et al., 2004), but supplementing the wrong type of substance at the wrong times may not only increase muscularity and mass, but add body fat. Increased size is a benefit, but the goal of bodybuilders and athletes is to increase lean muscle mass and minimize fat accumulation (Krumbach et al., 1999; Lun et al., 2012).

*Improving performance, energy, and recovery.*

The volume and intensity of a bodybuilder's training in attaining muscular mass and definition increases the demand for nutrients (Masedu, Ziruolo, Valenti, & Di Giulio, 2012). Research indicates that amateur bodybuilders are motivated to meet these demands by using dietary supplements in order to improve performance, increase energy, and enhance recovery (Karimian, & Esfhani, 2011). Bodybuilders able to recover faster by supplementing before and after training have exhibited elevated testosterone levels pre- and post-workout allowing more energy to put into a workout (Masedu et al., 2012). Also, bodybuilders aim to boost muscle glycogen recovery post-exercise using various supplements such as protein, creatine, and caffeine as a main motivation towards supplement use (Schneider & Hong, 2007). Investigations into athletes also exposed the use supplements to augment performance (Sobal & Marquart, 1994; Krumbach et al., 1999), to increase strength (Froiland et al., 2004), to increase energy (Ranelli, Dickerson,

& White, 1993; Sobal & Marquart, 1994, Krumbach et al., 1999; Froiland et al., 2004; Lun et al., 2012), and to enhance recovery (Lun et al., 2012).

*Prevention against nutritional deficiencies.*

Bodybuilders have been found to use copious amounts of protein supplements at each and every meal to acquire larger amounts of macronutrients and amino acids in order to build more muscle and prohibit nutritional deficiencies (Masedu et al., 2012). Likewise, athletes have been found to compensate for inadequate diet and special nutrient demands from high levels of physical activity by using supplement consumption (Nieman et al., 1989; Ranelli et al., 1993, Sobal & Marquart, 1994; Krumbach et al., 1999, Froiland et al., 2004, Karimian & Esfhani, 2011; Lun et al., 2012).

*Self-esteem.*

A general consensus among researchers shows that self-esteem is a primary motivator in why athletes choose bodybuilding (Parish et al., 2010). Weigers (1998) detailed that 81% of participants believed bodybuilding enhanced their sense of masculinity. Weigers (1998) noted that bodybuilding increased their self-confidence in regard to body size, strength, appropriate masculine behavior and attractiveness. Klein (2007) speculated that to achieve the ideal muscular image bodybuilders will escalate their regime to enhance their self-worth. Parish et al., (2010) note the non-acceptance of their current body compared to the masculine ideal stems from the fact regardless of how big someone gets they will always find someone they view as bigger.

*Emulation and anabolic steroid usage.*

Emulation is a concept that comes from an individual's perception of what society deems to be the ideal muscular image (Klein, 2007). Klein (2007) asserts that bodybuilding has created an idolized muscular physique as the sociocultural norm in Western fitness. Leit et al., (2002) discussed the impact of sociocultural influences which may motivate an individual to participate in bodybuilding. For example, amateur bodybuilders may be motivated to use supplements when a well-known professional bodybuilder uses supplements as influence from an ideal muscular physique has been found to persuade emulation into bodybuilder behaviors (Leit et al., 2002; Pearl, 2005). Equally, the exaggerated admiration of male fictional heroes in comic books has been found to relate with emulation behavior (Parish et al., 2010). Further, a relationship exists between steroid use among young bodybuilders and a desire to emulate older bodybuilding heroes (Parish et al., 2010). Klein (1993) in his study cited:

“A highly respected and widely recognized bodybuilder told me that he had a one time taken steroids-synthetic male hormones condemned by the sport’s establishment-but that he no longer used them. He claimed he had mastered the intricacies of diet and training, and he earnestly gave me a detailed account of his diet and regimen. A few days later I noticed a group of bodybuilders huddled over the latest issue of *Muscle and Fitness*. The bodybuilder in question, flanked by his friends, was poring over the magazine and commenting on each picture. When he reached the advice column he writes, he read – in the high pitched voice of an adolescent – a question sent in by a teenager from Pontiac, Michigan, concerning what steroids were best to take. Laughter all around. He then read his reply: “Don’t destroy yourself. If you want a physique like mine, don’t take shortcuts.” Convulsing laughter. “I didn’t win my titles by taking drugs. Chemicals are no substitute for hard work.” He would have continued, except that he was wiping tears from his eyes and his friends were on the floor.”

It is logical to assume that many bodybuilders use or may seriously consider using anabolic steroids due to the emphasis on muscular size, symmetrical development, and aesthetically pleasing definition in the subculture of the sport (Blouin & Goldfield, 1995; Peters & Phelps, 2001). Research supports this as there is a link between muscularity and the intention to use anabolic steroids (Parent & Moradi, 2011). Individuals driven to attain an ideal muscular physique may feel the need to use anabolic steroids to achieve the image they desire (Peters & Phelps, 2001; Parent & Moradi, 2011). The desired outcome from anabolic steroid use is to improve physical appearance or attractiveness, increase confidence, and increase physical size (Wright, Grogan, & Hunter, 2001; Parent & Moradi, 2011; Santos, da Rocha, da Silva, 2011).

#### *Sources of knowledge about supplements*

The increase in sport specific nutrition has led to an increase in purported performance enhancing supplements (Bosse & Dixon, 2012). This increase in the sport supplement field has led athletes to question which supplement to use and how to obtain credible information about supplements. Often athletes will choose to use themselves as a source for information when seeking the use of supplements (Dascombe et al., 2010). Further, bodybuilders of all groups have been found to acquire information regarding supplement use from friends, fellow bodybuilders, the media, internet, dietitians and physicians (Thorne & Embleton, 2000). Varying information and sources about supplementation has fostered a dearth of credible knowledge regarding supplementation practices.

Nieper (2005) found that many athletes using supplements need further education about usage and indicate they have poor knowledge on the subject. Dascombe et al., (2010) stated only slightly more than half of athletes possess in-depth knowledge on their chosen supplements and the rest remained uneducated about their nutritional supplement routine. This coincides with Slater, Tan, & Teh (2003) as it was reported 60% athletes were found to have no or narrow knowledge concerning supplements. Likewise, 36.3% of supplement users had either no or minimal knowledge about the supplements they purchased or consumed (Tian et al., 2009). 93% of athletes have indicated they would like to know more about supplements, but were uncertain of where to obtain reliable information (Tian et al., 2009). Similarly, Karimian and Esfahani (2011) found that 48% of bodybuilders believed they had an average knowledge of supplements, but desired more information about their usage. Athletes and bodybuilders which have received more knowledge about supplements were found to be more likely to use them (Tian et al., 2009). The most frequent explanation for not seeking further information about supplement usage by athletes was they believed the product to be safe since it is common available (Tian et al., 2009).

The source of information for supplement usage varies among bodybuilders. Krumbach, Ellis, and Driskell (1999) found that athletes were more likely to use themselves as providing information about supplements. Dascombe et al., (2010) reported that even if athletes had a limited knowledge regarding information on supplement usage they would still rely on their own opinion and research when using nutritional supplements. Most commonly athletes find information about supplements

through coaches after using oneself. Karimain and Esfahani (2011) found that coaches have the greatest influence on supplementation. Tian et al., (2009) and Froiland et al., (2004) also found that athletes may gather knowledge of information about supplements through a strength or athletic coach. Other ways for obtaining information or choosing to take supplements includes the recommendation by a family members, fellow athletes and friends (Dascombe et al., 2010). Krumach et al., (1999) found that a friend or family member were the most likely way an athlete would obtain information about supplements. Froiland et al., (2004) discovered that 32.4% of athletes obtained information from family members, 31.9% of athletes obtained information from fellow athletes, and 28.5% gathered information from friends.

Frequently, dieticians, physicians, nutritionists, and pharmacists were typically not methods in which many athletes chose to obtain supplement information (Krumbach et al., 1999). Athletes were found not to be influenced by dieticians and medical practitioners on supplement usage (Dascombe, et al., 2010). Lun et al., (2012) highlight this effect as in their study, physicians were rated the 8th source of information and dieticians were rated the 16th source of information. Other research by Froiland et al., (2004) indicated only 28.5% obtain supplement information from a registered dietician and less than 10% reported a pharmacist. Healthcare professionals in general and textbooks were used less than 18% of the time (Tian et al., 2009). Many bodybuilders had direct access to a nutritionist, but 72% chose to underuse the resource (Karimian & Esfahani, 2011). A study conducted among college athletes found that the internet was the most popular source for information about supplements (Malinauskas, Overton,

Carraway, & Cash, 2007). Similar research noted that athletes obtained information from a questionable source such as the media or internet. Froiland et al. (2004) found that males use recommendations from television or a magazine concerning supplement usage.

Supplement knowledge amongst gender also varied. A study on dietary supplements found males were more likely than females to research a product before purchase (Tian et al., 2009). However, parents and teammates were the strongest influence on a female student-athletes supplementation decisions (Housman, Dorman, Pruitt, Ranjita, & Perko, 2011). This is consistent with previous findings by Froiland et al., (2004) which noted female athletes have been found to be more likely to obtain information or recommendations from family members. Female athletes were also significantly affected by their perceptions of what others thought of their supplementation behavior (Housman et al, 2011).

The indicated low level of knowledge about supplements should raise doubts and concerns about their usage. Limiting the availability of dietary supplements to athletes is not the answer (Schwarzenegger, 2005). Often, dietary supplements that are performance enhancing have been placed in the same category as anabolic steroids due to lack of knowledge (Schwarzenegger, 2005). The result of this has led many athletes to be unsure of what supplements to use. Bodybuilders should seek sound nutritional education before using any kind of supplementation to enhance their physical performance or appearance. Further investigations regarding supplement knowledge for bodybuilders is warranted.

### *Theories to understand bodybuilder supplement use*

Using theory provides the ability to have a practical framework for analysis and facilitates development toward a solution (Wacker, 1998). Theory has the capability to take different domains and find similarities in that scientific area (Wacker, 1998).

Applying theory to bodybuilding supplementation use will allow insight into behavior tendencies. Theory will be applied directly to the sport of bodybuilding in order to gain insight towards supplement use by amateur bodybuilders.

#### *Social learning theory.*

Bodybuilding may be construed as a sport that affects its participants through modeling. Bandura (1977) wanted to understand how imitation and modeling may influence behavioral choices. Bandura stated that the model of imitation may be setting the example intentionally or unintentionally. This aspect consequently, is most likely the case in the history of bodybuilding. Professional bodybuilders in the history of the sport always appeared to society as Greek-like statues of dominance. They were revered for their bodies and physical stature. This power and desire often appeared attractive to other future bodybuilders and in essence helped developed the sport. The history of bodybuilding shows how current bodybuilders were influenced by Arnold Schwarzenegger, who himself was influenced by Steve Reeves and Reg Park, who themselves were influenced by Eugene Sandow. As such it can be said that Sandow along with the others impacted the sport of bodybuilding by modeling, either intentionally or unintentionally.

*Phenomenology.*

Phenomenology studies people and uses a first person point of view to seek information in how they experience things, have consciousness, and attempts to understand the way meanings are applied to those experiences (Smith, 2011). Creswell (2007) describes a phenomenological experience as garnering insight into how meanings, understandings, and perceptions are negotiated and constructed during situated social interactions of one or several individuals. The purpose is to use the experiences with the phenomenon and create a detailed depiction of its essence (Creswell, 2007). Detailed literature by (Carman, 2001) studies the lived experiences of bodybuilding and asks the question if bodybuilding is healthy or not. Similar research studies (Klein, 1993; Pope et al., 2000; Carman, 2001; and Ridgeway & Tylka, 2005) focus on the social identification of bodybuilders in an attempt to understand perceptions and attitudes about body image, steroid usage, supplementation usage, and nutritional diets. Further, experiences such as setting a personal lifting record, achieving a “pump,” using anabolic steroids, consuming caffeinated supplements to feel a “rush”, training with other bodybuilders, competing in a bodybuilding competition, winning a bodybuilding competition, or exploring what the concept of bodybuilding means to an individual constitutes as phenomena worth investigating in bodybuilders.

*Serious leisure.*

Robert Stebbins (1992) described serious leisure as the systematic pursuit of an amateur or volunteer activity that participants find so interesting they launch themselves on a career in acquiring and expressing the special skills, knowledge, and experience

required to live the lifestyle. The very concept of bodybuilding is serious leisure. Bodybuilding is a specialized field that one becomes involved to the point that other areas of their life begin to be neglected. The commitment to bodybuilding forces the relinquishment of choice, a component of serious leisure (Stebbins, 1992), as individuals frantically aspire to look bigger, look stronger, get bigger, and get stronger. As the activity becomes more serious in its importance to an individual, inconveniences and social constraints may cause individuals to feel that their live is being negatively impacted by activities (Stebbins, 1992). By feeling obligated to bodybuilding or the desire to be at the top of bodybuilding, one may have to abandon “choices” in their lives. This abandonment will serve to deepen the experience in bodybuilding.

## CHAPTER III

### Methodology

In this research, amateur bodybuilders were interviewed in an effort to extend the knowledge base regarding supplementation use in the sport of bodybuilding. Specifically, the purpose of this research is to investigative the dietary supplementation perceptions, knowledge, and attitudes among amateur bodybuilders. Further, this research addresses the phenomenon of bodybuilding and attempts to evaluate amateur bodybuilder supplement usage in an effort to understand why individuals choose to engage in supplementation behavior. This chapter presents the research methodology utilized during the investigation to assess amateur bodybuilders' perceptions, knowledge, and attitudes of supplements.

#### *Qualitative approach*

Qualitative research makes inquiries into the meaning individuals or groups ascribe to a social or human problem (Creswell, 2007). Qualitative researchers attempt to study a problem or interpret phenomena in terms of the meanings people bring to them (Denzin & Lincoln, 2005). To study a problem, qualitative researchers collect data in a natural setting to the people and places under study (Creswell, 2007). Methodologically, qualitative researchers conduct various degrees of interviews, field observations, and collect documents and audiovisual materials (Johnson & Chistensen, 2008). The collective analysis of these data sources allows the researcher to develop an understanding of the phenomena being studied through an inductive process (Mills, Duprepos, & Wiebe, 2010). The inductive process of data analysis involves the

researcher building patterns, categories, and themes from a bottom up approach by organizing the data into increasingly more abstract information. This process may also include participant collaboration to shape the data (Mills et al., 2010). The final written report consists of a complex description of the problem, the voices of participants, and the reflexivity of the researcher (Creswell, 2007).

This study seeks to utilize a qualitative approach as it is the best way to address the research question. A qualitative approach allows the researcher to make a rich description and provide meaning on amateur bodybuilder supplementation usage. Specifically, the researcher can examine how amateur bodybuilders understand, make sense of, and justify supplement usage. Qualitative methods will allow for an attempt to understand what motivates or drives this behavior through the utilization of open-ended in-depth interviews. It will allow for sensitizing concepts to guide the researcher's observations (Blumer, 1954). Specifically, the researcher seeks to understand concepts behind the questions of:

- What is the definition of body image to amateur bodybuilders?
- How does body image lead to supplementation usage?
- Where does this image come from?
- What motivates the usage of supplements?
- How do perceptions influence amateur bodybuilders?
- What role does the supplement industry play in usage?

### *Case study approach*

Case study research offers a means of investigating complex, real-life situations, consisting of multiple variables through rich accounts of a phenomenon through a detailed exploration (Denzin & Lincoln, 2005). The qualitative approach to case studies may involve the exploration of a single individual, several individuals, a group, an entire program, or an activity over time through a detailed and in-depth data collection process (Creswell, 2007). Case study methods utilize multiple sources of information such as interviews, observations, documents, and audiovisual materials to report case based themes about the participants and phenomenon (Creswell, 2007). These sources allow for rich detailed data to explain phenomenon (Mills et al., 2010). However, there are certain limitations that apply to case study research.

Limitations of representativeness are a validity concern to case studies as the sample being studied is a relatively small number of cases compared to the population (Creswell, 2007). However, sample validity within case study research is of more concern to qualitative researchers than threats to limitations of representativeness (Gerring, 2007). Literature suggests several measures to increase the soundness of qualitative case study research by applying the design tests of validity and reliability. For validity, Denzin & Lincoln (2005) suggests authenticity by clarifying any researcher bias, involve the participants in all phases of the research, and interview knowledgeable participants to provide more in-depth data. Biddle et al. (2001) noted that readers should be provided with a chance to interpret, understand, and evaluate data in a meaningful

manner. For reliability, Creswell (2007) states that reliability can be enhanced if the researcher applies five steps:

1. Obtain field notes by completing a detailed transcript from research tapes
2. Examine the extent to which the data collection and analysis techniques are administered
3. Ask whether the researcher's assumptions are made explicit
4. Wonder whether the study has overall warrant
5. The study must both inform and improve practice in protecting confidentiality for the participants.

Case studies are also limited by the integrity of the investigator. The researcher must fully allow the participants to be themselves. Further, the researcher is left to rely on his or her instincts and abilities as the primary instrument in data collection and analysis. Time and monetary constraints for the researcher in trying to provide detailed accounts of a phenomenon are a factor as well (Denzin & Lincoln, 2005). The researcher must decide on five key factors when dealing with the constraints of case study research:

1. How much to make the report a story
2. How much to compare with other cases
3. How much to formalize generalizations
4. How much description of the researcher to include in the report
5. Whether or not and how much to protect anonymity (Denzin & Lincoln, 2005).

Cases may also be distinguished in terms of the intent of the case analysis (Denzin & Lincoln, 2005). Three variations exist in terms of intent: the single case study, the collective case, and the intrinsic case study (Creswell, 2007). A collective case study approach enables the researcher to explore similarities and differences between cases in an effort to predict similar results and contrasting results for different reasons (Yin, 2003). The focus on a singular case and replication creates an issue with generalizability (Denzin & Lincoln, 2005). Qualitative researchers are reluctant to generalize from one case to another as the contexts of each individual case differentiate (Creswell, 2007). Using a purposeful sampling strategy requires the researcher to establish a rationale for selecting the case and for gathering information about the case (Creswell, 2007). However, in the purpose of this study, to best generalize about supplementation behaviors of amateur bodybuilders, select representative cases were required.

#### *Rationale for collective case study research design*

Due to a lack of knowledge concerning amateur bodybuilders' perceptions, knowledge, and attitudes of supplements, this study was deemed best suited to qualitative methods. Qualitative research has been depicted as an explorative approach to inquiry that offers descriptive data to uncover meanings people assign to human phenomenon (Silverman, 2006). Specifically, collective case study research offers a format for examining the lived experiences of participants including their beliefs, feelings, and assumptions (Creswell, 2007). Research by Yin (2003) states a case should be utilized when the focus of the study is to answer why or how research questions.

At the center of this study, this research seeks to understand the how and why supplementation practices among amateur bodybuilders. Therefore, the collective case study method was determined to be the best way to address the research problem. The collection of descriptive data from various perspectives will help promote a greater understanding of amateur bodybuilders' perceptions, knowledge, and attitudes of supplements. Furthermore, the specific method of interviews encourages individuals at a personal level to provide a descriptive and detailed account of their experiences (Kvale & Brinkmann, 2008). As such, interviews were selected to investigate amateur bodybuilders' perceptions, knowledge, and attitudes of supplementation.

The methods chosen to clarify participants' supplementation usage involved developing codes, categories, and themes inductively rather than imposing predetermined classifications on the data (Strauss & Corbin, 1998). Denzin and Lincoln (2005) stated that a case study is a good approach when the inquirer has clearly identifiable cases with boundaries and seeks to provide an in-depth analysis or comparison of the cases. A focus on themes provides the researcher the ability to understand the complexity of the case (Yin, 2003). Further, finding common themes that transcend cases allows for the comparison of several cases (Denzin & Lincoln, 2005). The exploration of themes among amateur bodybuilders' perceptions, knowledge, and attitudes of supplements taps into personal experiences not previously studied.

### *Participants*

To address the aim of this study a purposeful sampling technique was used to solicit participants that were amateur bodybuilders in status. Purposeful sampling

method may be utilized in qualitative research when there are a limited number of people in the research area (Creswell, 2007). Inclusion criteria were as follows: participants must not have previously won an accredited National Physique Committee (NPC) or International Federation of Bodybuilders (IFBB) at the local, state, regional, or national level bodybuilding competition; participants must be in the process of training for an upcoming NPC or IFBB accredited local, state, regional, or national level bodybuilding competition in the next twelve months; participants must be adult males. Justification for inclusion criteria is a result of the researcher seeking to limit the study to: amateur bodybuilders; amateur bodybuilders seeking competition in twelve months as this may influence supplementation usage; and adult males due to the male dominant culture (Carman, 2001) of the sport. By limiting the study to a purposeful sample of adult male amateur bodybuilders, the researcher defines a homogeneous group in an effort to make traits most evident.

The sample consisted of thirty ( $N = 30$ ) adult male amateur bodybuilders who ranged in age from 20 to 34 years ( $M = 22.93$ ,  $SD = 3.42$ ). The number of years involved in bodybuilding ranged from 2 to 15 years ( $M = 3.31$ ,  $SD = 2.82$ ). The age at which involvement with bodybuilding began ranged from 15 to 26 years ( $M = 18.40$ ,  $SD = 3.25$ ). The number of hours spent per day in the gym training ranged from 45 to 120 minutes ( $M = 77.16$ ,  $SD = 26.84$ ). In terms of sample size, Creswell (2007) states that the researcher typically conducts twenty to thirty interviews to collect interview data to saturate the categories or find information that continues to add to themes until no more can be found. The sample size of this study, thirty ( $N = 30$ ) adult male amateur

bodybuilders, was considered an appropriate number because enough information was gathered to fully saturate the data. To protect participant confidentiality, participants were guaranteed that data obtained would only be available to the primary researcher and pseudonyms are used throughout the results of the study to protect confidentiality.

#### *Procedure*

After receiving approval from the University's Institutional Review Board for the study, participants were recruited via cover letter flyers that were posted in local gyms. Recruitment information indicated that the study sought adult male amateur bodybuilders' to explore their respective perceptions, knowledge, and attitudes of supplementation usage through the use of a selection of open-ended interview questions. Interested participants called or e-mailed the author in order to participate in a brief telephone screening to determine whether the person met the study criteria. Participants were asked to identify if they were adult male amateur bodybuilders, describe their current use of supplements, report their plans on competition, and classify if they previously won a sanctioned IFBB or NPC competition at the state, regional, or national level.

In total, thirty-three individuals contacted the author to express interest in the study. All thirty-three individuals completed the screening interview, met the study criteria, and scheduled interviews. Ultimately, thirty ( $N = 30$ ) participants were interviewed as three declined further participation after being contacted by the author. Each participant reviewed the informed consent, found in Appendix A, with the

interviewer and signed the documentation before being allowed to participate. No compensation was given to participants for their participation within the study.

#### *Interview guide*

A four section interview guide was developed by the researcher to help investigate the research question (see Appendix B). Section one provided participants with information about the study, its purpose, and informed consent documentation. Section two consisted of general introductory questions (e.g., How long have you been into bodybuilding? Why did you get into bodybuilding?) to get participants to talk about themselves. Section three explored more specific contexts with open-ended questions and probes (e.g., What types of supplements do you take? How satisfied are you with the supplements you are currently taking? How often do you switch up supplement types and brands? Do you feel you need supplements to achieve the body you want?) to gauge perceptions of supplement usage. Section four encouraged the participants to voice any further issues and also evaluated the efficacy of the interview. The open-ended questions and varied order of questioning allowed for the interview to be structured in a flow of conversation the participants deemed appropriate. Interview transcripts and content were discussed and coded by the researcher after each interview was completed, allowing for questions and probes to evolve through the data collection process.

#### *Data analysis*

The data consisted of over thirty hours of audiotape with a digital recorder, which documented all thirty interviews. The interviews ranged in duration from 58 to 63 minutes ( $M = 60.17$ ,  $SD = 1.12$ ) and all of the audiotapes were transcribed verbatim by

the author. In addition, hand-written field notes were taken and Dragon Dictation software through an Apple iPad was utilized for each interview process. Each interview was conducted by the author and each interview took place at the local gym of the participant. The interviews were then conducted inside the facility in a waiting area. The interviews were completed from September 2013 to October 2013 and the author immediately began transcribing the data. Due to a lack of information on the perceptions, knowledge, and attitudes of supplementation usage regarding amateur bodybuilders, the focus of themes was utilized to understand the complexity of the cases.

Transcribed interviews were coded into three phases that led to themes using data analysis methods described by Strauss and Corbin (1998). The first stage involved the researcher beginning with an inductive approach through the use of open coding. The appeal to this method is that it limits researchers from incorrectly making preconceived results (Strauss & Corbin, 1998). The initial phase of open coding involved a line-by-line analysis where the researcher places each piece of data into as many codes and categories of information that seemed relevant (Strauss & Corbin, 1998). The examination of this data, and subsequent placing into codes and categories, was text made up of participant's words, phrases, and sentences (Strauss & Corbin, 1998). Each new data item was compared and contrasted to previously coded data to determine into which coding categories it most reasonably fit (Creswell, 2007).

After the transcripts were coded using open coding, the researcher moved into the axial phase. Axial coding involved placing the codes into higher order categories created by merging, connecting, and relating the initial coding categories produced during the

open coding phase (Strauss & Corbin, 1998). The creation of higher order categories allowed for the researcher to look for patterns and relationships among categories (Strauss & Corbin, 1998). Selective coding involved combining and narrowing axial codes to extract main themes into a theoretical model (Strauss & Corbin, 1998). Codes and categories were sorted, compared, and contrasted until all data was saturated. The researcher went back to the data one last time to determine if the themes extracted during coding and analysis still fit the data. Accountability was achieved through ongoing consultation with participants by maintaining an audit trail that outlined the research process and the evolution of codes, categories, and theory (Creswell, 2007). Because of the human bias toward conformation (Creswell, 2007), the 30 participants within the study were allowed to review their answers and provide feedback on the results. No participant requested changes.

The researcher then used domain analysis to focus on identifying common themes and subthemes in the data to arrange hierarchically. Domain analysis involves reviewing the researcher's observations, interviews, and field notes to explore specific domains associated in cultural situations (Spradley, 1980). Domain analysis seeks to explain a semantic relationship between a cover term and included terms (Spradley, 1980). For the purposes of this study, Spradley's "Rationale X is a reason for doing Y" (Spradley, 1980). Ultimately, asserting that the way amateur bodybuilder's view body image is a reason for taking supplements. The researcher sought to do this by ensuring that the domain defined reflected the participant's responses and not the researcher's own pre-defined set of categories (Atkinson & Abu El Haj, 1996). After identifying the primary

categories, the researcher identified subsets of topics in the domain to create a taxonomy to discover how the terms share a relationship (Atkinson & Abu El Haj, 1996). The taxonomy for this study may be found in Appendix C. A specified component of analysis was applied by the researcher through identifying participant responses in the form of direct quotations (Atkinson & Abu El Haj, 1996) to summarize the content of supplementation usage. Finally, the relationships were identified between all categories and the research question in an attempt to build an overall picture (Atkinson & Abu El Haj, 1996) of supplementation usage among adult male amateur bodybuilders.

## CHAPTER IV

### Results

Interviews with thirty ( $N = 30$ ) amateur bodybuilders indicate that bodybuilders take nutritional supplements for three primary reasons: (1) to help them achieve an ideal body; (2) to increase their strength and enhance their performance; and (3) because they believe the positive benefits outweigh possible negative consequences.

#### *Themes*

##### *To help them achieve an ideal body.*

Eight types of reasons for supplement usage emerged from the data, which ultimately led to certain phenomenological experiences related to body image (see Appendix C). These reasons were (1) bodybuilders in the study were, in general, dissatisfied with their bodies; (2) dissatisfaction may be broad based or focus on specific aspects of their body; (3) dissatisfaction is rooted in their desire to attain “the perfect body” as constructed and presented by the bodybuilding culture and the media; (4) many bodybuilders base perceptions of their body image from how they view themselves and how others view them; (5) since their ideal is practically unattainable, few bodybuilders are ever satisfied with their physical appearance and are constantly striving to improve; (6) many bodybuilders invest significant time and energy in an effort to reach this ideal, to the point of obsession; (7) many bodybuilders emphasize nutrition as a way of reaching this ideal; and (8) many bodybuilders use various legal and illegal supplements to reach this ideal.

Dissatisfaction in body image was commonplace among all bodybuilders in this study as most felt they could improve upon their physique. Frank (all names used are pseudonyms) shared a belief personifying many bodybuilders within the study by stating, “On a scale of one to ten, I would say I am only at a six in terms of happiness in my overall muscle appearance.” Frank is an avid bodybuilder who has been lifting weights for three years, trains six times a week currently, and regularly uses supplements. “I feel that I am just ok at the moment... There are things I can improve upon.” His struggle in satisfaction with appearance sets the stage for beliefs of other bodybuilders. Nick, who has been training over two years comments, “There is always room for improvement in my body... Right now, it is just not where I want it to be... The moment I am satisfied in my appearance is the moment I no longer get better.” His dissatisfaction was “acknowledged daily” by looking in the mirror at home and at the gym. Nick stated the following after disclosing his “acknowledged daily” comment, “I know that I look fine for a normal person, or even a fit person, but I want to look great as a bodybuilder.” This look is part of an underlying cause of broad-based dissatisfaction that seems to converge around specific aspects relegated to body dissatisfaction.

The second reason consisted of those various and specific forms or aspects of body image dissatisfaction that existed with each bodybuilder. Dissatisfaction ranged from the size of muscles, the overall tone and muscular appearance of the physique, the amount each bodybuilder weighed, and the amount of fat each bodybuilder felt they exhibited; forming the foundation for which bodybuilders perceive dissatisfaction with their bodies. These forms of dissatisfaction were classified into two categories: (a)

insufficient muscle size or tone and (b) a desire to increase bodyweight and an aspiration to decrease body fat. Insufficient muscle size or tone feelings were depicted by bodybuilders as not always the whole body, but rather specific areas. Steve provided a detailed illustration about the size and tone of his muscular leg development:

I am completely pleased with everything other than my legs. They are not little, but compared to my upper body I look disproportional. Really, I feel proportional in my legs, but I want more muscle mass in my hams and more definition in my quads...

Similar size concerns about the muscular development of chest were depicted by Lou stating, "I am satisfied with my muscle tone, but I could use a few more inches in my chest." These thoughts centering on the need for an increase in muscle mass led many bodybuilders studied in this research to believe they needed to increase bodyweight. Steve said, "I feel confident in my appearance in the gym... I basically have great genetics... but I know I need to gain weight to continue to get bigger." Even when bodybuilders felt satisfied with their overall appearance, in general, they still desired to "add quality weight," as Luke replied. All thirty participants experienced some form of dissatisfaction with muscle size and tone.

Increasing bodyweight and aspirations to decrease body fat, also experienced by all participants, included using supplements to augment the body. All thirty bodybuilders noted using a protein supplement to increase bodyweight. Steve commented, "I want to make my chest larger and I have seen significant progress over the years when using protein drinks." He further stated, "I feel I need protein powders to really bulk up... I want my appearance to have that thick and grainy look." Chris said he consumes protein shakes in an effort to "add pounds" and "be heavier." The majority of bodybuilders

acknowledged wanting to lose body fat and specifically mentioned body fat around the abdominal area as particularly troublesome to eliminate. “My abs is always a tough area for me... I feel men tend to store more fat in the abdominal region as compared to other areas of the body,” replied Dan. Some bodybuilders utilized the term “cutter,” which stands as a slang term for a supplement known as a diuretic agent that assists in losing bodyweight and body fat. Dan said, “I would like to shed a little more body fat... I’d like to use a cutter to shred down a little in the mid to low 240 pounds.” All thirty participants said they would use a diuretic agent in an attempt to lose body fat.

The third reason was bodybuilder body image dissatisfaction is rooted in their desire to attain “the perfect body” as constructed and presented by the bodybuilding culture and the media. This resulted in two core categories of subjective phenomena as reported by participants: (a) amateur bodybuilders desire to look like professional bodybuilders and (b) bodybuilders desire to look like sculptures of art. These categories support and extend Klein (1993) depictions of bodybuilders, in which Klein found males are drawn to bodybuilding by the lure of achieving the societal ideal of the perfect male image, attempt to sustain self-worth through the sport, and want to be the to be the individuals in the magazines. This research indicates that all bodybuilders seek the perfect male image as deemed professional bodybuilders possess. Most, but not all, of the bodybuilders in this study viewed the physiques as works of art.

Media and bodybuilding culture has driven most of the bodybuilders to experience dissatisfaction. John highlighted this phenomena when he said, “I would like to have a bigger, stronger, better looking body... like the top pro bodybuilders... the ones

on the cover of the magazines.” The image of professional bodybuilders was deeply entrenched in all participants. Robert discussed how he bought bodybuilding magazines in addition to his workouts for “three months straight trying to get bigger.” One participant used a quote from Arnold Schwarzenegger about his thoughts on how professional bodybuilders are viewed differently from the general public and other athletes. “I always think of the Schwarzenegger quote, “I would hate to be the same as everybody else,” and I think that is what drives me in the body I want,” replied Sean.

In addition to wanting “the perfect body” as dictated by bodybuilding culture, participants experienced what was termed *bodybuilders desire to look like sculptures of art*. John provided an example of this by illustrating, “I see what the guys I idolize look like. They look like massive Greek statues.” Throughout the data, others echoed his words:

I look at bodybuilding as an art. It is a way to set goals to achieve a perfected image, like a sculpture or statue... I am never satisfied with how I look as I view myself as always under construction... I see the big time bodybuilders and that's the physique I am going after. (Bret)

Not only did Bret and John experience feelings of being dissatisfied in their appearance due to today’s bodybuilding culture, but they sought after the look of the ancient Greeks in being regarded as living works of art such as sculptures or statues.

The fourth reason is many bodybuilders base perception of their body image from how they view themselves and how others view them. These perceptions were influenced by particular contextual indicators related to dissatisfaction. These indicators included: (a) bodybuilders having feelings of skepticism about their size and (b) their realization others do not view them as small. Bodybuilders experienced feelings of

having small or inadequate muscles, viewed themselves as skinny, and had a general overall size and weight dissatisfaction. It is likely that many bodybuilders in this study shared traits with previous bodybuilders who suffered from a form of body image or body dysmorphic disorder (Goldfield et al., 2006). Brandon noted, “It is hard to feel big when you see your idols walking on stage weighing 285 pounds of ripped muscle with no body fat.” These feelings were nearly universal as David replied, “I weigh 260 pounds and find myself thinking I am just not that big.” One particular bodybuilder, Bill, reflected similar feelings in more detail, “I know my shoulders and arms are huge, but I feel like I neglected my upper chest when I started working out so it is taking awhile to catch up even though I wear an XXL shirt.” These feelings may stem from each participant’s previous lifestyle or body type. Chris provided an example as such when he said, “I got into bodybuilding and started using supplements because I was tired of being a skinny wimp. I became fascinated with how far the human body can be pushed. I was 6’1 and 155 lbs... I wanted to see a beast.”

While bodybuilders viewed themselves as small in stature, they realized that others, such as the general public, did not view them in that manner. They were either told or felt that others viewed them as big, huge, intimidating, strong, and reported individuals staring at their size. The data analysis revealed statements about size were still met with skepticism. “Now, a lot of people say, “You are huge,” but I really do not feel very big. I still look in the mirror and see the same person I used to be most of the time,” said Chris. Justin shared that, “People have told me I am one of the biggest and strongest guys they have ever seen... I do not see it.” Riley, who is 230 pounds, said that

“When I am in the gym I can feel people staring at me... I am not sure why. Am I too big or am I too small if they know I am a bodybuilder?” Bodybuilders seemed to mentally reframe the concept of their body image even after hearing other people acknowledge their immense size. By mentally changing the perceptions of their bodies, they in turn constantly minimize the image they are trying to attain. As in Bill’s case:

I’ve had girls and guys tell me that I am big and intimidating, but I don’t always feel that way... Ultimately, I think there is always room for improvement. I think every bodybuilder is looking for an edge to get that size. To feel bigger and look at themselves as someone who is bigger.

The participant’s actions of skepticism influence not only the perceptions of their body image, but also perhaps their behaviors in the sport.

The fifth reason is body image ideal is practically unattainable, so few bodybuilders are ever satisfied with their physical appearance and are constantly striving to improve. The idea of constant improvement led to bodybuilders comparing the sport to addiction. James replied, “I think bodybuilding is an addiction. It is a way of life. The idea of that certain look, the sacrifices, and the supplements needed to achieve it are always on my mind.... It is about constant improvement.” In their attempts to feed this addiction for improvement, George reported “doubling up” workouts. This addiction did not stop when leaving the gym or only occur when in the gym. Bodybuilders reported daydreaming, fantasizing, and thinking about the sport all day long. “Lifting is all that I think about... regardless of what I am doing,” replied George. The addiction the sport causes resulting in impacts on all facets of their life carries both positive and negative consequences in their view. A negative effect about the addiction is Matt feels, “If I do not get a workout in for one day or for some strange reason I miss two days in a row, I

start to get really irritated in all aspects of my life.” However, experiences associated with positive thoughts about the sport were the consensus among participants. A common view shared by many was given by James, “I think it’s a positive addiction... I can choose to be addicted to things that will destroy my body or I can have a healthy addiction like bodybuilding.”

The sixth reason is that many bodybuilders invest significant time and energy in an effort to reach this ideal, to the point of obsession. In the presence of this context, three overarching phenomena led to the development of three efforts to reach this ideal: (a) longevity of commitment for involvement, (b) time involvement for each week, (c) time involvement for each training session. Longevity of commitment for involvement in bodybuilding consisted in years of commitment to the sport. “I have been doing this for a decade,” said Robert. Many of the bodybuilders echoed Robert’s statement. All of them had been involved in bodybuilding for at least two years and one had been involved for fifteen years. Kyle disclosed, “I started bodybuilding at the age of fourteen and have been involved in the sport for seven years now.” Will signified a difference in the commitment to bodybuilding versus regular weightlifting for other sports, “I have been into true bodybuilding for four years. Before that I lifted for college basketball for four years, but I do not really count that as lifting or even as the same thing.”

Many times, participants commented on the about of time involvement they had each week with the sport. Riley declared, “I train every day. There are no days off.” In a conversation with Robert, he said, “I train seven days a week, every week.” This amount of time and energy devoted to achieving their ideal image is similar across the

board with all participants. Even participants who chose to take “rest days,” still chose to lift weights five to six times a week. “Sometimes my body needs a break so I will train around six days a week,” declared Kyle. Will affirmed, “I train with weights anywhere between four and five days a week depending on how my body feels. I do cardio two to three times a week... putting me around five to six days a week.”

When asked what time each bodybuilder invested for each workout, responses ranged from “one hour” to “three hours.” The participant’s obsession with ideal body image seemed to converge with time commitment as training sessions were lengthy. Frank reflected, “I commit at least two and a half to three hours to the gym each day.” In fact, most bodybuilders seemed to commit two hours to lifting weights daily or on days they worked out. Kyle said,

I typically train anywhere from an hour and a half to two hours with weights. I always vary my cardio time away from my time with weights so you are talking about having to go back and forth to the gym each day for different hours or at least one hour at a time.

Even further on the extreme end, Will said, “I have lifted for as much as five hours in one day before when I doubled up a workout and added cardio to it.”

The seventh reason is that many bodybuilders emphasize nutrition as a way of reaching this ideal. Two categories concerning ideal body image were used to address this emphasis on nutrition: (a) bodybuilders want to consume large quantities of food and supplements and (b) bodybuilders have strict guidelines for food and supplements. One way in which participants managed their diet and supplements were to “bulk” eat. This type of “bulk” eating is characteristically known as eating all that one can of whatever one wants. Phil spoke of his eating, “When I bulk I eat in massive quantities... I eat as

much as I can eat... I also supplement with whey proteins or mass gainers to hit adequate levels in my diet.” Nick was just as specific when framing his large quantity eating as “bulk” eating sharing, “I have three or four large meals with a lot of protein everyday along with a couple of protein shakes.” Nearly all participants specified eating “great” or “big” amounts of food in an effort to maintain their “muscle mass.”

In addition to the consumption of large quantities of food and supplements, there were experiences of phenomena with strict guidelines with the consumption for food and supplements. While some bodybuilders chose to bulk eat with any item, others chose particular items. Participants stated consuming sizeable portion of lean cut ground beef, lean steak, or chicken and avoiding fattening foods or candy. Bret said, “I only eat chicken and lean steak for protein... I try to stick to brown rice and other complex carbohydrates and avoid refined sugars... I will sometimes have cheat days, but I do not feel I need those.” The avoidance of “cheat days” or bulking suggests back to bodybuilders’ perceptions of overall body dissatisfaction. Brandon noted, “I try to balance what I like with what is healthy, but I always sacrifice and the right thing because I know I have to.” The phenomena known as meal timing are a concept within the strict guidelines for food and supplement consumption among bodybuilders. Chris described being, “Very strict in my nutrition... I make sure to eat every two and a half to three hours for every meal with the right amount of proteins, carbohydrates, and fats.” John said, “I take food and protein powder with me everywhere in case something happens to my regular eating schedule... it is that important for me to eat on time.”

The eighth reason is that many bodybuilders use various legal and illegal supplements to reach this ideal. Characteristics varied in the experiences as bodybuilders highlighted using certain types of both, legal and illegal supplements, to achieve a body of ideal perfection as they increase body mass and limit body fat. James articulated, “When you are weak and small for so long you will use anything you can get if it allows you to get bigger and more muscular... I used and still use vitamins, test boosters, creatine, protein, and amino acids. The usage of these legal supplements is “frequent” and “continue to this day from when he first began,” he said. Similarly, bodybuilders reported using legal supplements “daily” and “for years” to improve their body image. Other specified supplements like “whey protein,” various types of “protein,” and “mass gainer,” were unanimous in their usage and approval in augmenting body image among bodybuilders. Justin said, “I train my body every day for perfection and the way I view perfection can only be achieved with the use of whey protein... creatine... and amino acids.” Many bodybuilders shared this outlook as supplements provide, “a great alternative in reaching macro and micro body goals.”

The usage of illegal supplements, such as anabolic steroids (typically referred to as “gear”), were employed by participants. The phenomena, experiencing the use of “gear” or illegal supplements to alter body image was similar to legal supplements as it varied in usage, duration, and frequency; and these traits continued for the years in which they participated in the sport. Many bodybuilders seemed to use “gear” as a way to “be the best they can” or to speed the process in rapidly building muscle. Lou believed in the “Use of certain “gear” with other supplements to speed the process in building muscle or

size.” Dan replied with this thought on the duration of steroid use, “During the course of all my years in bodybuilding, I have used “gear” off and on.” Many bodybuilders reported using a “cycle” of anabolic steroids and testosterone. A “cycle” is known as when bodybuilders utilize anabolic substances for a set amount of time with a usual length lasting between four and twelve weeks. Characteristics varied in the types of illegal substances reported and the length of time they were used. Frequency of illegal supplement usage was “1” or “2” times a year. Some bodybuilders reported using “diuretics,” “Deca (Nandrolone),” and substances like “Winnie V (Winstrol).”

*To increase their strength and enhance their performance.*

Three types of reasons for supplement usage emerged from the data, which ultimately led to certain phenomenological experiences related to performance (see Appendix C). These reasons were (1) bodybuilders perceive that performance enhancement requires supplement usage; (2) performance is reflected through intensity during training and the need for recovery after training; and (3) many bodybuilders use various legal and illegal supplements to enhance performance.

Supplement perception regarding performance was commonplace among all bodybuilders in this study as most felt they have an impact when used. Robert shared a thought held by many bodybuilders in the study stating, “Diet is number one, but supplements improve performance... there is no doubt in my mind.” Phil commented, “I know that as a bodybuilder I cannot have the performance I need in the gym to get the physique I want without the use of supplements in conjunction with my diet.” In fact, the perception among bodybuilders appears that performance may be negatively impacted or

viewed as having negative implications if supplements are not used. Isaac confirmed, “My overall performance in the gym suffers when I do not have a consistent take of whey protein and creatine.”

The widespread desire to increase “gains,” “muscle,” “mass,” recovery,” and “energy,” were universally held amongst bodybuilders and failure to use supplements may halt performance in these areas. They believed, “to excel in the gym, you need them,” as Alex affirmed. Jake commented a more detailed observation for their ideology:

Most assuredly I know that I am getting less gains if I am not taking or getting the adequate amount of whey protein used with my normal diet... it destroy my performance in the gym... I know in my mind that if I am not taking what I need... I am not preserving as much muscle which in turn decreases my performance.

Types of performance enhancement issues likely stem from the sport centering on the qualities of symmetry, aesthetics, mass, muscularity, and vascularity creating a notion of an ideal image. Nick believed in those qualities: “Bodybuilding is a sport based on image... the combination of aesthetics and mass... vascularity and symmetry... If you are not using protein or gear to enhance your ability... you have no chance of every winning.” The participants in this study and their perceptions about performance, with or without supplements, are largely attributed to those sport seeking qualities resulting in an underlying cause of dissatisfaction in their overall appearance.

The second reason is bodybuilder performance is reflected through intensity during training and the need for recovery after training. These particular forms of performance included training to the point of exhaustion or sickness and an added sense of recovery due to training by bodybuilders. Intensity determined by participants in this

research was pushing the body to its extreme capabilities. Participants used various apt descriptions of their experiences in the gym describing performance feelings like, “total failure,” discipline,” “pain,” “sick,” and “throwing up.” Frank analyzed his experiences: “I always get sick on leg days and sometimes when I train back. I think of it as an accomplishment to go that hard.” Kyle provided a detailed illustration about intensity in performance:

I feel the only way to know that I have pushed myself to the limits required is to reach that point of total failure... to be so exhausted that I cannot think straight... I think it says something about a person that knows how hard they can push and still continue to go to the point of throwing up or continue after throwing up.

Certainly, there seemed to be an overwhelming amount of pride in the participants in pushing their bodies. By framing this behavior in their mind, they set an expectation of what was deemed acceptable in their training and exhibited how they viewed others who did not have the same beliefs. Sean reported, “I live in a world of pain and discipline through my intensity... others live in a world of laziness and complacency.”

The need for recovery, also experienced by all participants, included using supplements to enhance performance. All thirty bodybuilders noted using a protein supplement after workouts to help recover. A sense of pride was exhibited by bodybuilders in this study in regards to perceived performance and rest. Bob commented, “I know I need more rest than others after talking to friends and even guys in the gym. I lift high reps with a good amount of weight compared to other guys I see at my gym.” He further stated, “I also have a better workout when I get that added rest which helps me recover.” Many bodybuilders felt they knew “bodybuilding was a sport

based on recovery,” but still desired be in the gym as much as possible. Daniel commented, “I know I need rest... but it is hard... that gives others time to catch up... I would rather just keep training past exhaustion.” The majority of all bodybuilders in this study acknowledged they over trained past what was beneficial to them.

The third reason is that many bodybuilders use various legal and illegal supplements to enhance performance. Characteristics varied in the experiences as bodybuilders highlighted using certain types of both, legal and illegal supplements, to achieve an increase in strength, training, and performance. Isaac expressed, “Have you ever heard someone say “Am I too strong?” or “Do I have too much muscle?” so I use creatine, vitamins, mass gainer, whey protein, amino acids and anything that is legal to supplement with.” The majority of supplements are dual purpose in that they may aide in recovery, strength, and performance. The usage of legal supplements to augment performance was “recurrent” and ongoing. Similarly, all bodybuilders reported using legal supplements “daily” and “for years” to improve their performance.

Other specified supplements like “N.O. Explode,” various types of “pre-workout supplements,” “caffeine,” and “beta alanine,” were unanimous in their practice and support in assisting performance among bodybuilders. The two main type of supplements used to enhance performance were pre-workout and protein supplements. About “pre-workout” supplements, Steve replied, “I always use a caffeine pre-workout type stimulant to get me going when I know I need the energy to sustain a long workout.” John said, “After awhile I began to increase my servings of protein... as I continued to learn of how protein works... and the benefits I would receive in training.” Many

bodybuilders shared of James who stated, “If you are not going to at the very least use protein and increase it as you gain size, you will never reach your potential or the results you desire.”

The use of illegal supplements, such as anabolic steroids (“gear”), to influence performance were experienced by bodybuilders in this research. The usage of “gear” on performance paralleled the usage of legal supplements as it varied in usage, duration, and frequency; and these traits continued off and on for the time in which they have participated in the sport. Many bodybuilders seemed to use “gear” as a way of quantifying they were doing their best or to increase muscle size, increase strength, and improve recovery leading to enhanced performance. Riley believed, “When I enter the gym I want to kill the weights and my workout in the gym so I use gear to push my body to the limit.” Dan remarked, “To become a machine I use anything and everything possible, which includes gear.”

Many bodybuilders reported using a “cycle” to improve all aspects of performance. John recalled, “I know with as hard and as long as I train that I need to recover... Gear gives me the best option for that and increases my strength.” Characteristics varied in the types of illegal substances reported and the length of time they were used. Again, frequency of illegal supplement usage was “1” or “2” times a year. Chris said, “I use everything supplement daily except for gear, which I do cycles on and off.” Some bodybuilders reported using “Dianabol,” “Trenbolone,” and substances like “Testosterone.”

*They believe the positive benefits outweigh possible negative consequences.*

Three types of reasons for supplement usage emerged from the data, which ultimately led to certain phenomenological experiences related to bodybuilders' perceptions on the benefits of supplementation usage over the possible negative consequences (see Appendix C). These reasons were (1) bodybuilders do not trust supplement companies or endorsers, but still utilize the product based on research behind each supplement; (2) bodybuilders acknowledge the lifestyle and usage of certain supplements may cause a lack of understanding for those in their social life; and (3) bodybuilders recognize the dangers for adverse side effects from supplementation.

Bodybuilders perceiving a lack of trust in supplement companies and endorsers led to the development of many bodybuilders making decisions based on research about each supplement. The lack of trust stemmed from experiences of being ripped off, knowing endorsers primarily do it for the money and not the product, and poor supplement regulation. George commented, "The supplement companies are always trying to rip you off price wise with endorsements... I do not care who endorses the product." Similar thoughts were shared by Frank, "I go with things I have purchased in the past because I know they work... I might look at an endorsement, but I am not going to purchase it on that basis... too much unknown. Nearly every bodybuilder felt the same way and found the inadequate regulation of supplements allowed faulty products to be on the market. Bret noted, "The regulation of supplements has been very weak so I try to do proper research on all the ingredients in a product I use." Concerns from Robert were, "If I am going to actually buy it, I want multiple sources evidence backing a new product..."

I see what the magazines suggest, but supplement companies and magazines work together so I do not purchase based on just that.”

When researching, bodybuilders will seek help from other bodybuilding friends. Steve said, “I only trust friends that know what they are talking about in choosing supplements. I never trust athletes or magazines.” “I want to hear from other bodybuilders how it benefited them and I will ask them for their honest opinion about it,” replied Riley. This led to a strategy in decision making as many bodybuilders then chose supplements based on effectiveness and cost of the product. Robert shared, “I continue to use certain supplements based on the effectiveness of them... After researching products, I may find something deemed better and will try it, but it all comes back to how effective it works.” Bodybuilders primarily chose to stick with reputable “brands,” but admitted to “trying something there heard was too good to pass up.” However, Sean notes in the end it comes back to effectiveness and cost: “I have tried tons of supplements and some just do not deliver... I price gauge a lot of supplements... I am not paying for just a name... I choose to stick with brands that I have experienced work.

The second reason is bodybuilders acknowledge the lifestyle and usage of certain supplements may cause a lack of understanding for those in their social life. The impact in social life was felt in terms of relationships and friends; and social events like parties or bar hopping. Robert stated, “I’ve had girlfriends that didn’t understand the commitment it takes to do bodybuilding and the priority it has in my life... those types of relationships never lasted long. Many bodybuilders were forced to make sacrifices in these areas to continue the lifestyle they wanted. Dan said, “Some of my friends do not

understand. They are lazy... Some of the others just acknowledge my progress and commitment." Participants spoke of how friends believed all supplements were cheating; would look down on them for using anabolic steroids; and questioned them of why they want to engage in a sport like bodybuilding.

Jake illustrated these points:

There are times that I have chosen to workout instead of spending time with friends or girlfriends... All of my friends that are not bodybuilders do not understand... They do not know why I take what I take... They think I workout too much, but they are the type of people that do not workout at all.

Social events were issues for participants in this study. The majority of bodybuilders felt that former part of their lifestyle was of little significance. Others believed that bar hopping and attending parties would only hinder the goals they were seeking to complete with their body. Bob said, "I feel like I am hurting myself by missing a lift if forced to go to a social event. They just are not as important to me as lifting." Throughout the data, others echoed his words. Dan declared:

To me going out and socializing is not important to me. There has been years where I did not go to the bar once, even after friends asked me to... I like being able to save my energy for training and I feel I can't do that by drinking and staying out late.

The third reason is bodybuilders recognize the dangers for adverse side effects from supplementation. The phenomenon produced avowed feelings concerning health. Bodybuilders felt that supplements bought over the counter carried minimal risk when compared with banned substances. However, that is not to say they need not foresee risk in using legal supplements. Phil replied, "I think there is a great benefit to one's overall

health by using supplements, but there is always a risk in using supplements... legal and illegal.” James gathered his thoughts and shared:

I think safety concerns and risk with the use of supplements is an important factor in this lifestyle... There has been a good bit of talk surrounding some products like ephedrine and DMAA lately that has caused the deaths of athletes and soldiers... But I do think there are many benefits to using the right supplements.

The majority of bodybuilders felt the usage of illegal supplements or “gear” carried a negative effect on their health. However, the ones using these types of supplements said they “might consider stopping,” “would have to think about it,” and “probably would not stop,” if their personal health was in trouble. While most bodybuilders accept the inherent risk with any kind of supplement usage, both legal and illegal, many said they would not quit using them. In fact, many reported they would only quit supplements if prescribed by a doctor, experienced adverse effects, or was in a unique life and death situation. Some even admitted they would not quit taking supplements if a doctor recommended quitting. Nearly all thirty participants felt that the possible benefits to supplement usage outweighed in negative consequences in respect to their bodies and the success they hoped to achieve in bodybuilding.

## CHAPTER V

### Discussion

The purpose of this research was to explore the perceptions, knowledge, and attitudes of amateur bodybuilders regarding supplementation usage. Previous literature in bodybuilding suggests that it is a sport designed to develop muscle mass, symmetry and definition (Brower, Blow, & Hill, 1994). Bodybuilders seek an image of a perfectly proportioned body with minimal fat content with clearly defined muscle structures (Peters & Phelps, 2001). Amateur and professional bodybuilders alike have been linked to legal and illegal supplement usage (Carman, 2001). The data reported here suggests this assertion by exposing supplementation perceptions, knowledge, and attitudes amongst amateur bodybuilders. More specifically, the findings highlight a multifaceted hierarchical model of supplement usage for amateur bodybuilders in Western fitness culture involving body image, performance enhancement, and need.

A main finding to emerge from the data was bodybuilders take nutritional supplements to help them achieve an ideal body. The majority of participants in this study are, in general, dissatisfied with their overall appearance, muscle size, muscle tone, or specific aspects about their body. In an effort to satisfy the desire for a defined body image, participants utilized bodybuilding and supplement usage as tools for constant improvement toward their ideal physique. Klein (1993) stated that males are drawn to bodybuilding by the lure of achieving the societal ideal of the perfect male image. Men want to look attractive to others by having a defined and lean abdomen, a large and defined chest, and large, defined, and strong arms. Men often feel sociocultural pressures

to look good from the waist up (Ridgeway & Tylka, 2005). Bodybuilders commit hours, days, weeks, and years in an attempt to be satisfied in overall appearance of muscle size and tone (Wiegers, 1998). Similar to this study, previous research showed bodybuilders emphasized feeling too fat and indicated a perception of being smaller than ideal with a strong desire to enhance masculinity (Goldfield et al., 2006). Notwithstanding this observation, the participants in this study also desired to have a bigger, stronger, and better looking body like those of professional bodybuilders. Skepticism was present in many of the participants in this study as they reported not really believing comments from other people about how “big” or “huge” they were. This is likely due to the constant body images purported out by the bodybuilding culture and media in which amateur bodybuilders view their idols. Parish et al. (2010) note the relationship between emulation and bodybuilding for amateur bodybuilders is in their desire to idolize or emulate older bodybuilding heroes. To combat these comparisons, the complex and dynamic relationship of nutrition and supplementation utilized strict requirements by bodybuilders in an effort to ascertain their desired image.

The second main finding showed bodybuilders take nutritional supplements to increase their strength and enhance their performance. The relationship with supplementation and performance provides an interesting dynamic for bodybuilders due to the fact that performance is uniquely tied to the concept of body image (Pope et, al., 2000). The literature has established that performance enhancement to each bodybuilder is a critical factor in success (Roundtree, 2005). Indeed, studies have repeatedly identified performance with and without supplementation (Sherman, 2011), the

effectiveness of training with supplements (Carman, 2001) and the use of legal and illegal supplements to enhance performance (Roundree, 2005). Participants in this study felt there was a significant impact on performance in training with or without supplements. As such, it may be assumed the difference is not only mental, but also physiological due to chemical responses in the body from legal and illegal supplements. The results of this study also emphasized how amateur bodybuilders felt the need to train to lengthy times and most likely certain exhaustion in effort to achieve success. These findings correlate with prior research that found bodybuilders feel training intensity that results in nausea, muscle soreness, muscle and tendon injuries, headaches, fainting, vomiting, and other pain were necessary to become a successful bodybuilder (Wiegers, 1998).

The last finding from the data found that bodybuilders take nutritional supplements because they perceive a need for supplements and believe the positive benefits outweigh possible negative consequences. Bodybuilders stressed an increase in frequency and quantities of supplementation were required to improve image and performance. Effectiveness and cost were key contributors in the selection of supplements for bodybuilders as opposed to supplement companies or endorsers. While the amateur bodybuilders in this study reported reading bodybuilding magazines, they felt a disingenuous trust and would not select supplements based strictly on magazine reviews or endorsement ads. Certainly, the muddled relationship between supplement companies and magazines in this decision making process. Instead of being swayed by supplement companies or athletic endorsers, participants chose to research supplements in various forms and seek out the experiences or recommendations from other bodybuilders.

Participants commonly viewed social events as carrying little importance in their life compared to bodybuilding. Participants believed that legal supplementation provided overall health benefits while illegal supplementation may have adverse effects.

From a practical perspective, the findings of this study go beyond merely identifying the characteristics of amateur bodybuilders to exploring the subculture within bodybuilding in how they perceive, judge, and use supplements. Certainly, there are various levels of narcissism, addiction, gluttony, social withdrawal, choice, and obsession to factor in the sport when accounting for amateur bodybuilder behaviors. The bright and dark sides of these traits are evident throughout the participant responses. The specific context of this research should help disseminate knowledge on amateur bodybuilding practices.

#### *Implications of the study*

There are two predominant implications to arise from the study and its findings. The first implication is that academic research areas of health and human performance, psychology, and sociology will provide additional avenues to explore bodybuilding and supplementation usage. The transfer of knowledge from these areas to bodybuilding will help to contribute to a more complete understanding of the sport and its practices. The second, related implication is that, as a consequence of developments in the evidence base, academic researchers will like need to broaden their scope in regards to supplementation and nutrition practices of bodybuilders. For example, in bodybuilding, many amateur and professional bodybuilders philosophically disagree on ways to

enhance performance and body image through the use of supplementation, rest, and nutrition.

#### *Limitations of the study*

The adopted approach of qualitative methods for this study offers specific strengths and limitations that should be discussed. The characteristics of the sample were a notable strength of this study. Specifically, the amateur bodybuilders who participated in the interviews were a representative population in the sport of bodybuilding due to the limited number of professional bodybuilders. Also, amateur bodybuilders consist of a small minority group in comparison to other groups in Western fitness culture. The use of open-ended interviews to collect data from these individuals ensured that descriptive information relating to supplement usage in bodybuilding could emerge. In terms of the analysis and presentation of the data, the hierarchical approach helped portray the scope of the issues investigated. However, the hierarchy does not indicate how often each theme was mentioned by participants. It is acknowledged that interviewing participants that are amateur bodybuilders limits the generalizability of the findings to all bodybuilders. However, the access to and the availability of professional bodybuilders is very limited. Due to this, the study tried to enhance applicability including varying experience and age in the sample. As the knowledge base in this area develops and if the researchers have access to professional bodybuilders, researchers may need to differentiate by including both populations.

### *Conclusion*

In conclusion, this paper has investigated the perceptions, knowledge, and attitudes of supplementation usage among amateur bodybuilders. Perhaps the most significant conclusion to be drawn is that the sport of bodybuilding is a phenomenon that influences bodybuilders to take nutritional supplements for three primary reasons: (1) to help them achieve an ideal body; (2) to increase their strength and enhance their performance; and (3) because they perceive a need for supplements and believe the positive benefits outweigh the possible negative consequences.. To bodybuilders, the sport offers a meaning of life and allows them to perceive themselves as being different from others. The sport allows each participant to feel a level of satisfaction while still feeling dissatisfaction. The body image the sport represents, and the body image Western fitness culture characterizes, promotes both positive and negative behaviors in supplementation. For this reason, amateur bodybuilders feel required to supplement in an effort to compete and succeed in reaching the image they desire.

### *Recommendations for future studies*

The recommendations of this study raise further important issues relating to the usage of supplements for amateur bodybuilders. Although the issues surrounding these questions are complex, it is likely the sport of bodybuilding will continually evolve. Specifically, questions or areas that need to be addressed include the following:

1. The examination of the relationship between amateur and professional bodybuilders and the role that winning influences the use of supplementation.

2. According to amateur bodybuilders, what role and how much do legal and illegal supplementation make the difference in winning a competition?
3. What are the thoughts, feelings, and beliefs of amateur bodybuilders that turn professional during the course of the study about the usage of supplementation before and after receiving a professional card?
4. A follow-up study on the evaluation of how amateur bodybuilders perceive their supplement use compared to professional bodybuilders.
5. Conduct an analysis that focuses on the different socioeconomic backgrounds and the supplementation usage of each amateur bodybuilder.

## REFERENCES

- Ahrendt, D. M. (2001). Ergogenic aids: Counseling the athlete. *American Family Physician*, 63(5), 913-922.
- Altabe, M., & Thompson, J. K. (1992). Size estimation versus figural ratings of body image disturbance: Relation to body dissatisfaction and eating dysfunction. *International Journal of Eating Disorders*, 11, 397– 402.
- Andersen R. E., Barlett S. J., Morgan G. D., & Brownell K. D. (1995). Weight loss, psychological, and nutritional patterns in competitive male body builders. *International Journal of Eating Disorders*, 18, 49-57.
- Antonio J, & Stout J. R. (2002). *Supplements for endurance athletes*. New York, NY: Human Kinetics.
- Antonio, J., Kalman, D., Stout, J. R., Greenwood, M., Willoughby, D. S., Haff, & G. G. (2008). *Essentials of sports nutrition and supplements*. Totowa, NJ: Humana Press.
- Atkinson, S., & Abu El Haj, M. (1996). Domain analysis for qualitative public health data. *Health Policy and Planning*, 11(4), 438-442.
- Baechle, T. R., & Earle, R. W. (2008). *Essentials of strength training and conditioning*. Champaign, IL: Human Kinetics.
- Balsamo, A. (1994). Feminist bodybuilding. In S. Birrell & C. L. cole (Eds.), *Women, sport, and culture*, 341-352. Champaign, IL: Human Kinetics.
- Bandura, A. (1977). *Social learning theory*. New York, NY: General Learning Press.
- Benardot, D. (2000). *Nutrition for serious athletes*. Chicago, IL: Human Kinetcis.
- Bean, A. (2007). *Sports supplements*. London: A. & C. Black.

- Biddle, S. J., Markland, D., Gilbourne, D., Chatzisarantis, N. L., & Sparkes, A. C. (2001). Research methods in sport and exercise psychology: Quantitative and qualitative issues. *Journal of Sports Sciences, 19*(10), 777-809.
- Blouin, A. G., & Goldfield, G. S. (1995). Body image and steroid use in male bodybuilders. *International Journal of Eating Disorders, 18*, 159-165.
- Blumer, H. (1954). What is wrong with social theory. *American Sociological Review, 18*, 3-10.
- Boorstin, D. J. (1961). *The image: A guide to pseudo-events in America*. New York, NY: Harper and Row, Publishers.
- Bosse, J., & Dixon, B. (2012). Dietary protein to maximize resistance training: a review and examination of protein spread and change theories. *Journal of the International Society of Sports Nutrition, 9*(1), 42-52.
- Boyle, E. (2010). Marketing muscular masculinity in Arnold: the education of a bodybuilder. *Journal of Gender Studies, 19*(2), 153-166.
- Braun, H., Koehler, K., Geyer, H., Kleinert, J., Mester, J., & Schänzer, W. (2009). Dietary supplement use among elite young German athletes. *International Journal of Sport Nutrition & Exercise Metabolism, 19*(1), 97-109.
- Brill, J., & Keane, M. (1994). Supplementation patterns of competitive male and female bodybuilders. *International Journal of Sport Nutrition, 4*(4), 398-412.
- Brower, K.J., Blow, F.C., & Hill, E.M. (1994). Risk factors for anabolic-androgenic steroid use in men. *Journal of Psychiatric Research, 4*, 369–380.
- Brown, S. (2012). *Nutritional supplements in the U.S., 5th Edition*. Rockville, MD: Don

- Montuori and David Sprinkle.
- Brownell, K.D. (1991). Dieting and the search for the perfect body: Where physiology and culture collide. *Behavior Therapy*, 22, 142.
- Burke, D. G., Chilibeck, P. D., Davison, K., Candow, D. G., Farthing, J., & Smith-Palmer, T. (2001). The effect of whey protein supplementation with and without creatine monohydrate combined with resistance training on lean tissue mass and muscle strength. *International Journal of Sport Nutrition & Exercise Metabolism*, 11(3), 349.
- Burke L, & Deakin V. (2006). *Clinical sports nutrition*. Sydney: McGraw-Hill.
- Calfee, R., & Fadale, P. (2006) Popular ergogenic drugs and supplements in young athletes. *Pediatrics*, 117(3), 577-589.
- Carman, K. P. (2001). *Competitive bodybuilding: Healthy or not?* Retrieved from ProQuest Digital Dissertations.
- Choi, P. (2000). *Femininity and the physically active woman*. London: Routledge.
- Columbu, F. & Fragomeni, L. (1985). *The bodybuilder's nutrition book*. Chicago, IL: Contemporary Books, Inc.
- Cook, J. (2000). Men's magazines at the millennium: new spaces, new selves. *Journal of Media & Cultural Studies*, 14(2), 171-187.
- Crerand, C. E. and Sarwer, D. B. (2010). Body dysmorphic disorder. *Corsini Encyclopedia of Psychology*, 1-2.
- Creswell, J. W. (2007). *Qualitative inquiry & research design: Choosing among five approaches*. 2nd ed. Thousand Oaks, CA: Sage Publications.

- Cribb, P. J., & Hayes, A. (2006). Effects of supplement timing and resistance exercise on skeletal muscle hypertrophy. *Medicine & Science in Sports & Exercise, 38*, 1918-1925.
- Cribb P. J, Williams A. D., Stathis C. G., Carey M. F., & Hayes A. (2007). Effects of whey isolate, creatine, and resistance training on muscle hypertrophy. *Medicine & Science in sports & Exercise, 39*, 298–307.
- Dascombe, B., Karunaratna, M., Cartoon, J., Fergie, B., & Goodman, C. (2010). Nutritional supplementation habits and perceptions of elite athletes within a state-based sporting institute. *Journal of Science & Medicine in Sport, 13*(2), 274-280.
- Davis, C., & Scott-Robertson, L. (2000). A psychological comparison of females with anorexia nervosa and competitive male bodybuilders: Body shape ideals in the extreme. *Eating Behaviors, 1*(1), 33-46.
- Delbecq A. L., Van de Ven, A. H., Gustafson, D. H. (1975). *Group techniques for program planning: A guide to nominal group and delphi processes*. Glenview, IL: Scott Foresman.
- Denzin, N. K., & Lincoln, Y. S. (2005). *The SAGE handbook of qualitative research*. Thousand Oaks, CA: Sage Publications.
- Dietary Supplement Health and Education Act “DSHEA”. (2013, March 22). Retrieved from [http://ods.od.nih.gov/About/DSHEA\\_Wording.aspx](http://ods.od.nih.gov/About/DSHEA_Wording.aspx)
- Eliason B. C., & Myszkowski J. (1996). Dietary supplement use in the general population. *Journal of the American Board of Family Practice, 9*, 249–53.

- Frestedt, J. L., Zenk, J. L., Kuskowski, M. A., Ward, L. S., & Bastian, E. D. (2008). A whey-protein supplement increases fat loss and spares lean muscle in obese subjects: a randomized human clinical study. *Nutrition & Metabolism*, 51-7.
- Froiland, K., Koszewski, W., Hingst, J., & Kopecky, L. (2004). Nutritional supplement use among college athletes and their sources of information. *International Journal of Sport Nutrition & Exercise Metabolism*, 14(1), 104-120.
- Gerring, J. (2007). *Case study research: Principles and practices*. NY: Cambridge University Press.
- Goldfield, G. S. (2009). Body image, disordered eating and anabolic steroid use in female bodybuilders. *Eating Disorders*, 17(3), 200-210.
- Goldfield, G. S., Blouin, A. G., & Woodside, D. B. (2006). Body image, binge eating, and bulimia nervosa in male bodybuilders. *Canadian Journal of Psychiatry*, 51, 160–168.
- Grogan, S., Evans, R., Wright, S., & Hunter, G. (2004). Femininity and muscularity: accounts of seven women body builders. *Journal of Gender Studies*, 13(1), 49-61.
- Gulick, D., Agarwal, M., Josephs, J., Reinmiller, A., & Zimmerman, B. (2012). Effects of MagPro on muscle performance. *Journal of Strength and Conditioning Research / National Strength & Conditioning Association*, 26(9), 2478-2483.
- Hackett, D., Johnson, N., & Chow, C. (2012). Training practices and ergogenic aids used by male bodybuilders. *Journal Of Strength And Conditioning Research / National Strength & Conditioning Association*.

- Hatoum, I. J., & Belle, D. (2004). Mags and abs: Media consumption and bodily concerns in men. *Sex Roles, 51*, 397-407.
- Heinberg, L.J., & Thompson, J.K. (1992). Social comparison: Gender, target importance ratings, and relation to body image disturbance. *Journal of Social Behavior and Personality, 7*, 335–344.
- Heywood, L. (1998). Masculinity vanishing: Bodybuilding and contemporary culture. In Parish, Baghurst, and Turner (Eds.), *Building bodies*, 165–183. New Brunswick, NJ: Rutgers University Press.
- Hoffman J. R., Ratamess N. A., Kang J., Falvo M. J., & Faigenbaum A. D. (2007). Effects of protein supplementation on muscular performance and resting hormonal changes in college football players. *Journal of Sports Science and Medicine, 6*, 85–92.
- Housman, J., Dorman, S., Pruitt, B., Ranjita, M., & Perko, M. (2011). Consumption of sport-related dietary supplements among NCAA Division 1 female student athletes. *American Journal of Health Behavior, 35*(4), 438-446.
- Huang S. H., Johnson K., Pipe A. L. (2006). The use of dietary supplements and medications by Canadian athletes at the Atlanta and Sydney Olympic Games. *Clinical Journal of Sport Medicine, 16*(1), 27–33.
- Hulmi, J. J., Lockwood, C. M., & Stout, J. R. (2010). Effect of protein/essential amino acids and resistance training on skeletal muscle hypertrophy: A case for whey protein. *Nutrition & Metabolism, 751*-761.
- International Federation of Bodybuilding and Fitness “IFBB”. (2013, March 24).

- Retrieved from <http://www.ifbbpro.com/>
- Jazayeri, S. (2004). Knowledge, attitudes and practices (KAP) of diet prescription among university students of Ahwaz, Iran. *Asia Pacific Journal of Clinical Nutrition*, 13S130.
- Johnson, R. B., & Christensen, L. (2008). *Educational research: Quantitative, qualitative and mixed approaches*. Thousand Oaks, CA: Sage Publications.
- Juhn, M. (2003). Popular sports supplements and ergogenic aids. *Sports Medicine*, 33(12), 921-939.
- Kanayama, G., Hudson, J. I., & Pope, H. G. (2008). Long-term psychiatric and medical consequences of anabolic-androgenic steroid abuse: A looming public health concern? *Drug and Alcohol Dependence*, 98, 1-12.
- Karimian, J., & Esfahani, P. (2011). Supplement consumption in body builder athletes. *Journal of Research in Medical Sciences*, 16(10), 1347-1353.
- Kennedy, R. (2008). *Encyclopedia of bodybuilding: The complete A-Z book on muscle building*. Mississauga, ON: Robert Kennedy Publishing.
- Kerksick C. M., Rasmussen C. J., Lancaster S. L., Magu B., Smith P., Melton C., Greenwood M., Almada A. L., Earnest C. P., Kreider R. B. (2006). The effects of protein and amino acid supplementation on performance and training adaptations during ten weeks of resistance training. *Journal of Strength & Conditioning Research*, 20, 643-653.
- Klein, A. M. (1987). Fear and self-loathing in Southern California: Narcissism and fascism in bodybuilding subculture. *Journal of Psychoanalytic Anthropology*,

- 10(2), 117-137.
- Klein, A. M. (1993). Of muscles and men: A seven-year anthropological study of the exotic culture of bodybuilding offers insights into the state of masculinity in America. *Sciences*, 33, 32-37.
- Klein, A. M. (2007). Special issue. *Sport in Society*, 1073–1119.
- Kreider R. B., Hill D., Horton G., Downes, M., Smith, S., & Anders, B. (1995). Effects of Carbohydrate supplementaiton during intense training on dietary patterns, Psychological status, and performance. *International Journal of Sports Nutrition*, 5(2), 125-135.
- Krucoff, C. (1992). Arnold at the fitness farm. *Saturday Evening Post*, 264(4), 44-48.
- Krumbach, C. J., Ellis, D. R., & Driskell, J. A. (1999). A report of vitamin and mineral supplement use among university athletes in a Division 1 institution. *International Journal of Sport Nutrition*, 9(4), 416-425.
- Kuhn, C., Swartzwelder, S., & Wilson, W. *Pumped: Straight facts for athletes about drugs, supplements, and training*. New York, NY: W. W. Norton & Co.
- Kuo, M. (2010). Meal planning and nutritional supplements use among elite bodybuilders in Taiwan. *British Journal of Sports Medicine*, 44:i40-i41.
- Kvale, S., & Brinkmann, S. (2008). *Interviews: Learning the craft of qualitative research interviewing*. Thousand Oaks, CA: Sage Publications.
- Lands L. C., Grey V. L., & Smountas A. A. (1999). Effect of supplementation with a cysteine donor on muscular performance. *Journal of Applied Physiology*, 87, 1381-1385.

- Leit, R. A., Gray, J., Jr., & Pope, H. G. (2001). The media's representation of the ideal male body: cause for muscle dysmorphia? *Journal of Eating Disorders, 31*, 334-338.
- Lemon, P., Tarnopolsky, M., MacDougall, J., & Atkinson, S. (1992). Protein requirements and muscle mass/strength changes during intensive training in novice bodybuilders. *Journal of Applied Physiology (Bethesda, Md.: 1985), 73*(2), 767-775.
- Lun, V., Erdman, K. A., Fung, T. S., & Reimer, R. A. (2012). Dietary supplementation practices in Canadian high-performance athletes. *International Journal of Sport Nutrition and Exercise Metabolism, 22*(1), 31-37.
- Malinauskas, B. M., Overton, R. F., Carraway, V. G., & Cash, B. C. (2007). Supplements of interest for sport-related injury and sources of supplement information among college athletes. *Advances in Medical Sciences, 52*, 50-54.
- Marangopoulos, K. (2008). *Natural bodybuilding nutrition: Structuring a solid diet plan.* Retrieved from <http://www.submityourarticle.com/articles/Konstantinos-Marangopoulos-789/bodybuilding-11125.php>
- Masedu, F., Ziruolo, S., Valenti, M., & Di Giulio, A. (2012). Resistance training and protein intake: Muscular mass and volume variations in amateur bodybuilders. *International Journal of Sports Medicine, 13*(2), 58-68.
- Mason, G. (1992). Looking into masculinity: sport, media and the construction of the male body beautiful. *Social Alternatives, 11*(1), 27-32.
- Maughan, R., Depiesse, F., Geyer, H., & International Association of Athletics

- Federations. (2007). The use of dietary supplements by athletes. *Journal of Sports Sciences*, 25(Sup. 1) S103-S113.
- McCreary, D. R., & Sasse, D. K. (2000). Exploring the drive for muscularity in adolescent boys and girls. *Journal of American College Health*, 48, 297-304.
- McDowall, J. L. (2007) Supplement use by young athletes. *Journal of Sports Science and Medicine*, 6, 337-342.
- Metges, C. C., & Barth, C. A. (2000). Metabolic consequences of a high dietary-protein intake in adulthood: Assessment of the available evidence. *Journal of Nutrition*, 130(4), 886.
- Mills, A. J., Duprepos, G., & Wiebe, E. (2010). *Encyclopedia of case study research*. Thousand Oaks, CA: Sage Publications.
- Moore, B. L. (1997). *Building bodies*. New Brunswick, N.J: Rutgers University Press.
- Mrozek, D. J. (1983). *Sport and American mentality 1880-1910*. Knoxville, T.N.: University of Tennessee Press.
- Morrison, L. J., Gizis, F., & Shorter, B. (2004). Prevalent use of dietary supplements among people who exercise at a commercial gym. *International Journal of Sport Nutrition and Exercise Metabolism*, 14, 481-492.
- Morrison, T. G. & Halton, M. (2009). Buff, tough, and rough: representations of muscularity in action motion pictures. *Journal of Men's Studies*, 17(1), 57-74.
- Morrison, T. G., Morrison, M. A., & Hopkins, C. (2003). Striving for bodily perfection? An exploration of the drive for muscularity in Canadian men. *Psychology of Men and Masculinity*, 4, 111-120.

- Mosley, P. E. (2009). Bigorexia: bodybuilding and muscle dysmorphia. *European Eating Disorders, 17*, 191–198.
- Mullis, P. E. (2000). *Doping in sport*. London: Bailliere Tindall.
- National Physique Committee “NPC”. (2013, March 24). Retrieved from  
<http://www.nationalphysiquecommittee.com/>
- Nieman, D., Gates, J. R., & Butler, J. R. (1989). Supplementation patterns in marathon runners. *Journal of the American Dietetic Association, 89*1615-1619.
- Nieper, A. (2005). Nutritional supplement practices in UK junior national track and field athletes. *British Journal of Sports Medicine, 39*, 645-649.
- Parent, M. C., & Moradi, B. (2011). His biceps become him: a test of objectification theory's application to drive for muscularity and propensity for steroid use in college men. *Journal of Counseling Psychology, 58*(2), 246-256.
- Parish, T., Baghurst, T. & Turner, R. (2010). Becoming competitive amateur bodybuilders: identification of contributors. *Psychology of Men & Masculinity, 11*(2), 152-159.
- Pearl, B. (2005). *Getting stronger: Weight training for men and women : sports training, general conditioning, bodybuilding*. Bolinas, CA: Shelter Publications.
- Perine, S. (2008). My first bodybuilding diet; three bodybuilders from three eras look back at their initial mass-gain diets to give you advice on starting successfully. *Flex Magazine, 7*, 125-133.
- Peters, M. A., & Phelps, L. (2001). Body image dissatisfaction and distortion, steroid use, and sex differences in college age bodybuilders. *Psychology in the Schools,*

- 38(3), 283-289.
- Philen, R. M., & Ortiz, D. I. (1992). Survey of advertising for nutritional supplements in health and bodybuilding magazines. *JAMA: Journal of the American Medical Association*, 268(8), 1008.
- Pickett, T., Lewis, R., & Cash, T. (2005). Men, muscles, and body image: comparisons of competitive bodybuilders, weight trainers, and athletically active controls. *British Journal of Sports Medicine*, 39(4), 217-222.
- Pope, H.G., Olivardia, R., Gruber, A., & Borowiecki, J. (1999). Evolving ideals of male body image as seen through action toys. *International Journal of Eating Disorders*, 26, 65–72.
- Pope, H. G., Phillips, K. A., & Olivardia, R. (2000). *The Adonis complex: The secret crisis of male body obsession*. New York, NY: Free Press.
- Ranelli, P., Dickerson, R., & White, K. (1993). Use of vitamin and mineral supplements by pharmacy students. *American Journal of Hospital Pharmacy*, 50(4), 674-678.
- Raudenbush, B., & Meyer, B. (2003). Muscular dissatisfaction and supplement use among male intercollegiate athletes. *Journal of Sport & Exercise Psychology*, 25, 161–170.
- Ridgeway, R. T., & Tylka, T. L. (2005). College men's perceptions of ideal body composition and shape. *Psychology of Men & Masculinity*, 6(3), 209-220.
- Rosellini, L. L. (1990). Pumping the public persona. *U.S. News & World Report*, 109(21), 62.
- Roundtree, K. L. (2005). *A critical sociology of bodybuilding*. Retrieved from ProQuest

- Digital Dissertations.
- Roy, B., Tarnopolsky, M., MacDougall, J., Fowles, J., & Yarasheski, K. (1997). Effect of glucose supplement timing on protein metabolism after resistance training. *Journal of Applied Physiology (Bethesda, Md.: 1985)*, 82(6), 1882-1888
- Ryckman, R. M., Dill, D. A., Dyer, N. L., Sanborn, J. W., & Gold, J. A. (1992). Social perceptions of male and female extreme mesomorphs. *Journal of Social Psychology*, 132(5), 615-627.
- Santos, A., da Rocha, M., & da Silva, M. (2011). Illicit use and abuse of anabolic-androgenic steroids among Brazilian bodybuilders. *Substance Use & Misuse*, 46(6), 742-748.
- Schneider, A. J., & Hong F. (2007). *Doping in sport: Global ethical issues*. London: Routledge.
- Schwarzenegger, A. (2005). In defense of supplements. *Flex*, 23(3).
- Schwarzenegger, A., & Dobbins, B. (1998). *The new encyclopedia of modern bodybuilding*. New York, NY: Simon & Schuster Paperbacks.
- Schwarzenegger, A. & Hall, D. K. (1977). *Arnold: The education of a bodybuilder*. New York, NY: Simon & Schuster Paperbacks.
- Senchina, D. (2013). Athletics and herbal supplements. *American Scientist*, 102(2), 134-141.
- Shea, B. (2001). The paradox of pumping iron: Female bodybuilding as resistance and compliance. *Women And Language*, 24(2), 42-46.
- Sherman, J. (2011). *Superheroes, and social realities in a hard core bodybuilding gym*.

- Retrieved from ProQuest Digital Dissertations.
- Skemp-Arit, K. M. (2006). Body image dissatisfaction and eating disturbances among children and adolescents: prevalence, risk factors, and prevention strategies. *The Journal of Physical Education, Recreation & Dance*, 77(1), 3-10.
- Slade, P.D. (1994). What is body image? *Behavior Research and Therapy*, 32, 497–502.
- Slater, G., Tan, B., & Teh, K. (2003). Dietary supplementation practices of Singaporean athletes. *International Journal of Sport Nutrition & Exercise Metabolism*, 13(3), 320-332.
- Sobel, J., & Marquart, L. (1994). Vitamin/mineral supplement use among athletes: a review of the literature. *International Journal of Sport Nutrition*, 4(4), 320-334.
- Smith, D. W. (2011). “*Phenomenology*”, *the Stanford encyclopedia of philosophy*. Retrieved from <http://plato.stanford.edu/entries/phenomenology/>
- Smolak, L., Murnen, S. K., & Thompson, J. K. (2005). Sociocultural influences and muscle building in adolescent boys. *Psychology of Men and Masculinity*, 6, 227-239.
- Spradley, J. (1980). *Participant observation*. NY: Holt, Rinehart, and Winston.
- Stebbins, R. (1992). *Amateur, professionals, and serious leisure*. McGill-Queen's University Press.
- Steen, S. (1991). Precontest strategies of a male bodybuilder. *International Journal of Sport Nutrition*, 1(1), 69-78.
- Stoddard, M. G., & SerVaas, C. (1990). Marketing fitness with the President and Arnold Schwarzenegger. *Saturday Evening Post*, 262(5), 42-110.

- Stout, J.R., Eckerson, J., Noonan, D., Moore, G. & Cullen, D. (1999). Effects of 8 weeks of creatine supplementation on exercise performance and fat-free weight in football players during training. *Nutrition Research*, 19(2), 217-225.
- Strauss A., & Corbin, J. M. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. London: Sage Publications.
- Swirzinski, L., Latin, R., Berg, K., & Grandjean, A. (2000). A survey of sport nutrition supplements in high school football players. *Journal of Strength & Conditioning Research (Allen Press Publishing Services Inc.)*, 14(4), 464-469.
- Taylor, L., Poole, C., Pena, E., Lewing, M., Kreider, R., Foster, C., & Wilborn, C. (2011). Effects of combined creatine plus fenugreek extract vs. creatine plus carbohydrate supplementation on resistance training adaptations. *Journal of Sports Science & Medicine*, 10(2), 254-260.
- Thompson, J. K. (1999). Body image, bodybuilding, and cultural ideal of muscularity. *Mesomorphosis*, 30, 1–6.
- Thompson, D. (2001). Prolonged vitamin C supplementation and recovery from demanding exercise. *International Journal of Sports Nutrition*, 11, 466-481.
- Thorne, G. & Embelton, P. (2000). *Musclemag International's anabolic edge: Secrets for that extra lean muscle mass*. Mississauga, ON: Robert Kennedy Publishing.
- Tian, H., Ong, W., & Tan, C. (2009). Nutritional supplement use among university athletes in Singapore. *Singapore Medical Journal*, 50(2), 165-172.
- Timbo, B., Ross, M., McCarthy, P., & Lin, C. (2006). Dietary supplements in a national survey: Prevalence of use and reports of adverse events. *Journal of the American*

- Dietetic Association, 106(12), 1966-1974.*
- Tscholl, P., Alonso, J. M., Dollé, G., Junge, A., & Dvorak, J. (2010). The use of drugs and nutritional supplements in top-level track and field athletes. *American Journal of Sports Medicine, 38(1), 133-140.*
- United States Anti-Doping Agency "USADA". (2013, March 25). Retrieved from <http://www.usada.org/>
- Vartanian, L. R., Giant, C. L., & Passino, R. M. (2001). 'Ally McBeal vs. Arnold Schwarzenegger': Comparing mass media, interpersonal feedback and gender as predictors of satisfaction with body thinness and muscularity. *Social Behavior and Personality, 29(7), 711-723.*
- Wacker, J. G. (1998). A definition of theory: Research guidelines for different theory-building research methods in operations management. *Journal of Operations Management, 16, 361-385.*
- Walberg-Rankin, J., Edmonds, C., & Gwazdauskas, F. (1993). Diet and weight changes of female bodybuilders before and after competition. *International Journal of Sport Nutrition, 3(1), 87-102.*
- Weider. (2013, March 24). Retrieved from <http://weider.com/en/>
- Whey Protein. (2008). *Alternative Medicine Review, 13(4), 341-347.*
- Wiegers, Y. (1998). Male bodybuilding: the social construction of a masculine identity. *Journal of Popular Culture, 32(2) 147-162.*
- Wright, S., Grogan, S., & Hunter, G. (2001). Body-builders' attitudes towards steroid use. *Drugs: Education, Prevention and Policy, 8, 91–95.*

- Yesalis, C., Barsukiewicz, C., Kopstein, A., & Bahrke, M. (1997). Trends in anabolic androgenic steroid use among adolescents. *Archives of Pediatrics & Adolescent Medicine, 151*(12), 1197-1206.
- Yin, R. K. (2003). *Case study research*. Thousand Oaks, CA: Sage Publications.
- Ziegler, P. J., Nelson, J. A., & Jonnalagadda, S. S. (2003). Use of dietary supplements by elite figure skaters. *International Journal of Sport Nutrition & Exercise Metabolism, 13*(3), 266-276.

## APPENDICES

## APPENDIX A

**Principal Investigator: Kevin King**

**Study Title: Amateur Bodybuilders' Perceptions of Supplements**

**Institution: Middle Tennessee State University**

Name of participant: \_\_\_\_\_ Age: \_\_\_\_\_

The following information is provided to inform you about the interview and your participation in it. Please read this form carefully and feel free to ask any questions you may have about this interview and the information given below. You will be given an opportunity to ask questions, and your questions will be answered. Also, you will be given a copy of this consent form. Your participation is voluntary and you are also free to withdraw at any time.

You are being asked to participate in this interview because the goal is to determine the perceptions, knowledge, and attitudes of amateur bodybuilders regarding supplementation usage. Your responses will be audio taped.

Your personal identities and any identifying information will not be reported within the study. Any information you provide that is quoted within the study will be listed under a pseudonym and not your actual name.

We can pause to rest at any time during the interview or stop if you choose to do so. However, this is an opportunity to share your story helping to preserve the past and hopefully enjoy yourself as well.

All efforts, within reason, will be made to keep the personal information in your research record private but total privacy cannot be promised. Your information may be shared with the MTSU Institutional Review Board, the Office of Human Research Protections, if you or someone else is in danger or if we are required to do so by law.

**If you should have any questions about this interview please feel free to contact me or my Faculty Advisor.** For additional information about giving consent or your rights as a participant in this interview, please feel free to contact the Office of Compliance.

**STATEMENT BY PERSON AGREEING TO PARTICIPATE IN THIS INTERVIEW**

**I have read this informed consent document and the material contained in it has been explained to me verbally. I understand each part of the document, all my questions have been answered, and I freely and voluntarily choose to participate in this interview.**

---

Date

---

Signature of Interviewee

Consent obtained by:

---

Date

---

Signature of Interviewer

---

Printed Name and Title

## APPENDIX B

### INTERVIEW GUIDE

#### **SECTION ONE**

Information: Amateur bodybuilders wanted for a research study. All participants must be adult amateur bodybuilders who have never won an IFBB state, regional, or national competition. Participants must plan on competing in a professional show within the next twelve months to qualify.

Purpose: This research focuses on surveying adult amateur bodybuilders to explore their respective of supplementation usage through the use of a selection of open-ended questions. Through individualized one hour long interviews, this research hopes to elicit a better understanding of supplementation usage among adult amateur bodybuilders.

Informed Consent – see Appendix A

#### **SECTION TWO**

1. How long have you been involved in bodybuilding?
2. Why did you get involved in bodybuilding?
3. What age were you when you started bodybuilding?
4. Currently, how many days a week do you work out?
5. On days you work out, how much time do you work out on a typical day?
6. How and why did you get involved in weightlifting or bodybuilding?
7. What percentage of your workout is strength training?
8. Do you have muscle soreness after exercising?
9. Do you feel you need more rest than others because you workout so hard?
10. Do you exercise at a high heart rate?
11. Do you or have you ever worked out so hard you got sick?
12. Have your workouts every interfered with your relationship with others? If so, why?
13. Do your workouts take priority over social events? If so, why?
14. Do your friends think you workout too much?
15. If you miss a workout, have you “doubled up” the next day? If so, why?
16. Would you say you want to have a bigger, stronger body? If so, why?
17. Does working out feel like an addiction to you? If so, why?
18. Describe to me how you feel about the following. How satisfied are you with your:
  - Lower torso (buttocks, hips, thighs, legs)
  - Mid torso (waist, stomach)
  - Upper torso (chest, shoulders, arms)

- Muscle tone
  - Overall appearance
19. Compared to your desired weight, how would you describe your current weight?
20. Do you think others view you as this way or a different way?
21. Do you have difficulty gaining, maintaining, or losing weight?
22. Do you take in large amounts of food to build your body?
23. Do you get irritable before meals?
24. Do you get hungry between meals?
25. Do you strictly follow lots of rules about your diet?
26. Are your meals and the types of food you eat specifically designed to enhance your workout and physique?

### **SECTION THREE**

27. What types of dietary supplements do you currently use or in the past have you taken because of bodybuilding?
- Do you currently or in the past have you taken vitamin supplements?
  - Do you currently or in the past have you used a pre-workout supplement that has caffeine, etc.?
  - Do you currently or in the past have you used a protein supplement?
  - Do you currently or in the past have you used creatine?
  - Do you currently or in the past have you used anabolic steroids, prohormones, or HGH?
28. Can you think of any other supplements in the past you may have used for an extended or even a brief time?
29. How satisfied are you with the supplements you are currently taking?
30. How often do you switch up supplement types and brands?
31. Do you notice a difference when you switch between product brands of a particular type of supplement?
32. How often do you take dietary supplements?
33. What are your reason(s) for taking dietary supplements?
- Ex: Medical Needs, Medical Deficiency, Health Maintenance/Prevent Nutritional Deficiency, Increase or Maintain Muscle Mass, Increase Endurance, Increase Energy, Improve Exercise Recovery, Enhance Immune System/Prevent Illness, Other Reason
34. Where do you purchase your dietary supplement(s)?
35. Have you ever attended a seminar(s) on dietary supplements?
36. How important is it to you to receive information about dietary supplements?
37. Where do you most often receive information about dietary supplements?
38. Which way do you prefer to receive information about dietary supplements?
39. What kind of information would be most useful to you regarding dietary supplementation? (i.e. effective supplements, safety concerns or risks, understanding product labels, other information)?

40. How would you rate your diet with supplements, what about without?
41. If you stopped taking your dietary supplements would this affect your performance?
42. Do you feel you need supplements to achieve the body you want?
43. Do you feel you need supplements to achieve the workout you feel you need to get the body you want?
44. What do you do when someone you know says a supplement is good?
45. If you saw a supplement with one or more sport personalities endorsement, or claims some named sportspeople used it, would you buy it on that basis?
46. You want to buy a specific type of supplement. What would make you purchase it?
47. If your doctor is warning you off supplements, would you stop?
48. If you receive a minor negative reaction to a supplement, would you stop?

## **SECTION FOUR**

49. Is there anything we did not discuss concerning supplement usage and bodybuilding that you feel like sharing?
50. Did you feel this interview covered all the necessary topics for bodybuilding and supplement usage?
51. Would you like to voice any issues or concerns regarding bodybuilding and dietary supplements?
52. Would you like to voice any issues or concerns regarding efficacy of this interview?

## APPENDIX C

### NUTRITIONAL SUPPLEMENT USAGE

Bodybuilders take nutritional supplements:

- 1. To help them achieve an ideal body**
  - a. Bodybuilders are, in general, dissatisfied with their bodies
  - b. Dissatisfaction may be broad based or focus on specific aspects of their body
    - i. Bodybuilders feel they have insufficient muscle size and tone
    - ii. They desire to increase bodyweight, but decrease body fat
  - c. Dissatisfaction is rooted in their desire to attain “the perfect body” as constructed and presented by the bodybuilding culture and the media
    - i. Amateur bodybuilders desire to look like professional bodybuilders
    - ii. Many bodybuilders desire to look like sculptures of art
  - d. Many bodybuilders base perceptions of their body image from how they view themselves and how others view them
    - i. Bodybuilders have feelings of skepticism about their size
    - ii. They realize others do not view them as small
  - e. Since their ideal is practically unattainable, few bodybuilders are ever satisfied with their physical appearance and are constantly striving to improve

- f. Many bodybuilders invest significant time and energy in an effort to reach this ideal, to the point of obsession
  - i. Longevity of commitment for involvement
  - ii. Time involvement for each week
  - iii. Time involvement for each training session
- g. Many bodybuilders emphasize nutrition as a way of reaching this ideal
  - i. Bodybuilders want to consume large quantities of food and supplements
  - ii. Bodybuilders have strict guidelines for food and supplements
- h. Many bodybuilders use various legal and illegal supplements to reach this ideal

**2. To increase their strength and enhance their performance**

- a. Bodybuilders perceive that performance enhancement requires supplement usage
- b. Performance is reflected through intensity during training and the need for recovery after training
- c. Many bodybuilders use various legal and illegal supplements to enhance performance

**3. They believe the positive benefits outweigh possible negative consequences**

- a. Bodybuilders do not trust supplement companies or endorsers, but still utilize the product based on research behind each supplement

- i. Many bodybuilders choose supplements based on the effectiveness and cost of each supplement
- b. Bodybuilders acknowledge the lifestyle and usage of certain supplements may cause a lack of understanding for those in their social life
- c. Bodybuilders recognize the dangers for adverse side effects from supplementation

## APPENDIX D: IRB Approval



September 9, 2013

Kevin King, Colby B. Jubenville  
Department of Health and Human Performance  
[kmk3r@mtmail.mtsu.edu](mailto:kmk3r@mtmail.mtsu.edu), [Colby.Jubenville@mtsu.edu](mailto:Colby.Jubenville@mtsu.edu)

Protocol Title: "AMATEUR BODYBUILDERS' PERCEPTIONS OF SUPPLEMENTS"

**Protocol Number: 14-064**

Dear Investigator(s),

The exemption is pursuant to 45 CFR 46.101(b) (2). This is because the research being conducted involves the use of educational tests, survey procedures, interview procedures or observation of public behavior.

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 **September 9, 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](http://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*  
Andrew W. Jones  
Compliance Office  
Graduate Assistant to:  
Kellie Hilker  
[Compliance@mtsu.edu](mailto:Compliance@mtsu.edu)