THE EFFECTS OF VIDEO GAME AND COMIC BOOK CHARACTER VIEWING
ON MIDDLE SCHOOL BOYS’ DRIVE FOR MUSCULARITY AND BODY
SATISFACTION

by

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Abstract

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The purpose of this experimental study was to determine whether viewing video game and comic book characters, depicting the current idealized muscular male body ideal, would affect 6th through 8th grade middle school boys’ drive for muscularity and body satisfaction. A second purpose of this study was to examine the relationship between maturational timing and concomitant somatotypes and the drive for muscularity and body satisfaction in the same age group of boys. The participants of the study included 54 (n=54) middle school boys in grades 6 through 8 from two local middle schools in Humboldt County. Twenty-one (n=21) 6th graders, 15 7th graders and 18 8th graders were randomly assigned to one of three experimental groups; Control Group, Experimental Group 1 (muscular images) and Experimental Group 2 (non-muscular images). This study utilized the Drive for Muscularity Scale (DMS) (McCreary & Sasse, 2000) to measure the subject degree of drive for muscularity and the Body Parts Satisfaction Scale (Slade et al, 1990) to evaluate levels of body satisfaction. The results did not support the hypothesis that boys who viewed pictures of hyper-muscled comic book and video game characters would have a higher drive for muscularity and lower body part satisfaction; in fact there was an overall decrease in DM and an increase in BPS pretest to posttest in this
population. Additionally, a trend suggested that perceived mesomorphs had a greater DM than perceived endomorphs and ectomorphs.
Dedication

To my family,
Thank you for your support and love and patience. I love you more than words can say.

And to Bronze…. 
Acknowledgements

Thank you to my committee, Dr. Anthony Kontos, my Chair, Dr. Justus Ortega and Dr. Kathy Munoz, for your support, guidance and assistance in achieving this goal. I did not do this thesis the easy way and way back in 2002, I wanted to finish this program but life got in my way. When I came back in 2008, Dr. Munoz and Dr. Sue MacConnie both supported my desire and efforts and here it is, finally done! Thank you for realizing I was determined to finish this and for supporting me all the way! Dr. Kontos, my Chair, has been an invaluable source of support, direction, smart feedback and he always kept me on track. He was the perfect choice as my chair and I am forever grateful for everything he has done for me.

On a more personal note, to Dave, my husband, who has sacrificed time and energy and sleep to help get me through this very long process-I love you more than words can say and thank you from the bottom of my heart! And to Galen and Ella, my amazing children, who have tolerated a sometimes absent-minded and grumpy mom with such patience and grace and wonderful hugs-I love you and I am the luckiest mom in the world! I must thank my parents who have never once given up on me and have supported me endlessly in anything I have put my mind to during my life. I love you so very very much! And Gregg, your pride in me has helped me keep going when sometimes I really didn’t want to-I love you!

And to my friends…Karen, Rebecca, Ruth, Stace, Pat…who listened and supported and supported and encouraged…I heard everything you said and thank you!!
To McKinleyville Middle School, principal Wendy Pearcy, PE teachers Enrique Esparza, Rand Hall, Kevin Tinkhum and Dave Deason and the administrative assistant- a enormous thank you for all of your time and assistance. Without you this study wouldn’t have happened. And to the 6th, 7th and 8th grade boys, you were gracious and kind and fun and thank you for your bravery and honesty for participating in my study.

To Trinidad Union School, Mr. Proust, Mr. Vack and the boys of the 7th and 8th grades-without you, I was not sure this study would work. I came in fast and serious and you were right there with me and helped me to make this study a success-thank you!
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Chapter 1

Introduction

Problem Statement

Danny is a 14 year old early maturer who has a predominately endomorphic somatotype. His mom describes him privately as having a “tire around his tummy.” He plays actively with his friends at school and even plays recreational basketball. His friends do not say much about Danny’s body shape because they look pretty much the same, with the exception of Frank, who is tall and skinny and Joe, who is small and thin for his age. Danny is an avid fan of video games, particularly “shooter”, “super-hero” and sport games. Many of the male characters in the games he plays look like the Incredible Hulk with unrealistically huge chest and arm muscles, “six-pack abs”, slender waists, and muscular legs. When Danny plays sports games like baseball or basketball he creates his own “avatar” to represent him. He has the choice of selecting characters ranging from normal to large/fat to muscular. He always selects a muscular character because that is what he wishes he looked like. This same muscular ideal is reinforced in the images that Danny sees in the comic books and sports magazines he reads. Danny believes that his current body is not very good compared to the characters he sees, and he is not very happy with his body. As a result of constantly being bombarded with muscular body image ideals that do not match his own body, Danny has started lifting weights and has begun taking a protein supplement that he hopes will make him bigger and stronger right now.
Body image dissatisfaction and related issues have traditionally been perceived as primarily female concerns. Over the past 20 years, research has correlated the media’s ideal female body type—tall, thin, large-breasted—with a range of health problems among girls and women, such as body dissatisfaction, drive for thinness and eating disorders (Barker & Galambos, 2003; Bearman, Martinez & Stice, 2006; Labre, 2002). Research by Rosenblum and Lewis (1999) reported a dramatic rise in body dissatisfaction in females following puberty, the time during which the development of fatty tissue on the waist and hips occurs. The increase in body fat may result in a body that is less in line with the female cultural body ideal, which might lead to body dissatisfaction in young women. In a meta-analytic review of 25 experimental studies examining thin media images of females in relation to body dissatisfaction, 6 of the studies focused on youth between the ages 9 and 18 years. Among the studies focusing on youth, body image perceptions were significantly more negative than in those studies involving adults (Groesz, Levine & Murnen, 2002). In a study that compared idealized images of advertising among female college students, Richins (1991) reported that the idealized images raised comparison standards for beauty and lowered body and appearance satisfaction.

Research on body satisfaction during adolescence has largely excluded boys until the last fifteen years. Although females have been inundated with unrealistic culturally-ideal body images in magazines, movies, and television since the introduction of the thin ideal in the late 1960s, males, too, have been and are exposed to an unrealistic body ideal. The male cultural-ideal has evolved from the 1970’s naturally muscular body type into
what we see today. The culturally ideal male body type of the past decade has evolved into a taller than average, inordinately muscular male with oversized chest, arms, and thighs, “six-pack” abdominals, and a small waistline. Pope et al, (2000) in the book *The Adonis Complex*, points out that this male body ideal is an unnatural build only achievable through use of steroids or extreme training. The unrealistic cultural male ideal body is evident in men’s magazines, on television and in movies, and on billboards that advertise products to young men. However, the influence of the media is not limited to adult males. As reported in the Philadelphia Inquirer (October 2009), Halloween costumes for children as young as 4 years are being filled with padding to create an unrealistically muscular body that conforms to the male cultural ideal. The costumes, which are also cinched at the waist to reflect the idealized narrow waist, have become popular with children. Rubie’s Costume Company offers padded Superhero costumes with “Deluxe Muscle Chest” in Superman, the Flash, Robin, Batman, Zorro and the Green Lantern. There are other “deluxe” models with enhanced musculature of the chest and abdominals (Rubies.com).

Research studies focusing on male body issues and the media are not as prevalent as those examining the same issues with females. Fortunately, studies focusing on males are becoming more common. One study by Hargreaves and Tiggemann (2006) reported that boys, aged 14 to 16 years, were not influenced by the media’s portrayal of the lean and muscular male ideal body type. However, boys in this study used the media for style guidance and they evaluated their bodies in relation to cultural ideals, often wishing to be taller and heavier than they were. Jung and Peterson (2007) studied body dissatisfaction
and patterns of media use in children ages 8 to 11 years. The researchers reported that preadolescent boys desired to have a heavier body size and also showed an increased attraction toward and recall of muscular appearances and athletic ability in the media. Field et al (2005) investigated adolescent boys and girls aged 12 to 18 years to assess the prevalence and correlates of products used to improve weight and shape. They concluded that approximately 4.7% of boys used protein powders or shakes, creatine, amino acids/HMB, dehydroepiandrosterone (DHEA), growth hormone, or anabolic/injectable steroids at least once a week to improve appearance or strength. Boys who read men’s fashion or health/fitness magazines were significantly more likely than their peers to use products to improve strength or appearance. The authors concluded that boys who frequently thought about wanting toned or well-defined muscles were more at risk for using potentially harmful substances to enhance their musculature. The majority of recent studies report that body dissatisfaction is a growing concern among adolescent boys (Jones, 2004; Kostanski, Fisher & Gullone, 2004; Presnell, Bearman, & Stice, 2004). Moreover, Pope, Phillips and Olivardia (2000) reported that men considered body satisfaction issues a hidden problem that they are not supposed to discuss. The authors concluded that men, like women, do have body dissatisfaction issues, but are not as free to express them. This hidden nature for body image issues among men is likely to exist if not be exaggerated among adolescent boys where social conformity pressures are even greater.

Researchers are examining male body dissatisfaction and finding multiple factors having an effect on it. One factor researchers are examining in its impact on body
satisfaction is the male maturational process. Boys, who typically mature later than girls of the same age, continue to grow in stature and weight and may, initially, not feel distress in gaining weight because that is what they want. However, teasing about appearance (Barker & Galambos, 2003), internalization, Body Mass Index (BMI) (Jones, Vigfusdottir & Lee, 2004), low socioeconomic status (O’Dea & Caputi, 2001), and negative parental comments (Rodgers, Paxton & Chabrol, 2009) also contribute to body dissatisfaction in males. In a review of 17 studies on body image and male students under the age of 18 years, researchers reported that although males were more satisfied with their bodies than females, boys of all ages reported body dissatisfaction, often accompanied by low self-esteem. Moreover, most males in the study reported that they wanted to be bigger than they were (Cohane & Pope, 2001).

Nature of the Problem

Introduction to body image. Body image reflects how people perceive their body, incorporating thoughts, feelings and behaviors (Lox et al, 2006). Body image comprises three dimensions: behavioral, cognitive/perceptual and affective. The behavioral dimension reflects positive or negative thoughts that are exhibited in our actions toward our body, such as, how we dress or what activities we participate in. The cognitive/perceptual dimension reflects how we think about our body functionally and aesthetically. This includes positive and negative self-talk and what we believe about our body, and incorporates how we visualize our body type; be it tall and lean, or short and weak. The affective, or emotional, dimension relates to how we feel about our body,
evoking positive, indifferent or negative feelings about functionality or aesthetics. A person with a healthy body image has positive self-evaluations among the three dimensions. A person with an unhealthy or negative body image has negative self-evaluations in one or all of the dimensions. People with a healthy body image have better self-esteem and lower risk for anxiety and depression (Lox et al, 2006). Body reality incorporates physical characteristics including height, weight, and percentage of body fat, lean body mass, and somatotypes. Conversely, body ideal describes what an individual thinks their body looks like or should look like (Lox et al, 2006).

**Body image and the media.** The media and popular culture may adversely affect adolescents’ perception of their body image. A study by Spitzer, et al, (1999), examined gender differences in body sizes as portrayed in the media to actual population statistics over the past four decades. The authors compared the media ideals of Playboy (female) and Playgirl (male) centerfolds and Miss America Pageant winners to the body sizes of young American women and men, aged 18 to 24 years. From the 1950’s to the present time, body sizes of Miss America Pageant winners and Playboy centerfolds have decreased significantly and remain below a normal, healthy bodyweight. Concurrently, Playgirl centerfolds and U.S. men and women’s body sizes have increased significantly. The Playgirl centerfold weight increase is due to an increase in musculature, whereas the weight increase in U.S. males and females is because Americans are fatter. In a similar study by Leit, Pope and Gray (1999), the researchers evaluated changes in centerfold models from Playgirl magazine, between 1973 and 1997. They studied the reported heights and weights from the magazine and used visual estimates of body fat to estimate
Body Mass Index (BMI) and Free Fat Mass Index (FFMI). Visual estimates were determined by a rater who estimated percentage of body fat of each man in a photograph. The researchers concluded that the models had become more muscular, with lower BMI and higher FFMI, over time. This same trend in musculature is evident in the evolution of male action figures, which can influence perceptions of the “ideal” male body type among youth. Pope et al (1999) obtained models of the most popular American action toys manufactured, for example, GI Joe, dating back to 1964 and the Star Wars action figures, beginning in 1978. The researchers measured the waist, chest, and biceps circumference of each action figure and scaled them to the proportional size of an actual man. The researchers reported that the action figures had become more muscular over time and that many of the newest action figures exceeded the musculature of today’s largest human bodybuilders.

*Body image and body dissatisfaction.* The pressure to fit into a body image ideal may lead to body image disturbance. The idea of looking a certain way begins early. When asked to choose a preferential body type, boys as young as 5 and 6 years old, chose a mesomorphic (i.e., well-proportioned, muscular build) body type over both endomorphic (i.e., fat, soft) and ectomorphic (i.e., thin, lanky) (Mishkind et al, 1986). In an effort to understand body image disturbance and why youth want to look a certain way, studies have been conducted to determine what risk factors may contribute to the development of body dissatisfaction in adolescent boys and girls. Barker and Galambos (2003) developed a conceptual model of multiple risk factors that may lead to body dissatisfaction in adolescent boys and girls. Physical risks included pubertal status, body
mass index (BMI) and figure management behavior (weight lifting or dieting).

Contextual risks included teasing about appearance and involvement in pop culture. Resource risks incorporated mother and father acceptance, sports activity involvement and church/religious activity involvement. The researchers reported that teasing about appearance and strength was related to increased body dissatisfaction in males. Al Sabbah et al (2009) conducted an international study examining body weight dissatisfaction among youth in 24 countries as determined by reporting being on a diet to lose weight or needing to lose weight. The authors concluded that difficulties talking to the male parent were associated with weight dissatisfaction among boys and girls. Interestingly, the authors also reported that among adolescent boys, the countries with the highest rates of body weight dissatisfaction were Italy (39.9%), USA (37.7%), and Greece (35.2%). These three countries all ascribe to the current idealized masculine body types. Cohane and Pope (2001) reported a positive correlation between self-esteem and body image satisfaction in an analytical review of 17 studies focusing on body image in boys. They concluded that body dissatisfaction in boys is common and is often associated with psychological distress. The majority of the studies they reviewed reported that boys wanted to be bigger, but the studies failed to distinguish between being bigger due to increased fat or increased muscle. The researchers recommended further studies to distinguish between increased fat and increased muscle, as the primary body image pressure on males is to be muscular. Ricciardelli and McCabe (2001) also reported a correlation between negative affect and strategies to increase muscle among adolescent boys. In a study of college-age men, Cahill and Mussap (2007) reported increased body
dissatisfaction correlated with muscle development after exposure to photographs of muscular male models.

*Drive for muscularity.* The motivation to increase muscle mass and tone is referred to as the drive for muscularity (McCreary & Sasse, 2000). The drive for muscularity among boys has been linked to various cultural influences. Cafri et al (2005), developed a heuristic model consisting of seven constructs that contribute to the development of the drive for muscularity. The constructs include: (a) biological factors-body composition, BMI, pubertal timing; (b) psychological functioning-negative affect, self esteem; (c) social body comparison; (d) societal factors-peer/parental pressure, media influence, teasing; (e) body dissatisfaction-percentage of body fat, lean body mass; (f) health risk behaviors-dieting to lose or gain weight/muscle, use of steroids; and, (g) sports involvement-weight lifting, organized or recreational sports. Harrison and Bond (2006) evaluated gaming magazines (the media) and the drive for muscularity in preadolescent boys. The researchers reported exposure to video game magazines predicted a significant increase in the drive for muscularity, particularly among Caucasian boys.

*Consequences of drive for muscularity.* Use of ergogenic aids, such as steroids and creatine, may be a consequence of the drive for muscularity. Use of steroids in adults is linked to many health related issues, while the consequences of creatine use among adolescents has not been thoroughly studied. In a study by Metzl et al (2001), creatine was used among young athletes. Middle and high school athletes, aged between 10 and 18 years, were surveyed during their annual sports pre-participation physical
examination. 5.2% of participants reported taking creatine. The common reasons cited for taking the creatine were, improved performance (74.2% of users) and improved appearance (61.3%). In a study evaluating college aged men, the authors reported that men with drive for muscularity have lower self-esteem and use quick fixes, such as supplements, to increase muscle mass. These men may also become exercise dependent as a consequence of their desire to achieve greater muscle mass (Chittester & Hausenblas, 2009).

Drive for muscularity in males can also lead to muscle dysmorphia (MD), which is one form of Body Dysmorphic Disorder (BDD) that tends to affect males more than females (Leone, et al, 2005). Body Dysmorphic Disorder is characterized by a consuming obsession with a nonexistent or slight defect of the body appearance (Pope, Gruber, Choi, Olivardia & Phillips, 1997). Individuals with BDD are usually overly concerned and anxious about a specific body part such as the face, hair, nose or skin. Often, the flaw a person with BDD is anxious about is not noticeable to others, but very real to the person. (Leone, Sedory & Gray, 2005). Individuals with MD, on the other hand, have a pathological obsession with the whole body. They are consumed with the fear they are not muscular enough so they focus their life on excessive weight lifting, extreme dieting and other similar behaviors (Pope, et al, 1999). Among the typical behaviors associated with MD are: engaging in extreme exercise, especially resistance training; spending many hours lifting weights; constantly checking themselves in a mirror; avoiding socially evaluative situations where they may appear muscularly small; comparing their muscular build to others; paying extreme attention to diet; lifting while injured; feeling anxiety
after missing a workout; neglecting family, friends, and job in order to exercise; and using anabolic steroids to enhance muscle mass (Waldron, 2009). Pope et al (1997) proposed diagnostic criteria for MD: (1) a preoccupation with the idea that one’s body is not sufficiently lean and muscular- associated behaviors include long hours lifting weights and excessive attention to diet; (2) preoccupation causes clinically significant distress or impairment in social, occupational, or other important areas of functioning, as demonstrated by at least two of the following four criteria: (a) the individual frequently gives up important social, occupational, or recreational activities because of a compulsive need to maintain his or her workout and diet schedule; (b) the individual avoids situations where his or her body is exposed to others, or endures such situations only with marked distress or intense anxiety; (c) the preoccupation about the inadequacy of body size or musculature causes clinically significant distress or impairment in social, occupational, or other important areas of functioning; (d) the individual continues to work out, diet or use ergogenic substances despite knowledge of adverse physical or psychological consequences. The primary focus of the preoccupation and behaviors is on being too small or inadequately muscular, as distinguished from fear of being fat, as in anorexia nervosa, or a primary preoccupation only with other aspects of appearance, as in other forms of BDD. Ricciardelli and McCabe (2004) conducted a review of the literature focusing on a biopsychosocial model of disordered eating and how it relates to the drive for muscularity in adolescent boys. They concluded that several risk factors are consistently associated with disordered eating in adolescent boys, including BMI, negative affect, self-esteem, perfectionism, drug use, perceived pressure to lose weight
from parents and peers and participation in sports that focus on leanness. The researchers also reported that further investigation is needed to determine whether drive for muscularity is a subset of disordered eating or BDD.

Maturation and body image. Maturational timing, also known as pubertal timing, in adolescent boys may affect body satisfaction and the drive for muscularity. Each individual has an internal clock that determines the speed at which they will mature. The process of maturation does not necessarily coincide with a child’s age. The three systems used as indicators of biological maturation are sexual maturation, skeletal maturation, and somatic maturation. Sexual maturation is a process beginning with the embryo, through puberty—the transitional period in the process from child to adult sexual characteristics—to full sexual maturity and fertility. Maturation of the skeleton follows the evolution of a skeleton of cartilage to a complete skeleton of bone. Somatic maturation follows the development of height, growth spurts and age at peak height velocity (Malina et al, 2004).

Pubertal timing, early, ‘on time’ or late, is still being studied to determine its influence on adolescent male and female self-esteem, depression, body satisfaction and the drive for muscularity. In a study looking at pubertal timing in females, Williams and Currie (2000) reported early maturation and lower ratings of body image were associated with lower levels of self-esteem in 11-year old girls. In a study on the relationship between pubertal timing and depressive symptoms among adolescent boys and girls, the authors reported differences for males and females. Specifically, males tended to be more depressed pre-puberty due to perceptions that they were not as developed or physically
large as their peers, whereas girls exhibited more depressive symptoms post-puberty due to perceptions they were overweight and more developed than their peers (Vogt Yuan, 2007). McCabe et al (2002) conducted a study exploring body change strategies among adolescents, and the impact of pubertal timing, relationships with peers and perceived media pressure on body dissatisfaction in adolescent boys and girls. The authors reported that girls were more likely than boys to adopt weight loss strategies, whereas boys were more likely to incorporate strategies to increase muscle tone, not increase weight. The main predictor of the desire to change the body in boys in years 7 and 9 was puberty and to a lesser degree, perceived popularity with peers. McCabe and Ricciardelli (2004) conducted a longitudinal study of pubertal timing and extreme body change behaviors on adolescent males and females. The authors reported boys were more likely to engage in strategies to increase muscle, compared to girls who were more likely than boys to desire to lose weight. Both sets of behaviors reflect society’s ideal body type dichotomy for males and females. When examining pubertal timing, the authors reported that early maturing boys were more popular with the opposite sex, had higher body satisfaction, were more likely to adopt weight loss and increase muscle strategies and were more likely to use food supplements and be exercise dependent. The authors reported that boys who matured late had higher levels of body dissatisfaction while boys who matured early had lower levels of body dissatisfaction. The authors had expected that late-maturing boys, whose bodies are less likely to conform to the societal ideal, would be more likely to engage in extreme body strategies to increase muscle mass and definition. However, they did not report such results. The authors posited that the reason for this result might
have been that late maturing boys were not focused on their body yet, whereas early maturing boys were focused on their bodies because of their early maturation changes (i.e., muscle mass, stature). The authors recommended further studies to examine this discrepancy.

Conclusion. Although researchers have only recently begun assessing the effects the male body ideal has on males in our society, it is clear that the impact that can be negative. Although males tend not to discuss their body satisfaction, multiple studies have concluded that males’ body satisfaction can be adversely affected. The male body type has evolved in the past 30 years from a relatively achievable slender, muscular body type to one that is grossly over-muscled and unachievable, possibly unattainable even with the use of anabolic steroids. Consequently, the increased drive for muscularity and other potentially negative consequences including muscle dysmorphia and muscle enhancing drug use are trickling down to the male youth of our society. Muscle-enhancing drug use has been reported in middle school aged boys, not only for sports performance improvement, but also for enhanced and increased muscularity. As the pressure to conform to an unrealistic societal ideal increases for middle school boys, they must also contend with what nature has given them- i.e., their biological and maturational processes. A late-maturing boy may feel increased pressure to be muscular through unhealthy means compared to an early-maturing boy. The vision of the overly muscular male body type has passed down from movies, television and magazines into youth magazines, comic books and video games. Researchers have yet to assess empirically the impact of viewing unrealistic muscular male body images, so prevalent now in comic
books and video games, on middle school boys. Additionally, researchers have not evaluated how these images affect the drive for muscularity and body satisfaction among young males. Therefore, it is the goal of this study to determine whether middle school boys’ drive for muscularity and body satisfaction are influenced by viewing current, popular comic book and video game characters.

Purpose of the Study

The purpose of the current study was to determine if viewing images of video game and comic book characters reflecting the cultural male body ideal would affect body dissatisfaction and drive for muscularity among middle school boys in grades 6 through 8. A secondary purpose of the study was to examine the relationship between maturational timing and concomitant somatotypes and drive for muscularity and body dissatisfaction among adolescent boys.

Hypotheses

The following hypotheses were proposed for this study:

H1: Participants in the group that viewed the images of video game and comic book characters reflecting an “ideal” muscular male body would report higher drive for muscularity and lower body satisfaction after viewing the images than before the images were viewed.

H2: Participants who were late maturers would report lower body satisfaction and higher drive for muscularity than those who were early maturers.
H3: Participants with predominately ectomorphic or endomorphic somatotypes would report lower body satisfaction and higher drive for muscularity than those with a predominately mesomorphic somatotype.

The following exploratory question was examined in this study:

Which variables best predict body satisfaction and drive for muscularity in this sample?
Chapter Two

Methods

Research Design

The proposed study used a randomized three groups, pre-post test experimental design (see Table 1). Participants were randomly stratified by grade into one of three groups: 1) Control, 2) Experimental Group 1, and 3) Experimental Group 2. Each group saw only images associated with the group to which they were randomly assigned.

Participants

Participants included 54 boys total, with 21 from 6th grade, 14 from 8th grade and 11 from 7th grade, recruited voluntarily from two local middle schools. Due to issues with obtaining enough numbers in each grade, the researcher recruited an additional four (4) boys in grades 7 and 8 from a second local middle school. Unequal cell size is of concern. Equal cell size is n=15 in each grade 6, 7 and 8, although the lower number in each cell weakens the strength of the study. The boys ranged in age from 11 to -14 years. The study took place in a Northern California coastal climate area where rain, fog and cool weather are the norm for the majority of the year. This data was collected in the months of March and April when heavy rain and colder conditions were the existing conditions. Students tended to be wearing heavier clothes with long sleeves and pant legs.
Table 1.

*Overview of Research Design.*

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-test</th>
<th>Condition</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control n = 17</td>
<td>Body Satisfaction scale</td>
<td>Pretty pictures of scenery</td>
<td>BSS, DMS</td>
</tr>
<tr>
<td>$6^{th}$=7, $7^{th}$=4, $8^{th}$=6</td>
<td>(BSS), Drive for Muscularity Scale</td>
<td>(DMS), demographics, maturation, somatotype</td>
<td></td>
</tr>
<tr>
<td>Randomly stratified for grade</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experiment 1 n=20</td>
<td>BSS, DMS, demographics, maturation, somatotype</td>
<td>Muscular “ideal” characters from comic books and video games; 27 pictures in 3 minutes</td>
<td>BSS, DMS</td>
</tr>
<tr>
<td>$6^{th}$=8, $7^{th}$=6, $8^{th}$=6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Randomly stratified for grade</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experiment 2 n=16</td>
<td>BSS, DMS, demographics, maturation, somatotype</td>
<td>Non-muscular characters in comic books and video games; 27 pictures in 3 minutes</td>
<td>BSS, DMS</td>
</tr>
<tr>
<td>$6^{th}$=5, $7^{th}$=4, $8^{th}$=7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Measures

Demographics. Participants self-reported their date of birth, grade, race-ethnicity, video game use and comic book use on a brief demographic form (See Appendix F). The investigator measured each participant’s height using a portable stadiometer and weight using a digital, portable scale. Parents voluntarily self-reported one or both biological parents’ height. This data was utilized in the Khamis-Roche equation for child’s maturation status.

The Drive for Muscularity Scale (DMS: McCreary & Sasse, 2000). The DMS is a 14-item, self-report survey that measures a person’s perception of whether they are muscular enough and whether muscle mass (bulk) needs to be added. Participants indicate on a Likert-type scale of 1 (Always) to 6 (Never) the degree to which a number of behaviors and attitudes reflect them. The DMS comprises the Muscle Development Behaviors (7 items) and Muscularity-Oriented Body Image Attitudes (7 items) subscales. The DMS was developed using the template of the Eating Attitudes Test (REF), a measure of the desire to be thinner. Lower scores equal a greater drive for muscularity. The DMS is both valid and reliable, with Cronbach’s alphas ranging from .85 to .91 (McCreary et al, 2004: McCreary & Sasse, 2000) (See Appendix A).

Body Parts Satisfaction Scale (Slade et al, 1990). The Body Parts Satisfaction Scale (Slade et al., 1990) is based on the Body Cathexis Scale (Secord and Jourard, 1953). This simple self-report scale assesses satisfaction/dissatisfaction with body parts. The items are rated on a 6-point scale ranging from "very satisfied" to "very dissatisfied."
Higher ratings indicate greater body dissatisfaction. A total and three summative scales (General, Head Parts [above the neck], and Body Parts [below the head]) are derived from the scale. For the purposes of this study, we focused on the total score only. It takes 2–3 minutes to complete. Internal consistency alpha coefficients for the three summative scales range from 0.79 to 0.89. The Body Satisfaction Scale has been shown to correlate positively with the Body Shape Questionnaire (Cooper et al., 1987) (See Appendix B).

**Maturation status.** The Khamis-Roche (Khamis & Roche, 1994) method will be used to determine participants’ maturational status. The Khamis-Roche method involves age-specific equations for the prediction of adult height using a child’s current height, weight and midparent height, the mean of the parents’ heights. Skeletal age (SA) is not necessary for the prediction of child height with the Khamis-Roche method. Researchers report that the Khamis-Roche method is both valid and reliable. Parents will self-report one or both biological parent’s height to be used in the Khamis-Roche equation for maturation (See Appendix H).

**Perceived somatotype.** A modified photoscopic somatotype self-report based on Dixson et al (2003) was used for perceived somatotype testing. The front-facing part-clothed male images, one each ectomorph, endomorph and mesomorph, were presented to the participants on a piece of paper. Participants marked the somatotype that most closely portrayed their body type (See Appendix G).
Procedures

The researcher submitted to the Humboldt State University IRB, the human subjects proposal to work with children in middle school. After IRB approval, the researcher requested and received Administrative Consent and permission from McKinleyville Middle School in McKinleyville, California and Trinidad Union School in Trinidad, California to conduct the study. Once permission was obtained from the administrative level at the schools, a Parental Informed Consent form was sent to all parents of potential subjects. The Parental Informed Consent included a detailed explanation of the process of data collection and the purpose of the study (See Appendix C). An additional form parents were asked to complete included biological parent heights to be used in the Khamis-Roche formula for maturation status. Once all Parental Informed Consent forms were returned, students interested in participating in the study were contacted via their Physical Education instructors. All students participating in the study completed a Child Assent form. This form explained the procedures of the test and outlined the responsibilities of the subjects and affirmed the student’s willingness to participate in the study (See Appendix E). Dates to conduct testing were scheduled. Each grade participated separately. Pre-testing was scheduled one week prior to the treatment testing day.

For the pre-test day, students in each grade convened in groups of two or three during their respective PE class to complete Child Assent Form, the Body Satisfaction Scale (BSS), Drive for Muscularity Scale (DMS), demographic information, and
perceived somatotype assessment. The pre-test questionnaires took approximately 15 minutes for the children to complete. The following week, the researcher conducted the testing. All participants were randomly assigned to a treatment group; Control (1), Experimental Group 2 (muscular images) or Experimental Group 3 (non-muscular images) within each grade. The researcher had two assistants so three children were tested during each 15 minute allotment of time. Each child viewed 27 pictures on a computer for 3 minutes. The pictures viewed varied depending upon the treatment group the student was randomly assigned to. The Control group, group 1, looked at pictures of scenery and animals. Experimental Group 2 looked at images of comic book and video games characters that would be described as fitting into the predominant muscular male body type ideal- i.e., Incredible Hulk (See Appendices J & K). Experimental Group 3 looked at images of video game and comic book characters that would be considered “average” sized and/or “non-muscular” characters (See Appendices L & M). Each child only saw images associated with their treatment group. Post-viewing, each child completed the BPSS and DMS. The testing was conducted in a large music room with only the researchers present. It took approximately 15 minutes to complete the treatment with each individual student. Data collection continued until time ran out. Data collection at McKinleyville Middle School took from March 25 to April 2 and at Trinidad Union School from March 31 to April 13 (spring break was the week of April 5 -9). All student participants were given a chance to win one of three $15 certificates (in each grade) for a gift certificate to a local sports store as a reward for participation in the study. Parents
who provided biological parent height were placed in a drawing for one of three $15 gift certificates to a local coffee shop.

*Data Analysis*

All results were analyzed using SPSS Version 16.0. A descriptive statistical summary was conducted to describe the participants (e.g., age, height, weight, somatotype), and all baseline and posttest measures. A comparison of group differences on descriptive variables was conducted to assess potential baseline differences. A series of 3 (group) x 2 (repeated measures) ANOVAs with BPSS and DMS as the dependent variables was used to test H1. A 3 (maturation) x 2 (repeated measures) ANOVA with BPSS and DMS as the dependent variables was used to test H2. A 3 (somatotype) x 2 (repeated measures) ANOVA with BPSS and DMS as the dependent variables was used to test H3. The exploratory question was tested using a multiple regression with BPSS and DMS as the outcomes. Finally, bivariate correlations were used to explore interrelationships among the continuous variables in the study.

*Sample Size Calculation*

Using a conservative effect size of 0.25, \( p = .05 \) and the 3 (groups) x 2 (repeated measures) ANOVA design for the main research hypotheses in the current study with a total sample size of 54 participants yielded a power of 90%. The power analysis was conducted using GPower version 3.0.
Chapter Three

Results

Introduction

This chapter includes the descriptive statistics for the sample population. This is followed by a review of results for the hypotheses and exploratory question. Tables will be included in the chapter to summarize and more clearly depict the results of the study.

Descriptive Statistics for the Student Demographics

A total of 54 boys participated in this study. The boys ranged in age from 11 to 14 years. There were 21 6th graders, 15 7th graders and 18 8th graders. All 21 6th graders were recruited from one local middle school as were 11 7th graders and 14 8th graders. Due to the small sample size of 7th graders and the desire for a strong study, the researcher added another local middle school to the pool and an additional 4 7th graders and 4 8th graders volunteered to participate in the study. Unfortunately, time limitations prevented the researcher from involving any other local middle schools from the study. A descriptive statistical summary was conducted to describe the participants-age, height, weight- and all baseline and posttest measures. A comparison of group differences of descriptive variables was conducted to assess potential baseline differences. The average age of the participants in the study was 12.94 (SD= 0.91) years. The boys ranged in height from 137.16 meters to 182.24 meters with a mean average of 158.94 meters (SD= 11.15). The participants ranged in weight from 34.05 kilograms to 73.55 kilograms with a mean
average of 52.1 kilograms ($SD= 10.86$). The BMI for each participant ranged from 16.1 to 32.1 with a mean average BMI of 20.53 ($SD= 3.30$). The percent predicted height for the participants ranged from 80.56% to 95.82%, with a mean average of 88.18% ($SD=4.00$). With regard to race/ethnicity, 81% (n=44) of the sample were Caucasian, 11% (n=6) were Native American, 6% (n=3) were Asian and 2% (n=1) were Latino. Overall, for self-reported perceived somatotype, 6th graders reported 15% (n=3) as ectomorph, 20% (n=4) as endomorph and 65% (n=13) as mesomorph. Seventh graders reported 40% (n=6) as ectomorph, 0% (n=0) as endomorph and 60% (n=9) as mesomorph. Eighth graders self-reported 27.8% (n=5) as ectomorph, 5.6% (n=1) as endomorph and 66.7% (n=12) as mesomorph. In total, 26.4% (n=14) of the participants self-reported as ectomorph, 9.4% (n=5) self-reported as endomorph and 64.2% (n=34) self-reported as mesomorph. Of the question, “how often do you read comic books?”, 6th graders reported 1.76 (.83), 7th graders reported 1.4 (.51), 8th graders reported 1.67 (.77) and total mean was 1.63 (.73). Of the question “how often do you play video games?”, 6th graders reported 4.23 (.77), 7th graders reported 3.4 (.63), 8th graders reported 5.5 (6.9) and total mean was 4.42 (4.04). Drive for Muscularity Scale (DMS) was divided into its two parts; Cognitive and Behavioral. DMS Cognitive (Pre-test) ranged from 10.0 to 42.0 with a mean average of 30.45 ($SD=8.24$). DMS Behavioral (Pre-test) ranged from 12.0 to 42.0 with a mean average of 34.35 ($SD=7.58$). Body Parts Satisfaction Scale (BPSS) total (Pre-test) ranged from 10.0 to 37.0 with a mean average of 21.76 ($SD=6.55$).
Reliability of the Measures; Drive for Muscularity Scale and Body Satisfaction Scale

The reliability (i.e., internal consistency) of the scales used to measure drive for muscularity and body satisfaction were determined using Cronbach’s alpha coefficient. Cronbach’s alpha coefficient for the total Drive for Muscularity Scale was .90. This is consistent with the Cronbach’s alpha coefficient, ranging from .85 to .91, reported by McCreary et al (2004) and McCreary & Sasse (2000). Cronbach’s alpha coefficient for the cognitive component of the DMS was .90 and for the behavioral component of the DMS was .87. Cronbach’s alpha coefficient for the Body Parts Satisfaction Scale was .91. The reliability of both studies used in this study was sufficiently high.

Evaluation of Hypotheses

Hypothesis 1- Participants in the group that viewed the images of video game and comic book characters reflecting an “ideal” muscular male body would report higher drive for muscularity and lower body satisfaction than the participants who viewed non-muscular images of video game and comic book characters or those who were in the control group.
Table 2

Descriptive Statistics for Participants.

<table>
<thead>
<tr>
<th></th>
<th>6th Grade</th>
<th>7th grade</th>
<th>8th Grade</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td></td>
</tr>
<tr>
<td><strong>Number (n)</strong></td>
<td>21</td>
<td>15</td>
<td>18</td>
<td>54</td>
</tr>
<tr>
<td><strong>Age</strong>*</td>
<td>11.99 (.31)</td>
<td>13.08 (.52)</td>
<td>13.91 (.33)</td>
<td>13.01 (1.12)</td>
</tr>
<tr>
<td><strong>Mean Height(cm)</strong></td>
<td>153.57 (8.91)</td>
<td>162.26 (11.67)</td>
<td>162.45 (11.11)</td>
<td>158.94 (11.15)</td>
</tr>
<tr>
<td><strong>Mean Weight(kg)</strong></td>
<td>49.72 (10.32)</td>
<td>53.53 (13.34)</td>
<td>53.70 (9.21)</td>
<td>52.10 (10.86)</td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td>20.95 (3.10)</td>
<td>20.03 (2.71)</td>
<td>20.46 (4.04)</td>
<td>20.53 (3.30)</td>
</tr>
<tr>
<td><strong>% Predicted Adult Height</strong>*</td>
<td>84.93 (3.01)</td>
<td>88.62 (3.35)</td>
<td>91.45 (2.45)</td>
<td>88.18 (4.00)</td>
</tr>
<tr>
<td><strong>Time Reading Comic Books</strong></td>
<td>1.76 (.83)</td>
<td>1.40 (.51)</td>
<td>1.67 (.77)</td>
<td>1.60 (.73)</td>
</tr>
<tr>
<td><strong>Time Playing Video Games</strong></td>
<td>4.23 (.77)</td>
<td>3.4 (.63)</td>
<td>5.5 (6.9)</td>
<td>4.42 (4.04)</td>
</tr>
<tr>
<td><strong>DMS:Cognitive</strong>*</td>
<td>29.65 (8.39)</td>
<td>36.28 (4.74)</td>
<td>26.58 (8.0)</td>
<td>30.45 (8.24)</td>
</tr>
<tr>
<td><strong>DMS:Behavioral</strong>*</td>
<td>34.90 (6.90)</td>
<td>38.00 (4.90)</td>
<td>30.47 (8.77)</td>
<td>34.34 (7.58)</td>
</tr>
<tr>
<td><strong>Body Part Satisfaction Scale</strong></td>
<td>22.85 (5.84)</td>
<td>19.46 (7.67)</td>
<td>22.34 (6.17)</td>
<td>21.76 (6.55)</td>
</tr>
</tbody>
</table>

*p<.05; a = significantly different from 6th grade, b = significantly different from 7th grade; c = significantly different from 8th grade.
A series of three 3 (group) x 2 (repeated measures) ANOVAS were used to test this hypothesis. The results of the 3 x 2 ANOVA for DMS cognitive supported a within subjects main effect for the repeated pre and posttest measures (F[1, 47] = 9.68, p=0.003). Specifically, participants reported less drive for muscularity (i.e., higher scores) at posttest than at pretest (i.e., lower scores; see Table 3). However, the results (F[2, 47] = 0.01, p=0.99) did not support a group by repeated pre and posttest interaction for DMS cognitive scores. The results of the 3 x 2 ANOVA for DMS behavioral supported a within subjects main effect for the repeated pre and posttest measures (F[1,49] = 8.88, p=0.004). Participants reported less drive for muscularity (i.e., higher scores) at posttest than at pretest (see Table 3). However, the results (F[2,49] = 2.92, p=.112) did not support a group by repeated pre and posttest interaction for DMS behavioral scores. The results of the 3 x 2 ANOVA for BPSS supported a within subjects main effect for the repeated pre and posttest measures (F[1,51] = 4.38, p=0.041). Specifically, participants reported less drive for muscularity (i.e., higher scores) at posttest than at pretest (i.e., lower scores; see Table 3). The results F[2,51] = .766, p=0.47) did not support a group by repeated pre and posttest interaction for BPSS scores. A summary of all of the means and standard deviations for the above analyses is provided in Table 3.
Table 3

Results for Hypothesis 1-The Effect of Viewing Muscular Images on DMS Cognitive, DMS Behavioral and BPSS Outcomes.

<table>
<thead>
<tr>
<th></th>
<th>Control (n= 15)</th>
<th>Muscular Images (n=19)</th>
<th>Non-Muscular Images (n=16)</th>
<th>Total (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>DMS Cognitive</td>
<td>32.6 (8.33)</td>
<td>30.57 (8.47)</td>
<td>29.25 (7.3)</td>
<td>30.7 (8.0)*</td>
</tr>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMS Behavioral</td>
<td>34.6 (6.65)</td>
<td>32.36 (7.45)</td>
<td>31.18 (7.54)</td>
<td>32.6 (7.54)*</td>
</tr>
<tr>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BPSS Pretest</td>
<td>21.06 (8.33)</td>
<td>21.71 (6.18)</td>
<td>22.47 (5.3)</td>
<td>21.76 (6.48)*</td>
</tr>
<tr>
<td>BPSS Posttest</td>
<td>20.68 (7.73)</td>
<td>21.0 (6.37)</td>
<td>20.76 (5.69)</td>
<td>20.83 (6.48)*</td>
</tr>
</tbody>
</table>

*p<.05
Hypothesis 2- Participants with predominantly ectomorphic or endomorphic somatotypes would report lower body satisfaction and higher drive for muscularity than those with predominantly mesomorphic somatotypes.

A series of three 3 (somatotype) x 2 (repeated measures) ANOVAs with BPSS and DMS as dependent variables were conducted to test this hypothesis. The results of the 3 x 2 ANOVA for DMS cognitive supported a within subjects main effect for the repeated pre and posttest measures ($F_{[1, 46]} = 8.032, p = 0.007$). Specifically, participants reported less drive for muscularity (i.e., higher scores) at posttest than at pretest (i.e., lower scores; see Table 4). However, the results ($F_{[2, 46]} = 0.531, p = 0.591$) did not support a group by repeated pre and posttest interaction for DMS cognitive scores. The results of the 3 x 2 ANOVA for DMS behavioral did not support a within subjects main effect for the repeated pre and posttest measures ($F_{[1, 48]} = 3.004, p = 0.089$). Specifically, participants reported less drive for muscularity (i.e., higher scores) at posttest than at pretest (i.e., lower scores; see Table 4). The results ($F_{[2, 48]} = 0.581, p = 0.563$) did not support a group by repeated pre and posttest interaction for DMS behavioral scores. Although not significant ($p = .09$) the results did support a between subjects trend suggesting that the three somatotype groups differed in their DMS behavioral scores (see Figure 1). Specifically, the mesomorphs reported the highest drive for muscularity (i.e., lower DMS behavioral scores), followed by endomorphs and ectomorphs. The results of the 3 x 2 ANOVA for BPSS did not support a within subjects main effect for the repeated pre and posttest measures ($F_{[1, 50]} = 3.44, p = 0.070$). Specifically, participants reported less drive for muscularity (i.e., higher scores) at
Table 4.

*Results for Hypothesis 2 - The Effect of Somatotype on DMS Cognitive, DMS Behavioral and BPSS.*

<table>
<thead>
<tr>
<th></th>
<th>Ectomorph</th>
<th>Endomorph</th>
<th>Mesomorph</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n= 14)</td>
<td>(n=5)</td>
<td>(n=32)</td>
<td>(n=51)</td>
</tr>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>DMS Behavioral</td>
<td>37.85 (3.11)</td>
<td>35.4 (5.27)</td>
<td>32.5 (7.64)</td>
<td>34.27 (7.64)</td>
</tr>
<tr>
<td>Pretest</td>
<td>38.85 (3.05)</td>
<td>35.8 (4.08)</td>
<td>24.18 (8.11)</td>
<td>35.59 (6.97)</td>
</tr>
<tr>
<td>Behavioral</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>DMS Cognitive</td>
<td>31.54 (7.65)</td>
<td>27.75 (12.12)</td>
<td>30.65 (7.90)</td>
</tr>
<tr>
<td></td>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DMS Cognitive</td>
<td>33.07 (6.42)</td>
<td>31.75 (11.47)</td>
<td>32.43 (7.75)</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BPSS Pretest</td>
<td>25.0 (6.63)</td>
<td>25.0 (10.34)</td>
<td>20.05 (5.4)</td>
</tr>
<tr>
<td></td>
<td>BPSS Posttest</td>
<td>23.92 (6.58)</td>
<td>23.6 (10.13)</td>
<td>19.17 (5.46)</td>
</tr>
</tbody>
</table>

*p < .05
posttest than at pretest (i.e., lower scores; see Table 4). The results ($F[2, 50] = 0.061, p=0.941$) did not support a group by repeated pre and posttest interaction for BPSS scores.

**Exploratory Question: Which variables best predict body satisfaction and drive for muscularity in this sample?**

The results of two multiple linear regression models with the DMS cognitive and behavioral subscales as the outcomes and select continuous variables (time playing video

Figure 1

Trend in DMS Behavioral scores for somatotype.
games, time reading comic books, height, weight, and age) in the study as the predictors were not significant ($p = .17; p = .20$). The results of a multiple linear regression model with BPSS as the outcome using the same continuous variables as the predictors was also not significant ($p = .27$). In conclusion, none of the continuous variables entered into the three multiple linear regression models were predictive of DMS cognitive and behavioral, and BPSS scores.

**Correlations**

A series of bivariate Pearson product moment correlations were conducted to assess the interrelationship among the continuous variables in the study. The variables included in the correlation matrix were age, height, weight, BMI, percent predicted adult height, DMS cognitive (pre and posttest), DMS behavioral (pre and posttest), BPSS total (pre and posttest), and the questions “How often do you read comics?” and “How often do you play video games?” Highlights of the correlational results include that BMI was inversely related to DMS behavioral pre ($r = .30, p = .03$) and posttest ($r = .33, p = .02$) scores suggesting that higher BMIs were associated with greater drive for muscularity. Similarly, percent predicted adult height was inversely related to DMS behavioral posttest ($r = .31, p = .03$) scores, suggesting that boys that were closer to their predicted adult height reported greater drive for muscularity. Age was also inversely related to DMS behavioral pre ($r = .27, p = .05$) and posttest ($r = .33, p = .01$) scores suggesting that as age increased so too did drive for muscularity. Finally, DMS cognitive pretest scores were inversely related to BPSS pre ($r = .37, p = .01$) scores, suggesting that lower body
satisfaction was associated with higher drive for muscularity. These results are consistent with the findings of the first hypothesis of this study. The remaining correlations were nonsignificant.
Chapter 4

Discussion

Introduction

This chapter provides a brief summary of the results of this study. The chapter also provides a general discussion related to the hypotheses and the exploratory question. Descriptive data is provided to offer a snapshot of the subjects of the study. Limitations of the study, implications for the results of the study, recommendations for future research and the conclusion will be included in this chapter.

Summary of Results

The primary objective of this study was to determine the relationship between the viewing of hyper-muscled video game and comic book characters and the drive for muscularity and body part satisfaction in middle school boys. Participants reported a significant higher score for DMS (i.e., lower drive for muscularity) in the posttest as compared to the pretest. The second objective was to determine if maturation status was related to drive for muscularity and body parts satisfaction in middle school boys. At this time, the data for maturation status and whether there is an effect regarding drive for muscularity and body satisfaction is not available. The third objective was to determine the relationship between self-reported somatotype and drive for muscularity and body part satisfaction. Participants with a perceived mesomorphic somatotype reported a lower DMS score (i.e., higher drive for muscularity) than either the endomorphic or
ectomorphic somatotype. Finally, the exploratory question looked at what factors may have predicted body satisfaction and drive for muscularity in this sample. No significance was reported for any of the factors examined.

The Drive for Muscularity Scale (DMS) (McCeary & Sasse, 2000) and the Body Parts Satisfaction Scale (BPSS) (Slade et al, 1990) were the primary scales used to measure the response to the treatment of the control, muscular images and images of non-muscular pictures.

*Effect of Muscular and Non-muscular Treatment on DMS and BPSS*

Rather than the muscular treatment causing increased drive for muscularity and decreased body part satisfaction as predicted for the first hypothesis, the opposite response was reported in this study. Boys who viewed the muscular images of video game and comic book characters had lower drive for muscularity and had greater body part satisfaction.

The male-cultural ideal has evolved from the 1970’s naturally muscular body type to the hyper-muscled male we see in the media and culture today yet research on body satisfaction, drive for muscularity and boys has been limited to the last fifteen years. Jung and Peterson (2007) reported preadolescent boys desired to have a heavier body size and showed increased attraction and recall of muscular appearances in the media. Field et al (2005) reported of boys 12 to 18, 4.7% used a substance to improve appearance or strength and that boys who read men’s fashion or health/fitness magazines were more likely to use products to increase size or strength. Pope et al (2000) reported the men
consider body satisfaction a hidden problem they are not supposed to discuss. In two recent studies on adult males, body dissatisfaction and drive for muscul arity, researchers report a clear relationship between drive for muscul arity, body-comparisons and appearance-based comments. McCreary & Saucier (2009) reported that college-aged men with increased drive for muscul arity engaged in more frequent weight-related and muscle-related body comparisons. The association between drive for muscul arity and muscle-related comparison was significantly stronger that the association between drive for muscul arity and weight-related comparisons. Nowell & Ricciardelli (2008) conducted a study on men aged 18 to 36 to determine whether appearance-based comments affected body dissatisfaction and drive for muscul arity. The researchers reported the more frequent negative appearance-based comments were associated with higher body dissatisfaction while more frequent positive appearance-based comments were associated with lower body dissatisfaction. However, both frequent positive and frequent negative appearance-based comments were associated with a higher drive for muscul arity. While these study subjects are adult males, the implications for boys are important, especially as the majority of recent studies report that body dissatisfaction is a growing problem among adolescent boys (Jones, 2004; Kostanski et al, 2004; Presnell et al, 2004). Conversely, Hargreaves and Tiggemann (2006) reported that boys aged 14 to 16 were not influenced by the media, although they did use images they had seen to evaluate their bodies in relation to cultural ideals, wishing to be heavier and taller.

In contrast to what we expected, the boys in this study who looked at images of the idealized male muscular body had a decreased desire for increased size or strength
and an increased body satisfaction. A few possible reasons for the results of this study are as follows. It is possible disincentive played a role in the result. Specifically, the boys who viewed the muscular pictures were uninspired by the images as they were so far from what the boys perceived as a possible body type for themselves and it is possible they felt the images to be unattractive (i.e., enormous muscular chest, arms and thighs but small head) so they did not even consider it a goal. Similarly, the pictures may have been so unrealistic (i.e., some of the characters have muscles drawn in that do not even exist in the human body and some of the images are almost monster-like) that the boys did not even consider the look the pictures had as something interesting to them to strive for.

Another potential reason for the results is the possibility the boys in this study were generally satisfied with how they look and so were not influenced by the muscular images. In a study by O’Dea & Caputi (2001), the researchers reported that 50% of boys ages 6 to 12 were overweight but reported about themselves that their weight was “about right”. The researchers surmised that some boys, aged 6 to 12, are unaware of their body and are not affected by common body image stereotypes. Jones et al (2004) reported that viewing appearance magazines had no effect on boys and concluded that it is possible boys did not internalize the media’s portrayal of a particular body image. Conversely, Harrison & Bond (2007) concluded that boys in grades 2 through 4 who read gaming magazines did have increased drive for muscularity after a year. However, the participants in this study self-reported the number of magazines read per week and, the magazines read were categorized as gaming, health/fitness, fashion and sports. In a very recent study determining the effects of the media on drive for muscularity in dating and
non-dating adult males, Giles & Close (2008) reported the preoccupation with attaining the idealized male body may be enhanced by exposure to “lad magazines”; i.e., *GQ*, *Maxim* and *Esquire*. It is possible adult males are less satisfied with their bodies and therefore, more susceptible to media influences than boys, however, due to the contradictory conclusions, further research is necessary. Geographic location of the study may have affected the outcome of the study. This study was conducted in a Northern California coastal climate in the months of March and April. The predominant weather trend was rain with temperatures in the 40-50 degree Fahrenheit range. The majority of the participants wore long-sleeved shirts and sweatshirts and long pants or jeans. It is possible, as a result of being covered, the participants may not have had an accurate picture of what their bodies looked like. Clearly, more research is needed in this area of study to help understand the phenomenon that is boys and their response to the media depiction of hyper-muscled males. This researcher found only one other study using images of video game characters (Harrison & Bond, 2007, gaming magazines) and no studies using comic book characters images in her literature review. There were only a handful of studies that included looking at any pictures at all and there was no similarity in the types of pictures boys looked at.

However, all three experimental groups in this study reported a lowered drive for muscularity and a greater body satisfaction level from pre to posttest. As such for participants in this study, completing the DMS and BPSS may have created an awareness in the participants that they did not have before completing the questionnaires. It is possible the boys completed the questionnaires at pretest and then thought about the
questions and their answers. They may have looked more closely at their behavior regarding exercise or looked at their body parts as they were pointed out in the questionnaire. They may have discussed the questions with peers or friends and compared their answers to that of their peers. Consequently, the participants could have changed their answers on the posttest to numbers they felt were more socially correct (fitting in with their peers’ answers) rather than answering with numbers that accurately assessed themselves or it is possible they did not feel they had assessed themselves correctly at pretest and corrected for the difference at posttest. Maturation effect may have had an impact on the outcome of the study. Consequently, the participants were not controlled for exposure to muscular or non-muscular images they may have encountered in the week between the pretest and posttest. It is possible the participants were influenced by something outside the researcher’s control.

*Effect of somatotype on DMS and BPSS*

Mesomorphs reported a trend toward greater drive for muscularity than endomorphs and ectomorphs in this study. This researcher had anticipated that boys who were endomorphs and ectomorphs would have greater drive for muscularity and decreased body satisfaction than boys who were mesomorphs. It was expected that boys who were less like the muscular characters would be more self-conscious because their body type did not conform to the societal ideal. However, to the contrary, the mesomorphic boys had the higher drive for muscularity as compared to the endomorphs and ectomorphs.
Limited research exists looking at somatotype and body satisfaction. In some studies somatotype and maturation status are used interchangeably. Ectomorphic boys are typically considered late-to-average maturers and mesomorphs are typically considered early-maturers. Studies report that time of maturation may have an effect on DM and BPSS. For example, McCabe and Ricciardelli (2004) reported that late-maturing boys did not engage in extreme body strategies to increase muscle mass and definition. The researchers proposed that late-maturing boys were not yet focused on their bodies because the maturation process had not yet begun. However, other researchers have reported the conclusion this researcher had posited; that endomorphic and ectomorphic somatotypes would have higher DM and lower BPSS. Bearman et al (2006) reported boys had greater body dissatisfaction early in the maturation process. Boys wanted to be bigger; although distinguishing between being bigger due to greater muscularity versus more fat was not clear. In a study of boys aged 6 through 19, O’Dea et al (2001) reported that boys were more disinterested in weight loss which was possibly due to wanting to be bigger; most likely more muscular versus fatter, but again the distinction was not made between the two goals. Jung & Peterson (2007) reported that preadolescent boys aged 8 to 11 wanted to be heavier, with no distinction between muscularity and fat. Specific to this study, because an endomorphic boy is bigger, he may not feel as critical of his appearance and therefore have a lower DM and have a higher body satisfaction.

In the current sample, boys’ perceived themselves to be more mesomorphic than expected. Mesomorphs represented 64.2% (n=34) of the population, endomorphs were 9.4% (n=5) of the population and ectomorphs were 26.4% (n=14) of the population.
Malina (2004) reports that boys increase in mesomorphy between 15-19 years due to muscle growth during this time. Endomorphy tends to decrease with age, particularly during adolescence. Ectomorphy tends to increase with age in boys into adolescence, with declines beginning in late adolescence due to the late adolescent increases in muscle and torso proportions. The current sample fits somewhat into the appropriate development processes but with a greater number of self-reported mesomorphs in the coinciding period of adolescence as opposed to late in adolescence. One possible reason for the differences may be that boys did not accurately perceive their somatotype. Alternately, boys may inflate their self-perceptions of their muscularity. The geographical area in which the study occurred may have influenced perceived somatotype. It is possible due to the fact that the participants were used to being dressed in multiple layers due to the cold, rainy weather, a lack of awareness of their somatotype may have existed.

**Correlations**

One of the highlights of the correlation analysis was that BMI is inversely related to DMS behavioral suggesting that higher BMI’s were associated with a greater drive for muscularity. Additionally, boys who were closer to their predicted adult height reported a great drive for muscularity. Third, as age increased, drive for muscularity increased. All three of these outcomes support the idea that the more mature boys, the mesomorph somatotype, had a greater drive for muscularity. The final correlation, between DMS cognitive and BPSS, found lower body satisfaction was associated with a higher drive for
muscularity. So there is a relationship between how boys felt about their bodies and their desire to be more muscular.

**General Discussion and Significance**

The results of this study bring up some valid questions that will hopefully add to literature on body satisfaction and drive for muscularity in middle school age boys. The two most important findings of this study; looking at pictures of muscular images decreased DM and increased body satisfaction and that there was a trend for mesomorphic somatotypes to have higher DM and body satisfaction, are contrary to much of what was previously reported about body image and drive for muscularity in boys.

**Limitations**

The small and relatively homogenous sample size from coastal, rural Northern California was a potential limitation. The researcher strived to obtain 21 volunteers in each grade but was unable to achieve that goal. Two different middle schools had to be used to reach a large enough sample size. All 6th graders, 11 7th graders and 14 8th graders came from one middle school. Due to the low numbers, particularly 7th graders, students from an additional school were recruited into the study. In total, four 7th and 4 8th graders from the second school participated in the study. Use of two schools is a possible limitation. Self-reporting for somatotype by the boys who participated was another potential limitation. It is possible the participants did not accurately self-identify their
somatotype. In our sample, 14 identified as ectomorph, 5 identified as endomorph and 32 identified as mesomorph. This appears to be skewed toward the mesomorphic somatotype. One potential rationale is the geographical area of the study. The study took place in a Northern California coastal climate, where children tend to dress in long sleeves, shirts or sweatshirts and pants. It is possible the participants’ awareness of their body type is limited based on being covered up as compared to children who live in a hot climate and spend the hot seasons of the year in shorts, short-sleeved shirts and tank tops. Parents’ self-reported height could also allow for error in the maturation status calculations. Another potential limitation was exposure time to the treatment. In this study, subjects were exposed to the treatment, one time for only three minutes. It is possible the limited exposure time minimized the degree of internalization of the images and thus affected the responses to the DMS and BPSS posttests. Another potential limitation is maturation effect. There was no control over what participants were exposed to in the week between the pretest and posttest. It was possible the participants saw other images of muscular characters or were exposed to information about body satisfaction or drive for muscularity that could have influenced how the participants answered in the posttest. One potential threat to internal validity was statistical regression. It is possible the participants responded more extremely to their first exposure to the questionnaires than to the second exposure. The testing effects may have also posed another internal validity threat to the current study. The content of the pretest may have predisposed the subjects to what was likely to appear on the posttest, especially as the DMS and BPSS were completed as a pre- and posttest. A potential threat to external validity was the
interaction effect of testing. It is possible that the questions asked in the pre-test created an awareness in the subjects as to what the study was about and thus affected the way subjects responded in the posttest. The researcher randomly assigned each participant to the treatment they were exposed to. Random assignment helps to offset the effects of the limitations of the study.

Future Research

It is clear, as this study reports data that conflict with other studies examining the media and its effect on boys, that this particular area of research; using images of video game and comic book characters, needs to be more closely scrutinized. First, a larger sample size with the same or similar methods would be important to determine if the lower numbers in this study affected any outcomes. Second, conducting a longitudinal study with similar video game and comic book character images and more frequent exposure time to the muscular images would be ideal to see if exposure time is an important element in internalization of the muscular body type. Third, due to the few numbers of studies that look at perceived somatotype, using somatotype in this type of study would be ideal, again to see if outcome is similar. Fourth, a study using pictures of real people, such as professional bodybuilders as the over-muscled population and ‘regular’ men as the non-muscular population instead of the video game and comic book characters would be interesting. Taking any sense of fantasy out and therefore, separating reality from fiction, may provide a better measure of whether middle school aged boy are influenced negatively or positively by overly muscled men. Humboldt County is a very
rural, coastal county in Northern California and visual media such as billboards are few and far between. Doing a similar study to this one in a large metropolitan area, where the media influence is bigger and more profound, for example, where billboards selling clothing such as underwear, are very difficult to avoid, would be interesting. It is possible that living in a rural area may have influenced the outcome of this study. A study in a warmer climate would be interesting to see if being dressed for a cold climate versus being dressed for a hot climate would influence how boys perceived their somatotype, body part satisfaction and drive for muscularity.

Research measuring the activity of the brain while viewing images of muscular body times across a large age span in boys would be intriguing. As the brain develops, the ability of a person to perceive their body; i.e., drive for muscularity, body satisfaction and somatotype, may change. In eleven year olds, the cerebellum has a growth spurt. The cerebellum is where formal operational thinking takes place as well as regulation and coordination of movement, posture and balance. New research is reporting the cerebellum is also involved in novelty and emotion. In twelve year old boys, the parietal lobe reaches its gray matter peak. The parietal lobe is associated with movement, orientation, recognition and perception of stimuli. At 14 years, the brain has reached its adult weight. During puberty the reticular formation, which helps maintain attention, influences wakefulness and the overall degree of arousal and consciousness, becomes fully myelinated. The frontal lobe which is responsible for reasoning, planning, emotion and problem solving is not fully myelinated until the mid-twenties (Diamond & Hopson, 1998). Using MRI to measure the area of activity in the brain while looking at muscular
images would be a helpful way to determine more accurately what part of the brain is being used during the viewing, the stage of development of the part of the brain being used, and potentially, accuracy of perception and degree of internalization of the images could be determined.

**Implications**

The results of the current study suggested that middle school aged boys may not internalize the hyper-muscled images they see when reading comic books or playing video games. However, in light of the growing number of children who suffer from obesity and its related health risks, it is important to limit time playing video games and reading comic books, and encourage physical activity as much as possible. Concern about development of body image issues should not be ignored as it is proven that men and boys do have body satisfaction issues and boys are generally not rewarded for expressing concerns about their bodies in our society (Pope et al, 2000). The societal ideal body type for males is a lean, tall man with six-pack abdominals, an enormous chest, arms and thighs, and very defined muscles. Action toys that boys play with have evolved to represent this body type. Television, movie and magazine male figures show this body type. Sports figures who fit this image are plastered all over the media for boys to see. For parents who allow their boys to play video games or read comic books with the hyper-muscled characters, a conversation about what the boy perceives about the characters and himself would be critical. Parents need to acknowledge that boys have concerns about what their bodies look like and need support to work through any
concerns or conflict they may have. Parents also need to recognize that the male muscular images the media portrays are not realistic and often cannot be achieved without muscle-enhancing drugs. Lastly, while physical exercise offers multiple benefits both psychologically and physically, a boy with body satisfaction concerns may use exercise in an unhealthy manner so parents, teachers and all those who work with youth should become familiar with signs of body dissatisfaction or of an unhealthy drive for muscularity. Familiarity with the signs can help improve chances of intervention to help avoid the development of a problem with body image or drive for muscularity in boys.

Conclusion

The results of the current study are inconsistent with much of the research examining middle school boys and DM and body satisfaction. In fact, this study reports that boys who viewed images of hyper-muscled male video game and comic book characters had a decreased DM and an increased body satisfaction. Additionally, a trend for mesomorphic somatotypes toward a higher DM and higher body satisfaction than endomorphic or ectomorphic somatotypes was reported, which were also opposite what this researcher had hypothesized. Additional research with a larger sample size, longer exposure time to the images, and utilizing the same type of exposure (timed powerpoint presentation) to the video game and comic book character images is highly recommended. This researcher believes this is an intriguing area of study and hopes researchers in the future will continue to examine the effects media has on middle school boys’ drive for muscularity and body satisfaction.
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Appendix A

Drive For Muscularity Scale
Please read each item carefully. Then, for each statement, circle the number that best applies to you.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Always</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Very often</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Often</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sometimes</strong></td>
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<tr>
<td><strong>Rarely</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Never</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**I. ITEMS TO ASSESS MUSCULARITY-ORIENTED BODY IMAGE COGNITIONS**

1. I wish that I were more muscular. 1 2 3 4 5 6
2. I think I would feel more confident if I had more muscle mass. 1 2 3 4 5 6
3. I think that I would look better if I gained 10 pounds in bulk. 1 2 3 4 5 6
4. I think that I would feel stronger if I gained a little more muscle mass. 1 2 3 4 5 6
5. I think that my arms are not muscular enough. 1 2 3 4 5 6
6. I think that my chest is not muscular enough. 1 2 3 4 5 6
7. I think that my legs are not muscular enough. 1 2 3 4 5 6

**II. ITEMS TO ASSESS MUSCULARITY-ORIENTED BEHAVIORS**

1. I lift weights to build up muscle. 1 2 3 4 5 6
2. I use protein or energy supplements. 1 2 3 4 5 6
3. I drink weight-gain or protein shakes. 1 2 3 4 5 6
4. I try to consume as many calories as I can in a day. 1 2 3 4 5 6
5. I feel guilty if I miss a weight-training session. 1 2 3 4 5 6
6. Other people think I work out with weights too often. 1 2 3 4 5 6
7. I think that my weight-training schedule interferes with other aspects of my life. 1 2 3 4 5 6
Appendix B

Body Parts Satisfaction Scale
Please indicate how satisfied you are with each of the following aspects of your body (circle ONE number to the right of each item):

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<tr>
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<th>Very satisfied</th>
<th>Satisfied</th>
<th>Neither satisfied nor dissatisfied</th>
<th>Dissatisfied</th>
<th>Very dissatisfied</th>
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<td>Weight</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Body shape</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Face</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Shoulders</td>
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<td>2</td>
<td>3</td>
<td>4</td>
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</tr>
<tr>
<td>6</td>
<td>Chest</td>
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<td>2</td>
<td>3</td>
<td>4</td>
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<td>7</td>
<td>Arms</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>Legs</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>Stomach</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>Body build</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</tbody>
</table>
Appendix C

Parental Consent Form
HUMBOLDT STATE UNIVERSITY
PARENT CONSENT AND INFORMED CONSENT

Project Title:
The effects of video game and comic book character viewing on middle school boys’ drive for muscularity and body satisfaction

Principal Investigator:  
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707-497-4958  
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Faculty Advisor:  
Dr. Anthony P. Kontos  
Humboldt State University  
707-826-3533  
Anthony.Kontos@humboldt.edu

Purpose:
The purpose of this study is to assess boys’ thoughts and feelings about their bodies, muscles, exercise, and how they might relate to video game and comic book characters.

Consent:
In order for your son to be in the study, you must read and sign this written parental consent form. Your child’s participation in the study is up to you and your child. Your child or you may choose for him not to participate at all, or may refuse for him to participate in certain parts or stop participating at any time without penalty. Your child’s participation in this research project will not involve any additional costs to you. Your child will not receive any money to participate in this study; however he may receive one of the gift certificates mentioned below (see Benefits below).

Procedures:
Data will be collected for this study on two different days. Day one will include your child completing several brief questionnaires about his thoughts and feelings about his body, muscles, and exercise. He will also be asked to answer some demographic questions on his age, grade, and sports participation. On day one, your child will complete all questionnaires in a group setting with all other students from the same grade who participate in the study. The first day will take about 10 min of class time. On day two, about one week later, your child will meet with the researcher to look at approximately 30 images of comic book and video game characters (e.g., Superman, Spiderman) for 2 to 3 minutes. Immediately following viewing the images, your child will complete two questionnaires about what they think about their body, muscles, and exercise; and their height and weight
will be measured. The second day will take about 7-12 min of time away from the classroom.

**Possible Risks:**
There will be little or no discomfort to your child other than possible fatigue or frustration from filling out the questionnaires. Your child will be asked to answer questions about how they feel about their body. You or your child may choose to not answer certain questions and still continue in this study. Your child may quit the study at any time without penalty. **All answers your child gives are strictly confidential and will not be shared with anyone.**

**Benefits:**
Your child will not directly benefit from being in this study. However, for participating in the study, your child will be entered into a raffle for one of six $15 certificates for a local sporting goods store.

**Confidentiality/Anonymity:**
Participation in this study is completely voluntary. Your child’s identity and information recorded during the study will remain confidential at all times. Confidentiality will be protected by: (a) results will be presented as group data in any presentations and publications; and (b) all data will be stored in a computer that is password-protected and accessible only to the Principal Investigator.

**Institutional Contacts:**
For questions about this study, please contact the Principal Investigator or Faculty Advisor using the contact information above. If you have any other questions about your child’s rights as a participant or are dissatisfied at any time with any aspect of this study you may contact-anonymously, if you wish – the Chairperson of the IRB committee at Humboldt State University at (707) 826-3949.

**Signatures:**
Your signature below indicates YOUR voluntary agreement to ALLOW YOUR CHILD to participate in this study.
I, __________________________ have read and agree to allow my child __________________________ to participate in this study as described above.

*(Please PRINT YOUR Name Here)*

________________________________________ (Please PRINT Your CHILD’s Name Here)
Appendix D

Parental Consent For Parent Height
HUMBOLDT STATE UNIVERSITY
PARENT CONSENT AND INFORMED CONSENT

Project Title:
The effects of video game and comic book character viewing on middle school boys’ drive for muscularity and body satisfaction

Principal Investigator: Susan Diemer
Humboldt State University
707-497-4958
sdiemer4@gmail.com

Faculty Advisor: Dr. Anthony P. Kontos
Humboldt State University
707-826-3533
Anthony.Kontos@humboldt.edu

Purpose:
The purpose of this study is to assess boys’ thoughts and feelings about their bodies, muscles, exercise, and how they might relate to video game and comic book characters.

Consent:
The researcher requires one or both biological parents’ height for determination of maturational status of your child. By signing this consent form you agree to provide one or both biological parents’ height to the best of your knowledge. If you do not know the heights of either biological parent, please mark in the “Don’t know” category (See Biological Parent Height Self-Report Form attached). You may choose not to participate at all without penalty.

Procedures:
Height data collected will be used to determine your child’s maturational status using the Khamis-Roche formula. Your child’s height, weight and age are also necessary.

Possible Risks:
There will be little or no discomfort to you other than possible fatigue or frustration from determining biological heights. You may choose to not answer the questions. All information you provide is strictly confidential and will not be shared with anyone.

Benefits:
You will not directly benefit from being in this study. However, for returning your two parental consent forms and the Biological Height form, you will be entered into a raffle for one of six $15 certificates to a local coffee shop.
Confidentiality/Anonymity:
Participation in this study is completely voluntary. Your child’s identity and all information recorded during the study will remain confidential at all times. Confidentiality will be protected by: (a) results will be presented as group data in any presentations and publications; and (b) all data will be stored in a computer that is password-protected and accessible only to the Principal Investigator.

Institutional Contacts:
For questions about this study, please contact the Principal Investigator or Faculty Advisor using the contact information above. If you have any other questions about your child’s rights as a participant or are dissatisfied at any time with any aspect of this study you may contact-anonymously, if you wish – the Chairperson of the IRB committee at Humboldt State University at (707) 826-3949.

Signatures:
Your signature below indicates YOUR voluntary agreement to participate in this study.

I, ______________________ have read and agree to participate in this study as described above.

(Please PRINT YOUR Name Here)

__________________________(Please PRINT Your CHILD’s Name Here) __________/________/_______

(Please SIGN YOUR Name Here) (Date)
Appendix E

Informed Assent-Minor
Project Title:
The effects of video game and comic book character viewing on middle school boys’ drive for muscularity and body satisfaction

Principal Investigator:  
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sdiemer4@gmail.com

Faculty Advisor:  
Dr. Anthony P. Kontos  
Humboldt State University  
707-826-3533  
Anthony.Kontos@humboldt.edu

Purpose:
The purpose of this study is to ask what you think and feel about your body, muscles, exercise, and how they might relate to video game and comic book characters.

Consent:
In order for you to be in the study, you must read and sign this written assent form. Your participation in the study is up to you. You may choose not to participate at all, or may refuse to participate in certain parts or stop participating at any time without penalty.

Procedures:
You will answer questions for this study on two different days. On day one you will answer several brief questionnaires about your thoughts and feelings about your body, muscles, and exercise. You will also be asked to answer some questions about your age, grade, and sports participation. On day one, you will complete all questions in a group setting with all other students from the same grade who are participating in the study. The first day will take about 10 min of class time. On day two, about one week later, you will meet individually with the researcher in a room to look at 30 images of male comic book and video game characters for 2 minutes- or 4 seconds per image. Immediately after looking at the pictures, you will answer some more questions about what you think about your body, muscles, and exercise; and your height and weight will be measured. The second day will take about 7-12 min of time away from the classroom.

Possible Risks:  
There will be little or no discomfort to you other than feeling tired or frustrated from filling out the questionnaires. You will be asked to answer questions about how you feel about your body. You may choose not to answer certain questions and still continue in this study. You may quit the study at any time without penalty. All answers you give are strictly confidential and will not be shared with anyone.

Benefits:
You will not directly benefit from being in this study. However, for participating in the study, you will be entered into a raffle for one of five $10 certificates for a local sporting goods store.

**Confidentiality/Anonymity:**
Participation in this study is completely voluntary. Your child’s identity and information recorded during the study will remain confidential at all times. Confidentiality will be protected by: (a) results will be presented as group data in any presentations and publications; and (b) all data will be stored in a computer that is password-protected and accessible only to the Principal Investigator. You or your child may stop his participation at any time without penalty. Your child’s participation in this research project will not involve any additional costs to you. Your child will not receive any money to participate in this study; however he may receive one of the gift certificates mentioned above (see Benefits above).

**Institutional Contacts:**
For questions about this study, please contact the Principal Investigator or Faculty Advisor using the contact information above. If you have any other questions about your child’s rights as a participant or are dissatisfied at any time with any aspect of this study you may contact-anonymously, if you wish – the Chairperson of the IRB committee at Humboldt State University at (707) 826-3949.

**Signatures:**
Your signature below indicates YOUR voluntary agreement to participate in this study.

I, __________________________ have read and agree to participate in this study as described above.

*(Please PRINT YOUR Name Here)*

____________________________________   _____/_____/_____

*(Please SIGN YOUR Name Here)                       (Date)*
Appendix F

Student Participant Self-Reported

Demographic Information Form
Student Participant Self-Reported Demographic Information

Please complete the following information:

Birth date: YEAR:________  MONTH:________   DAY:________

Grade:  _6th_  _7th_   _8th_

Race/Ethnicity (Please Check One):
__African American  __Asian  __Latino(a)
__Pacific Islander  __Native American/American Indian
__Native Alaskan  __Caucasian

How often do you read comic books? (Please Circle One):

1  2  3  4  5
Never Rarely Sometimes Often Very Often

How often do you play video games? (Please Circle One):

1  2  3  4  5
Never Rarely Sometimes Often Very Often
Appendix G

Perceived Somatotype Scale
Perceived Somatotype Scale

Please place an “X” on the line under the ONE figure below that looks most like your body.
Appendix H

Biological Parent Self-Reported Height Form
Biological Parent Height Self-Report Form

Thank you for completing this information. It will enable your son to participate in the study as well as assist the researcher in adding to the research about whether video game and comic book characters effect how middle school boys think and feel about their body, muscles and exercise.

Please complete the following information to the best of your ability.

Child Name __________________________________

Child’s Grade _________________________________

Biological Mother’s Height ______________________ft ____________inches

Biological Father’s Height _______________________ft____________inches

___ Please check here if you do NOT know either Biological Mother’s or Biological Father’s Height.

Thank you for your participation in this study.
Appendix I

Thank You Letter
May 17, 2010

To Wendy Pearcy, Enrique Esparza, Rand Hall, Kevin Tinkum and David Deason,

I, my advisor Dr. Kontos and Humboldt State University would like to thank you for allowing me to conduct my study at your middle school. You were so helpful and patient throughout and without your assistance, my study would not have run as smoothly as it did. Your students were respectful and curious and never gave me any kind of difficulty. I recognize that being there and emailing and coordinating times and places was an addition to your already enormous load but everyone was gracious and kind. Thank you.

I have analyzed my data and am in the process of editing my final draft of my thesis. I do intend to write up a synopsis to be shared with the boys who participated so that will be forthcoming soon (next week is my goal). But interestingly, the conclusions of my study were the opposite of my hypotheses. I had thought that the boys who looked at the muscular images would have a greater drive for muscularity and lower body satisfaction. But the opposite happened. The boys who viewed the muscular images actually had a lower drive for muscularity and a higher body satisfaction. As this is the only study (that I have been able to find…) that has used images such as these in the manner I did, the implications of this study are interesting. I will include what we have come up with in my synopsis for the boys.

Thank you again for being so supportive and helpful in conducting my study. I will be in touch next week with my study synopsis to be shared with the boys.

Sincerely,

Susie Diemer, MS Kinesiology

Dr. Anthony Kontos, Committee Chair
Appendix J

Examples Of Muscular Video

Game Images Used In Treatment
Appendix K

Examples Of Muscular Comic Book Images Used In Treatment
Appendix L

Examples Of Non-Muscular Video Game Images Used In Treatment
Appendix M

Examples Of Non-Muscular Comic Book

Images Used As Treatment