FOR: Graduate Candidates Completing Theses in Partial Fulfillment of the Degree
Graduate Faculty Advisors Directing the Theses

RE: Preservation, Reproduction, and Distribution of Thesis Research

Preserving, reproducing, and distributing thesis research is an important part of Booth Library’s responsibility to provide access to scholarship. In order to further this goal, Booth Library makes all graduate theses completed as part of a degree program at Eastern Illinois University available for personal study, research, and other not-for-profit educational purposes. Under 17 U.S.C. § 108, the library may reproduce and distribute a copy without infringing on copyright; however, professional courtesy dictates that permission be requested from the author before doing so.

Your signatures affirm the following:

- The graduate candidate is the author of this thesis.
- The graduate candidate retains the copyright and intellectual property rights associated with the original research, creative activity, and intellectual or artistic content of the thesis.
- The graduate candidate certifies her/his compliance with federal copyright law (Title 17 of the U. S. Code) and her/his right to authorize reproduction and distribution of all copyrighted materials included in this thesis.
- The graduate candidate in consultation with the faculty advisor grants Booth Library the non-exclusive, perpetual right to make copies of the thesis freely and publicly available without restriction, by means of any current or successive technology, including by not limited to photocopying, microfilm, digitization, or internet.
- The graduate candidate acknowledges that by depositing her/his thesis with Booth Library, her/his work is available for viewing by the public and may be borrowed through the library’s circulation and interlibrary loan departments, or accessed electronically.
- The graduate candidate waives the confidentiality provisions of the Family Educational Rights and Privacy Act (FERPA) (20 U. S. C. § 1232g; 34 CFR Part 99) with respect to the contents of the thesis and with respect to information concerning authorship of the thesis, including name and status as a student at Eastern Illinois University.

I have conferred with my graduate faculty advisor. My signature below indicates that I have read and agree with the above statements, and hereby give my permission to allow Booth Library to reproduce and distribute my thesis. My advisor’s signature indicates concurrence to reproduce and distribute the thesis.

Graduate Candidate Signature

Chelsea Duncan

Printed Name

Kinesiology and Sports Studies

Graduate Degree Program

Please submit in duplicate.

Faculty Advisor Signature

Amber M. Shepherd

Printed Name

6/20/16

Date
THE EFFECTS OF HIGH INTENSITY INTERVAL TRAINING ON BODY-ESTEEM AMONG COLLEGE-AGED WOMEN

(TITLE)

BY

CHELSEA K. DUNCAN

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

Master of Science in Exercise Science

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

2016

YEAR

I HEREBY RECOMMEND THAT THIS THESIS BE ACCEPTED AS FULFILLING THIS PART OF THE GRADUATE DEGREE CITED ABOVE
THE EFFECTS OF HIGH INTENSITY INTERVAL TRAINING (HIIT) ON BODY-ESTEEM AMONG COLLEGE-AGED FEMALES

A Thesis
Presented to the
College of Education and Professional Studies
And the
Faculty of the Graduate College
Eastern Illinois University
in Partial Fulfillment
of the Requirements for the Degree
Master of Science
Eastern Illinois University

by
Chelsea K. Duncan

2016
EFFECTS OF HIIT ON BODY-ESTEEM

ACKNOWLEDGEMENTS

First and foremost, thank you to my son Connor; without you I cannot be certain I would have been able to complete this. You have been a constant in my life and my motivation for working hard and doing the best I can in everything. Everything I have done I did not just for you, but because you needed me to. As a mother I knew you needed to see me work hard and complete everything I did with motivation and passion. Always know that I love you so much and I hope you are proud to call me your mother.

To my family, thank you for believing in me and being proud of my accomplishments. Thank you for helping when you could and for coming to countless school-related ceremonies throughout the years. To my friends, both old and new, thank you for supporting me, for all the laughing and a little bit of crying. To my love Colby, thank you for not allowing me to never give up. Thank you for listening to me, for talking with me, and for forcing me to take the necessary breaks in order to keep my sanity. Thank you for your tough love, your understanding, and your overwhelming support during this difficult endeavor.

To the faculty at EIU, thank you for making me the educated and passionate person I am today. Dr. Shipherd, thank you for being my thesis chair, for sharing graduate school memes, supporting me, and believing in my ability to complete this project. Thank you for laughing with me about my countless anxieties and mini panic attacks. To Dr. R., thank you for all of your assistance throughout the year. You have given me the tools to become a better researcher and writer, and for that I am forever grateful. Thank you for always treating your students as your peers, it is one of the best qualities a professor can have. I hope I was able to add a little color to your life for the
year. To Dr. K., you have and always will remain one of my favorite professors. Your passion for the field and for teaching is the reason I found myself so enthralled in exercise science. You have been more influential than you know throughout my undergraduate and graduate studies. Thank you for always caring about your students and helping them succeed in whatever ways you could. I hope to one day be as tough of a cookie as you!
THE EFFECTS OF HIGH INTENSITY INTERVAL TRAINING (HIIT) ON BODY-ESTEEM AMONG COLLEGE-AGED FEMALES
Chelsea K. Duncan

Kinesiology and Sports Studies
Eastern Illinois University
2016

Chairperson: Dr. Amber Shipherd

The purpose of this study was to examine the effects of high intensity interval training (HIIT) on body-esteem among college-aged females. The study had four participants complete a pre-intervention questionnaire, which included BMI information and the Body-Esteem Scale (BES: Franzoi & Shields, 1984). The participants then completed 12 sessions of HIIT, three sessions each week for four weeks. After completing the HIIT protocol, participants filled out a post-intervention questionnaire, including BMI and the BES. The post-intervention questionnaires were then compared to the participants’ pre-intervention questionnaires using a paired-samples $t$ test with SPSS software. Small changes in BES scores occurred, however no statistical significance was found between pre and post-intervention. The small changes suggest that further studies could yield more significant findings.
## Table of Contents

**Chapter 1: Introduction** ........................................................................................................ 8  
Statement of Purpose ................................................................................................................. 12  
  Hypothesis ................................................................................................................................. 12  
  Delimitations of the Study .......................................................................................................... 12  
  Limitations of the Study ............................................................................................................ 12  
  Definition of Terms ................................................................................................................... 13  

**Chapter 2: Review of Literature** ....................................................................................... 16  
Body-Esteem in College Females ................................................................................................. 16  
Objectification Theory .................................................................................................................. 17  
Social Comparison Theory .......................................................................................................... 19  
Influences on Body-Esteem ......................................................................................................... 20  
  Culture ....................................................................................................................................... 20  
  Ethnicity ..................................................................................................................................... 21  
  Peers and Family ........................................................................................................................ 22  
  Media ......................................................................................................................................... 23  
  Social Media .............................................................................................................................. 25  
Weight and Body-Esteem ............................................................................................................. 26  
Effects of Negative Body-Image ................................................................................................. 27  
  Depression ................................................................................................................................. 28  
  Eating Disorders ....................................................................................................................... 28  
  Social Physique Anxiety ........................................................................................................... 30  
Exercise’s Effect on Body-Esteem ............................................................................................... 30  
  Exercise and Depression ............................................................................................................ 32
List of Tables

1. Demographic Information ........................................................................................................ 45
2. Pre and Post Exercise Intervention Means ........................................................................... 47
3. Pre and Post Paired Samples Test ......................................................................................... 47
Chapter One
Introduction

In 1999, Thompson, Heinberg, Altabe, and Tantleff-Dunn surveyed women and found that 56% had a negative body image. More recent studies have concluded that up to 80% of college females experience body dissatisfaction (Neighbors & Sobal, 2007; Vohs, Heatherton, & Herrin, 2001). Body image refers to a person’s self-evaluation of their physical appearance (Mendelson, Mendelson, & Andrews, 2000), while body-esteem is a number that characterizes those feelings (Sheldon, 2010). By these terms, body image and body-esteem are related in that body image is an evaluation of appearance and body-esteem portrays a number to illustrate that evaluation. When assessing body-esteem, participants are often asked to rate certain aspects of their self-perceived appearance, weight, and body parts/functions on a numeric scale. These ratings will be utilized to assess whether participants have low, normal, or high body-esteem. Due to the relationship between these variables, studies involving both body image and body-esteem will be utilized in the research of this study.

Throughout their lifespan, females are at a higher risk for developing negative body image than males (Eisenberg, Neumark-Sztainer, & Paxton, 2006; Elgin & Pritchard, 2006; Feingold & Mazzella, 1998; Muth & Cash, 1997; Wang, Byrne, Kenardy, & Hills, 2005). Dissatisfaction with one’s body image has become so common that Rodin, Silberstein, and Stiegel-Moore (1984) referred to it as “normative discontent.” The coining of the term “normative discontent” over 30 years ago reveals a long-standing problem between women and body image. In late adolescents, individuals are beginning to create their style of self-presentation (Erikson, 1963) and by college those individuals begin to search for their identity. In the search for identity, self-esteem and body-esteem
can be factors that affect this development (Lyxell & Adamson, 1996). Self-esteem refers to the perceptions that a person has about themselves in either a positive or negative manner (Rosenberg, 1965) and is a personal judgement of one's own value (Branden, 2001). As girls become adults, they are constantly bombarded with unrealistic images of the “ideal body” and a message that if they work hard, they can achieve such bodies (Krane, Waldron, Michalenok, & Stiles-Shipley, 2001; Pilafova, Angelone, & Bledsoe, 2007).

Western cultures have long placed an importance on the image presented by women. Societal influence to meet the culture’s beauty standards can often lead to low body-esteem and unhealthy practices in order to achieve such standards. There are different factors that may contribute to the pressure of presenting a specific body image, including family, peers, and mass media. Previous research has linked body images shown in the media and body dissatisfaction (Botta, 1999; Cattarin & Thompson, 1994; Eisend & Möller, 2007; Field et al., 2001; Harrison & Cantor, 1997). The highly unattainable physiques shown in magazines, television, and other media sources can be detrimental to a woman’s positive perception of her body.

As technology has advanced, the ability to alter images to portray a more desirable appearance has become common among social networking and online dating sites (Hancock & Toma, 2009). These altered images of women depict a certain physique has contributed to the illusion that the overly thin body images portrayed in the media are not only normal, but attainable. More recently, social media’s impact on body-esteem has become a concern (Perloff, 2014). With the overwhelming reliance on social media by women of all ages, the sharing of images, peer pressure, and celebrity presence could contribute to body dissatisfaction. Negative body image can have detrimental
effects on both physical and mental health. Adopting the thin ideal has consistently been found to contribute to body dissatisfaction, low self-esteem, and disordered eating (Cafri, Yamamiya, Brannick, & Thompson, 2005; Fernandez & Pritchard, 2012; Rivadeneyra, Ward, & Gordon, 2007). The drive, or inability, to meet such standards may result in mental or physical disorders such as depression, eating disorders, and social physique anxiety (SPA). SPA is described by Hart, Leary, and Rejeski (1989) as fear that others are evaluating one’s body or physical appearance negatively.

Billions of dollars are spent each year on products whose aim is to change body shape and size, including diet pills, cosmetic surgery, and beauty and fitness products (Campbell & Hausenblas, 2009). This negative body image epidemic requires a more feasible and healthy treatment option. One option to treat low body-esteem is exercise. Exercise has been shown to improve body image (Burgess, Grogan, & Burwitz, 2006; Duncan, Al-Nakeep, Neville, & Jones, 2004; Gehrman, Hovell, Sallis, & Keating, 2006; Hausenblas & Fallon, 2006) by changes in body weight, muscularity, and physical competence (Cash, 2002). Those who exercised regularly (i.e., at least 3 times per week) reportedly had a more positive body image than non-exercisers (Hausenblas & Fallon, 2006).

While there can be many causes of low body-esteem, many females with body image concerns have body dissatisfaction due to their weight (Pilafova et al., 2007; Stice & Whitenton, 2002; Thompson et al., 1999). Exercise is an effective way to not only lower body weight, but can also increase health. A study by Vocks, Hechler, Rohrig, and Legenbauer (2009) resulted in a decrease in body dissatisfaction and an increase in positive mood after a single exercise session. This finding led the researcher to question what effect an exercise program performed on a regular basis would have on body-
Esteem. While high-volume, moderate intensity training has been shown to induce abdominal and visceral fat loss (Irwin et al., 2003; Ross et al., 2000), it requires a large time commitment, making it less practical (Zhang et al., 2015). Nybo et al. (2010) found that high-intensity interval training (HIIT) could induce favorable metabolic adaptions similar to moderate intensity training in normal populations. Racil et al. (2013) found HIIT to be an effective exercise strategy for young obese women to make improvements in body composition and lower obesity-related health issues.

High intensity interval training (HIIT) involves bouts of high intensity exercises mixed with short rest intervals for recovery. HIIT is most commonly performed at shorter durations than traditional aerobic and resistance training sessions, therefore lowering the time commitment necessary for each training session. HIIT can also incorporate a variety of difference exercises in order to reduce monotony. Therefore, HIIT addresses the major barriers of participation in physical activity found by Godin et al. (1994), and Reichert, Barros, Domingues, and Hallal (2007) which include lack of time and monotony of exercises. While many studies researching high intensity interval training utilize traditional cycling or sprinting protocols (Perry, Heigenhauser, Bonene., & Spriet, 2008; Shepherd et al., 2015; Skelly et al., 2014; Zhang et al., 2015), a new trend of HIIT circuits include bouts of bodyweight exercises. Performing bodyweight HIIT routines also removes the barriers of requiring a gym or equipment to exercise. Without these barriers, individuals may find it easier to perform HIIT in the comfort of their own home, and at a time when their schedule allows. This method of training may increase the adherence to an exercise program, and make weight loss goals more attainable. Due to the shorter duration of training sessions, HIIT could be a possible training mode to increase health and self-esteem while decreasing weight and body dissatisfaction.
The majority of studies examining exercise and perceived body image focus on aerobic or resistance training (Asi, 2002; Bartleewski, Van Raalte, & Brewer, 1996; Bowden, Rust, Dunsmore, & Briggs, 2005; Daley Copeland, Wright, Roalfe, & Wales, 2006; Henry, Anshel, & Michael, 2006; Skriner, Bullen, McArthur, Cheek, & Vaughan, 1986; Vocks, et. al., 2009; Williams & Cash, 2001; Williams & Depcik, 2001; Zabrinski, Calfas, Gehrman, Wilfley, & Sallis, 2001). Due to HIIT gaining popularity as an alternative to moderate intensity continuous exercise, more research is needed to investigate its effects on the mental and physical self. There has been no known research examining the effects of high intensity interval training (HIIT) and body-esteem.

**Purpose of the Study**

The purpose of this study was to examine the effects of high intensity interval training on body-esteem in college-aged females.

**Hypothesis**

The study was designed to test whether high intensity interval training would be an effective exercise mode to increase body-esteem. It was hypothesized that high intensity interval training would have a positive effect on participants’ body-esteem.

**Delimitations**

The study was delimited to the following:

1. Participants were between the ages of 18-25.
2. The study was delimited to only females.
3. Risk for cardiovascular disease was assessed to allow for only low risk participants.

**Limitations**

The study was limited by the following:
1. The study consisted of a small sample which may not accurately represent the entire female college-aged population.

2. The study lacked ethnic diversity, as all participants were Caucasian.

3. Inaccurate responses could result in skewed data.

4. Body mass index (BMI) does not differentiate between fat mass and fat free mass.

5. Exercise sessions were unsupervised, which does not ensure participants completed the prescribed exercise sessions or performed the exercises correctly or at the prescribed intensity.

6. The Borg RPE scale is based on perceived intensity. Participants may have perceived their exertion to be higher than the target rate.

7. The length of the study was only four weeks. A longer study may yield more significant findings.

8. The questionnaire was distributed to participants online, therefore it is possible ineligible participants completed the study.

**Definition of Terms**

The following terms have been defined for the purpose of this study:

**Body Dissatisfaction:** A negative subjective evaluation of an individual’s physical body (Garner, 2002).

**Body-Esteem:** Body-esteem refers to the rating one gives to their perceptions, thoughts, and feelings about their own body; it is the numeric scale used to assess one’s body image (Sheldon, 2010).
**Body Image:** A person’s self-evaluation of their physical appearance (Mendelson et al., 2000)

**Body Mass Index (BMI):** A measure used to indicate obesity based on a ratio of height to weight. Weight in kilograms divided by height in meters squared (American College of Sports Medicine, 2014).

**Body Surveillance:** involves focusing on how one’s body appears to an outsider and how their body looks instead of how it feels (McKinley & Hyde, 1996).

**High Intensity Interval Training (HIIT):** An exercise protocol which involves bouts of high intensity exercises mixed with short rest intervals for recovery (Shepherd et al., 2015).

**Internalization:** Acceptance of a set of norms or values (Moradi, 2010).

**Internal Awareness:** Accurately detecting and interpreting physiological sensations (Reel, 2013).

**Ideal Discrepancies:** Viewing a discrepancy between one’s actual body and their ideal body (Higgins, 1987).

**Objectification Theory:** A theory that suggests that the body is created biologically and is developed through sociocultural frameworks such as gender roles and sexual objectification (Fredrickson & Roberts, 1997).

**Self-Esteem:** The perceptions that a person has about themselves in either a positive or negative manner (Rosenberg, 1965) and is a personal judgement of one’s own value (Branden, 2001).
Social Comparison Theory: A theory which suggests that individuals naturally assess where they stand in life, which leads to social comparison in an attempt to understand their place in the world (Festinger, 1954).

Social Physique Anxiety: The anxiety experienced in response to others' evaluations of their physique (Hart, Leary, & Rejeski, 1989).
Chapter Two

Review of literature

The review of literature on body-esteeem relevant to this study is included in this chapter and includes the following: body-esteeem in college females; influences on body-esteeem, including culture, ethnicity, objectification theory, social comparison theory, peers and family, media, and social media; the effects of negative body-esteeem including depression, eating disorders, and social physique anxiety; weight and body-esteeem; exercise’s effect on body-esteeem as well as depression, eating disorders, and social physique anxiety, and HIIT as a form of exercise.

Body-Esteem in College Females

Body image disturbances can affect individuals at any age, however college students are more susceptible because of the transitions and changes occurring in their lives. Many students change their eating behaviors due to the availability and fewer restrictions involving unhealthy foods, which can lead to weight gain (Hoffman, Policastro, Wuick, & Lee, 2006). Changes in eating behaviors as well as weight gain can also lead to a change in body-esteeem. College females are also surrounded by others similar in age, engaging in social activities that may encourage comparisons in physical appearance with their peers (Pilafova at al., 2007). Many social activities or organizations, such as sororities, may place importance on physical appearance, pressuring students to live up to societal norms of physical attractiveness.

If an individual feels they do not meet the standards of physical attractiveness, it can lead to negative body image. It is not uncommon for individuals with lower body image to engage in upward comparison between themselves and peers or celebrities.
According to Fanzoi and Klaiber (2007), college females are more likely to evaluate their body by comparing themselves to professional models. When considering body-esteem, college males reported having higher self-esteem and body-esteem than college females (Pilafova et al., 2007), therefore this review is focused on college-aged females. The two theories most commonly involved in studies concerning body image are objectification theory and social comparison theory.

**Objectification Theory**

Objectification theory (Fredrickson & Roberts, 1997; Szymanski, Moffitt, & Car, 2010) suggests that the body is created biologically and is developed through sociocultural frameworks such as gender roles and sexual objectification. The theory also suggests that in American culture, the female body is an object made to be looked at (Fredrickson & Roberts, 1997; McKinley & Hyde, 1996). Sexual objectification teaches women to believe their value depends on their appearance. The belief that values lie in physical appearance can lead to the belief that women are objects on display, or encourage them to self-objectify (Moradi, Dirks, & Matteson, 2005; Moradi & Huang, 2008; Szymanski et al., 2010). Women who self-objectify may become preoccupied with their appearance, and may begin to develop other issues. The psychological and behavioral consequences of self-objectification may occur regardless of appearance satisfaction (Noll & Frederickson, 1998).

Thin-ideal internalization, body surveillance, and body shame are part of the self-objectification process and although related, each construct must be measured separately because they embody distinct concepts in objectification theory (Moradi, 2010; Moradi & Huang, 2008). Moradi (2010) suggested that self-objectification is a "process" which
manifests as body surveillance and internalization of beauty standards. By internalizing sociocultural beauty ideals, an individual may begin to believe that she is making a personal choice to conform to culturally defined beauty ideals instead of seeing the decision as a result of social pressure (McKinley & Hyde, 1996). Manifestations of internalization and body surveillance may reduce internal awareness (Fredrickson & Roberts, 1997; McKinley & Hyde, 1996; Moradi, 2010; Szymanski et al., 2010; Tylka & Hill, 2004) which can theoretically promote negative body image or body image concerns (Cafri, Yamamiya, Brannick, & Thompson, 2005; Fredrickson & Roberts, 1997; McKinley & Hyde, 1996; Moradi, 2010; Moradi & Huang, 2008; Szymanski et al., 2010). Although many people observe the same images and understand the societal importance placed on appearance, those who tend to adopt society’s standards for themselves are at a higher risk for internalizing such ideals.

Self-objectification and body image issues have been associated with health risks such as disordered eating (Grabe, Ward, & Hyde, 2008; Moradi et al., 2005; Tylka & Sabik, 2010), depression (Carr & Szymanski, 2010; Szymanski & Henning, 2007), decreased self-esteem (Tylka & Sabik, 2010), anxiety (Muscat & Lon, 2008), substance abuse (Carr & Szymanski, 2010), and sexual dysfunction (Szymanski et al., 2010). Self-objectification may manifest as a behavior known as body surveillance (Moradi & Huang, 2008), which involves focusing on how one’s body appears to an outsider and how their body looks instead of how it feels (McKinley & Hyde, 1996). Body surveillance can lead to a realization that there is a difference between their ideal body and their own body which can have negative consequences (Fitzsimmons-Craft et al., 2015). If individuals find a discrepancy between the way they view themselves and society’s beauty standards, it is
possible they may begin to develop a negative body image, which can lead to other physical or psychological issues. Body surveillance has been known to lead to body dissatisfaction (Forbes, Jobe, & Revak, 2006; Frederickson, Robets, Noll, Quinn, & Twenge, 1998; Knauss, Paxton, & Alsaker, 2008; McKinley, 1998). Body dissatisfaction is a negative subjective evaluation of an individual’s physical body, which may include weight and shape (Garner, 2002; Pearson, Heffner, & Follette, 2010; Stice & Shaw, 2002). Another theory that can be applied to body image and its ability to lead to body dissatisfaction is social comparison theory.

Social Comparison Theory

Social comparison theory (SCT; Festinger, 1954) suggests that individuals naturally assess where they stand in life, which leads to social comparison in an attempt to understand their place in the world. Much like objectification theory, SCT finds that individuals engaging in social comparison may find discrepancies between their own bodies and their ideal body, leading to body dissatisfaction. A study conducted using 232 college women, which involved completing a daily diary for two weeks, while answering surveys three times per day, found, on average, women who compare themselves to others more frequently, will experience higher levels of body dissatisfaction (Fitzsimmons-Craft et al., 2015). SCT suggests that individuals will attempt to make accurate comparisons by comparing themselves to those similar to themselves, usually their peers (Lin & Kulik, 2002). Although it may be a large influence, social comparison is only one of many factors that could impact body-esteem.
Influences on Body-Esteem

Body-esteem refers to the rating one gives to their perceptions, thoughts, and feelings about their own body; it is the numeric scale used to assess one’s body image. Body image is dependent on various factors including psychological components and sociocultural influences such as culture, family, peers, and ethnicity (Gross, Cary, Browne, & Le Veist, 2005; Gualdi-Russo et al., 2012; Johnson-Taylor, Fisher, Hubbard, Starke-Reed, & Eggers, 2008; Kruger, Lee, Ainsworth, & Macera, 2008). Mass media also perpetuates the search for the ideal body, influencing how one perceives their body, which can lead to internalization of the media’s beauty standards and a desire to conform to them (Stefanile, Matera, Pisani, & Zambrini, 2009). Social media has also become a popular source of networking which may influence the spread of society’s standard of beauty. Among the many factors influencing body-esteem, the role culture has in setting standards of physical attractiveness may be the largest contributor to how individuals view themselves.

Culture. Western cultures have long placed an importance on the image presented by women. This issue was apparent with a rise in eating disorders in Western culture. While these disorders are more common in Western cultures, Sharan and Sundar (2015) hypothesized the slow spread to “non-Western nations” via cultural transformation. Bruch (1978) attributed the growing body-esteem issues with the importance placed on thinness in society’s standard of beauty. The importance place on a culture’s idea of beauty may lead to an internalization of such standards which can be seen throughout many age groups. Females in Western cultures as young as three years old were able to assign more positivity toward thinner characteristics (Dittmar, Halliwell,
EFFECTS OF HIIT ON BODY-ESTEEM

& Ive, 2006; Harriger, Calogero, Witherington, & Smith, 2010). Dittmar et al. (2006) suggests that this exposure for females begins at an early age with children’s toys such as the Barbie doll.

In today’s Western society, it is normal for women to feel a moderate level of body dissatisfaction (Sands, 2016), which could occur due to a discrepancy between an individual’s actual body and the “ideal body” portrayed in the media. The Western culture relies heavily on media for advertisement, which continuously portrays altered images of women looking extremely thin. Although culture can be influential in impacting body-esteem, many cultures are made up of individuals of different ethnicities, which may also have a different standard of beauty.

Ethnicity. Western civilizations such as the United States, United Kingdom, and Australia share many of the beauty standards including the “thin ideal” (Bell & Dittmar, 2011). Although many studies have used primarily Caucasian samples in Western societies, recent research has begun to explore body dissatisfaction within other ethnic groups. Schooler and Lowry (2011) found evidence that Latinas experienced body dissatisfaction at a comparable rate to Caucasians. This could be a sign of the spread of Western culture to other countries.

African American women are traditionally more satisfied with their body and display a more positive body image (Fujioka, Ryan, Agle, Legasi, & Toohey, 2009). Although it is common to find more body satisfaction among African American women, culture and environment have been shown to affect body image. A study by Sanderson, Lupinski, and Moch (2013) assessed different body image aspects of African American women from two different environments. One group consisted students from a primarily African American college, while the other group was comprised of African American
women from a primarily Caucasian college. While both groups showed similar views on rejecting societal values of thinness and the value of exercise, the participants from the primarily African American college showed a higher body satisfaction. This could suggest that African American women may begin to internalize societal definitions of beauty depending upon the environment they live in.

Other ethnic groups that have been studied to assess body dissatisfaction include Asians and Pacific Islanders. In 2004, Kennedy, Templeton, Gandhi, and Gorzalka found Chinese women to have higher body dissatisfaction than Caucasians. Although a more recent study found Asians to have a similar level of body satisfaction to Whites, despite having lower BMIs (Latner, Knight, & Illingworth, 2011). This could suggest that Asians have a stricter view of thinness and body size standards or that they would need to reach a smaller BMI in order to achieve the same level of body satisfaction as a Caucasian counterpart. In opposition of Asians, Pacific Islanders were found to have a higher body satisfaction regardless of having a higher body weight (Latner et al., 2011). Pacific Islanders have a cultural acceptance of larger body types and less fear of becoming overweight. The rejection of the “thin ideal” would support the finding that Pacific Islander adolescents did not consider themselves “too fat,” regardless of common obesity among this group. This rejection of the Western culture’s thin ideal may also affect the attitudes of peers and family concerning obesity, which can play a pivotal role in the development of body-esteeem throughout an individual’s lifetime.

**Peers and family.** Body satisfaction has been reportedly associated with body-related teasing as well as criticism from peer and family members (Gray & Ginsberg, 2007; Thompson et al., 1999). Many females rely on the opinions of those close to themselves,
such as peers and family members in order to develop their body-esteem as they age. For this reason, the attitudes expressed toward a female’s body by peers and family may instill a lasting positive or negative affect. Reives and Cash (1996) found that college women who perceived body image issues in their mothers tended to develop body image issues themselves, while McKinley, (1999) found women who believed to have their mother’s approval of their appearance, had a more positive body image (as cited in Sanftner, Ryan & Pierce, 2009). As women age and enter a collegiate atmosphere, they may become less dependent on their family’s feedback of their body image, and instead find themselves surrounded by a new group of peers to receive body-related feedback from. College women have been known to engage in social comparison with peers (Leahey, Crowther, & Mickelson, 2007). College campuses are a prime setting to engage in this social comparison (Fitzsimmons-Craft, 2011), as women are constantly in contact with other women relatively the same age (Linder, Hughes, & Fahy, 2008). When surrounded by females of the same age group, it may be difficult for some women to avoid comparing themselves with their peers, even if the comparison occurs unconsciously. Correlational and experimental work has shown an association between social comparison with peers and body dissatisfaction (Bamford & Halliwell, 2009; Myers & Crowther, 2009; Trottier, Polivy, & Herman, 2007). Individuals may also feel that they are not only held to the standards of their peers, but also to the beauty standards set by the media.

**Media.** The media is considered the cultural gatekeeper and influences the standards on which we base our perception of beauty (Garner, 1997). As the media has grown, the placement of beauty standards can be seen most everywhere throughout daily life. The standard of beauty for women portrayed by the media includes a physique
considered to be “ultrathin,” or exceedingly thin. Research conducted by Tiggemann (2014) used primarily Caucasian participants within these Western societies and found a correlation between media exposure and body dissatisfaction. Body dissatisfaction has been greatly affected by exposure to ultrathin models and celebrities in the media (Harrison & Cantor, 1997; Levine, Smolak, & Schermer, 1996; Thompson et al., 1999).

It is likely that the media’s standards of beauty may bring about the realization of the discrepancies between an individual’s actual body and their “ideal” body. McCarthy (1990) termed the current standard of beauty as the “thin ideal”, which is thought to be conveyed to women through popular media. With exposure to mass media images around every corner, women may find it difficult to avoid internalizing the media’s definition of beauty. Lin & Reid (2009) found that women are particularly susceptible to societal messages that promote achieving the “ideal body.”

Those who engage in comparison with others will likely engage in media-based social comparison, especially individuals who find self-worth in their appearance (Perloff, 2014). Among the things individuals may evaluate about their appearance is weight. Due to the thin images portrayed in the media, weight concerns may influence an individual’s body-esteem. Research has shown that women are adversely affected by exposure to advertisement when evaluating their weight-related body-esteem (Bissel & Zhou, 2004; Frisby, 2004; Schooler, Ward, Merriwether, & Caruthers, 2004; Tiggemann & McGill, 2004; Wiederman & Pryor, 2000). The desire to achieve the media’s definition of physical attractiveness can influence people to lose weight in large numbers (Bish et. al., 2005). As technology has advanced, social networking sites have become a
popular method of networking for individuals, as well as a source for media to expose consumers to their advertisements.

**Social media.** Most studies have concentrated on traditional forms of media such as television, magazines, and even music videos, however Perloff (2014) suggests that these media sources are not the primary media choice for younger individuals anymore. Lenhart, Purcell, Smith, and Zickuhr (2010) found that 72% of online users ages 18-29 use social media. As time continues, technology progresses and will continue to add more users to these networks. This means that more individuals will be exposed to the mass media’s idea of beauty standards on a regular basis. It has also been concluded that women are more likely than men to frequent social networking sites (Duggar & Brenner, 2013).

Social media itself differs from traditional media based on the ability of users to communicate by creating and sharing messages instantaneously. Eveland (2003) notes the key feature separating social from traditional media is the interactivity provided. The social media environment provides a personal outlet for each individual user, giving them the ability to personalize their sites with their own information, pictures, and option to engage in self-disclosure. One appeal of social media to users is the ease of access to communities of like-minded individuals (Amichai-Hamburger, 2007). With the sharing of personal photos and information, individuals are giving other users access to their lives and the ability to judge them based on their appearance, including their weight, which can have an impact on their body-esteem.
Weight and Body-Esteem

In a study conducted by Neighbors and Sobal (2007), 84% of college undergraduate women stated they would like to lose weight. Women often view being overweight as socially unacceptable and oppose the standards of attractiveness (Mendelson, White, & Mendelson, 1996). Societal pressures to achieve a perfect body have led to low self-esteem and negative body image in individuals with higher body mass indexes (BMI). BMI is a height to weight ratio used to assess if a person is considered within normal weight ranges for their height. It is however, not a completely accurate representation of body composition since it does not take fat mass and fat free mass into consideration. Although it may not be the gold standard for predicting whether an individual is overweight or obese, research has concluded BMI is a strong predictor of a female’s overall body dissatisfaction (Kostanski & Gullone, 1998; Stice & Whitenton, 2002). Studies conducted by Groesz, Levine, and Muren (2002), and Gruber, Pope, Borowiecki, and Cohane (2000) found that concerns about body image are almost exclusively related to fat (as cited in Woodman & Steer, 2011). On the other end of the spectrum, Pilafova et al. (2007) found that college students with lower BMI’s reported a more positive body image. Improving appearance and weight loss can often serve as motivation for lifestyle changes such as exercise (Ingledew & Markland, 2008; Kilpatrick, Herbert, & Bartholemew, 2005; King, Hopkins, Caudwell, Stubbs, & Blundell, 2005). Improving one’s body-esteem can also assist in avoiding the negative effects that can occur with body dissatisfaction.
Effects of Negative Body Image

Negative body image can have detrimental effects on both physical and mental health. Body dissatisfaction has been linked to low self-esteem, and eating disorders (Cafri et al., 2005; Fernandez & Pritchard, 2012; Rivadeneyra et al., 2007). A perceived difference between ideal and actual body image can lead to social physique anxiety and body image dissatisfaction. Social physique anxiety is defined as individuals worrying that their body or physical appearance is being negatively evaluated by others (Hart et al., 1989). The fear of being judged by others can impact an individual’s decision to engage in socialization. Negative body image can also cause emotional distress (Johnson & Wardle, 2005), smoking (Croghan et al., 2006), steroid use (Raevuori et al., 2006), impaired sexual functioning (Wiederman, 2002), and depression (Stice & Bearman, 2001). Among the negative effects of low body-esteem, the most prevalent issues include depression, eating disorders, and social physique anxiety.

Depression. In 2011, Lepine and Briley stated that the complex and debilitating illness known as depression was affecting over 120 million people worldwide. This psychological disorder cannot only interfere with daily living tasks, but can also lead to other health issues. Depression is a widespread illness that is projected to become the second largest cause of disability worldwide by the year 2020 (World Health Organization, 2001). If depression causes health issues and interferes with an individual’s ability to perform daily tasks, it would not be surprising to see the individual’s quality of life suffer as well.

One form of depression is Major Depressive Disorder (MDD) which is characterized by severe symptoms that interfere with a person’s ability to work, sleep,
EFFECTS OF HIIT ON BODY-ESTEEM

Eating, study, or simply enjoy life (National Institute of Mental Health, 2016). MDD is the most prevalent depression disorder and is known to be a recurring issue. More than 80% of individuals suffering from MDD will experience more than one episode of depression (Kessler & Wang, 2009). The onset of these bouts of depression could be caused by a specific mix of stress and vulnerability.

The National Institute of Mental Health (2016) states that the symptoms of depression include: persistent sad, anxious, or empty feelings, feelings of hopelessness or pessimism, feelings of guilt, worthlessness, or helplessness, irritability, restlessness, loss of interest in activities or hobbies, fatigue and decreased energy levels, difficulty concentrating, insomnia or excessive sleeping, overeating or appetite loss, thoughts of suicide or suicide attempts, or aches and pains that cannot be eased with treatment. Depression can affect either gender, however women are 70% more likely to experience depression at least once in their lifetime. African Americans are also 40% less likely to experience depression than Caucasians (NIMH, 2016). Although these statistics suggest females and Caucasians are more likely to experience depression, it is not to be said that these numbers are completely accurate. With any disorder, especially mental, it can be difficult to gauge the number of individuals affected simply because not every person will seek treatment.

Eating disorders. Sharan and Sundar (2015, p.286) stated “Eating disorders are disorders of eating behaviors, associated thought, attitudes and emotions, and their resulting physiological impairments.” Due to the many factors entwined within eating disorders, multiple complex treatments may be necessary. According to Harris and Barraclough (1998), eating disorders rate among the highest mortality of psychiatric
disorders (as cited in Sharan & Sundar, 2015). Although eating disorders may seem less extreme than other psychological disorders, it is a disease that allows those who suffer from it to cause themselves bodily harm on an everyday basis.

The classifications of eating disorders include anorexia nervosa and bulimia nervosa. Binge eating disorder (BED) is under active consideration of the Diagnostic and Statistical Manual of Mental Disorders Volume V (DSM-V) work group according to Walsh (2008). Anorexia nervosa typically consists of three key characteristics including fear of gaining weight, distorted body image, and refusal to maintain a healthy body weight (helpguide.org, 2016). Bulimia nervosa is most commonly known as binge eating and then purging due to guilt (Mayoclinic.org, 2016). BED consists of recurring episodes of binge eating without regular compensatory behaviors (i.e., vomiting or laxative abuse) (Sharan & Sundar, 2015).

Stice and Shaw (2002) confirm that body dissatisfaction often predates eating disorders and is considered a major risk and maintenance factor (as cited in Sands, 2016). Both males and females are capable of experiencing body dissatisfaction and although recent research shows that the male population suffering from eating disorders has been underestimated, women are at greater risk of body dissatisfaction and disordered eating than men (Anderson & Yager, 2009). It is possible that the standards to which women are held by society’s beauty standards make eating disorders a more plausible option to reach such goals. Men’s ideal body images tend to consist of a muscular stature, which would be difficult to achieve without the proper caloric intake. When asked about appearance, women generally wanted to be smaller and weigh less (Gillen & Lefkowitz, 2006), which could be a factor contributing to disordered eating.
Social physique anxiety. Social Physique Anxiety (SPA) can be defined as the anxiety experienced in response to others’ evaluations of their physique (Hart, Leary, & Rejeski, 1989). Due to the concern of social evaluation, it is not surprising that women who view more of a discrepancy between their actual body and their ideal body (known as ideal discrepancies) are at a higher risk for experiencing SPA.

While social physique anxiety can be in response to a real threat, it may also arise based on an imaginary perceived threat. Martin Ginis, Strong, Arent, and Bray (2012) conducted a study which found that regardless of whether the threat of physique evaluation is real or imagined, the anticipation of the threat alone will cause the body to release the stress hormone, cortisol. This study was the first to link the physiological consequences of exposure to environments of social evaluation, as opposed to the psychological. The finding is important because it can contribute to other health issues. McEwen (1998) found that repeated exposure to high cortisol levels can lead to health problems such as diabetes, hypertension, cancer, cardiovascular disease, and depression (as cited in Martin Ginis et al., 2012). One option to increase body-esteem and also treat or prevent health issues is a regular exercise program.

Effects of Exercise on Body-Esteem

Asci, (2003) found a stronger self-perception compared to a control group after a 10-week physical fitness program. A strong perception of one’s self can be an influential factor in how a person perceives their body. Therefore, if an exercise program can increase an individual’s view of themselves, it may also affect how they feel about their body. Numerous studies have shown a link between physical exercise and improved mood, which can affect body image (Berger & Motl, 2000; Ekkekakis et al., 2000; Lane, Crone-Grant, & Lane, 2002; Lane, Jackson, & Terry, 2005).
Voeks et al. (2009) found a positive influence on body image after only one session of physical exercise, which could be explained if the participants were focused more on body-related stimuli, causing them to perceive even minor changes in body image after exercise. Although this study found one session of exercise to have a positive effect on body image, there is limited research examining the effect of acute exercise on body image. Due to body image presenting both state and trait characteristics (Hausenblaus, Brewer, & Van Raalte, 2004), the existing body of knowledge would benefit from future studies including acute exercise’s effect on body-esteem.

A meta-analysis conducted in 2006 by Hausenblaus and Fallon revealed a small effect between exercisers and non-exercisers showing a better body image for the exercising population. They speculate the results could be due to activity levels resembling that of a lean and fit individual (Thompson et al., 1999), as well as the fact that participation in exercise yields positive psychological benefits that could include increasing body image (Landers & Arent, 2001). Regardless of reason, the meta-analysis showed that participants engaging in exercise interventions had a better body image than the non-exercising control groups at the end of the intervention. Individuals who engaged in exercise programs were more likely to report a more positive body image at the end of the program when compared to the beginning (Hausenblaus & Fallon, 2006).

Based on the results from the Hausenblaus and Fallon’s (2006) meta-analysis, the best mode and intensity of exercise for prescriptions can be inferred. When prescribing exercise to improve body image for females, both aerobic and anaerobic exercise should be prescribed in order to control body fat and increase muscle tone. Intensity of exercise should be moderate to strenuous in order to receive health benefits. Participants who
engage in both aerobic and anaerobic exercise, as well as those who perform at a minimum of moderate intensity, were found to have a greater body image (Hausenblas & Fallon, 2006).

Body-esteem can be also affected by weight. For this reason, it is important to understand how exercise can assist in weight management. Exercise has been shown to help reduce or manage weight (Gillison, Standage, & Skevington, 2006). In regards to weight management exercise helps prevent obesity and obesity-related illnesses (Vartanian, Wharton, & Green, 2012). Although weight loss is a common objective for those engaging exercise, understanding the motivation behind desired weight loss is important. Exercising for appearance only can lead to other health and psychological issues, however exercising for health or fitness can increase body satisfaction and self-esteem (Strelan, Mehaffey, & Tiggeman, 2003; Vartanian et al., 2012). Along with the effects on body-esteem, it is important to understand how exercise may affect the other issues brought on by an individual’s body dissatisfaction.

**Exercise and depression.** Along with positive physical effects, exercise may lead to an increase in psychological well-being, increased positive affect, and a reduction in depression (U.S. Department of Health & Human Services, 2008). Numerous studies have shown a reduction in depression symptoms through both cardiovascular (Dimeo, Bauer, Varahram, Proest, & Halter, 2001; Krogh, Saltin, Gluud, & Nordentoft, 2009) and resistance exercise (Pilu et al., 2007; Singh et al., 2005). Although both aerobic and anaerobic exercise are prescribed to keep individuals healthy, those who suffer from depression may find both activities to be difficult. When dealing with a depressed client, it is possible that they may have symptoms that make even leaving their house difficult.
It is important to work with these individuals to assess what form of exercise they enjoy. The likelihood of adherence can be improved by prescribing a form of exercise clients with depression enjoy. With increased activity, clients may lower their depression symptoms.

Although challenging, high intensity training has shown to positively affect depression. Heggelund, Kleppe, Morken, and Vedul-Kjelsas (2014) found that a high intensity routine consisting of four rounds, four minutes each at 85-95% peak heart rate, intermitted by three minutes of active rest at 70% of peak heart rate yielded positive results with patients suffering from depression. The depressed patients showed an improvement in distress visible even 15 minutes after the exercise session, as well as reduced state anxiety, improved mood, and well-being up to three hours after high intensity training.

**Exercise and eating disorders.** Exercise has been known to be one of the components included in both anorexia nervosa and bulimia nervosa (Naylor, Mountford, & Brown, 2011). Excessive exercise has been seen in patients with eating disorders to have increased psychological distress (Naylor et al., 2011). Excessive exercise is the inability or unwillingness to cut down or stop exercising, even if it becomes detrimental to one's health (Naylor et al., 2011). Many with eating disorders also exhibit a compulsive side to their exercise habits. This means that specific exercise routines are adhered to and cannot be adjusted or changed. Typically, many with eating disorders have both compulsive and excessive exercise habits (Naylor et al., 2011).

Researchers have concluded that exercise helps achieve the determined “perfectionism” body image that is desired (Naylor et al., 2011). Even if an individual
reaches their desired body image, the use of excessive exercise to do so may lead to other health issues and could also become an addiction in itself. Although exercise is known as positive with a mentally healthy person, with someone who has an eating disorder, it can be detrimental. Exercise becomes detrimental when there is a dependence (Cook, Engel, Crosby, Hausenblas, & Mitchell, 2013). Typically, exercise dependence also correlates with a severe case of an eating disorder (Cook et al., 2013). Exercise dependence becomes an issue when the activities of daily living are affected and exercise becomes the only priority of the person. When an individual is a compulsive exerciser, it takes much longer to recover than someone who does not have the exercise component (Meyer, Taranis, Goodwin, & Haycraft, 2011).

Although excessive exercise may be a technique used in eating disorders (American Psychiatric Association, 1994), it may also be a treatment option depending upon the individual’s motivation to exercise. Individuals using appearance as an exercise motivator have shown a higher trend of disordered eating, body dissatisfaction, and a decrease in self-esteem (Thome & Espelage, 2007). This information identifies one of the reasons why interviewing individuals prior to treatment or exercise prescription is an important process. A meta-analysis conducted by Hausenblas and Fallon (2006) found research suggesting that exercise may be a more effective treatment in cases of bulimia nervosa and binge-eating disorders than the traditional cognitive behavior therapy and nutritional. Due to this knowledge, it is suggested to proceed with caution when using exercise as part of treating an eating disorder.

The National Athletic Trainer’s Association has recommended that trainers working with athletes suffering from eating disorders need to be ready and willing to
enforce exercise limitations if they feel the athletes are exercising at a dangerous level (Bonci et al., 2008). Exercise has been known to have a positive effect on those suffering from mood disorders such as anxiety and depression. Due to the high rate of mood disorders that affect individuals with eating disorders, exercise should be carefully considered as a treatment option (Hudson, Hiripi, Pope, & Kessler, 2007). In 2006, the APA suggested exercise to be a safe form of treatment based on preliminary research. Although the subject of exercise as treatment for eating disorders is still controversial, there have been positive results. It is suggested that reasons for exercise be explored prior to an exercise intervention and that careful supervision take place if an intervention is decided upon as a form of treatment.

**Exercise and social physique anxiety.** Social physique anxiety (SPA) research is commonly conducted in exercise settings, which is expected due to the environment. Exercise settings may cause a person to feel exposed or anxious that others are evaluating their body. Foct and Hausenblas (2004) conducted a study which randomly assigned women to either exercise in a private setting or in a busy college facility. The results showed that women placed in a more public exercise setting felt more of a perceived threat of others judging their bodies than the group exercising in a private setting. More recently, Martin Ginis et al., (2011) found that a group of women felt more anxious in a group strength training class when the class consisted of both male and females as opposed a female only group. It is not uncommon for women who experience SPA to exercise less frequently than others or have issues with adherence to exercise.

Although an exercise environment may increase SPA, Lindwall and Lindgren (2005) found a positive effect on self-perception which reduced social physique anxiety
after a six-month exercise intervention. As was suggested by studies involving exercise as a treatment for eating disorders, it is suggested to use caution when prescribing exercise for those suffering from SPA. It may be wise to suggest personal training sessions, closed gender specific exercise groups, or exercise groups specifically comprised of like-minded individuals. Easing a client suffering from SPA into an exercise environment will likely increase adherence as well as assist in treating the disorder.

While aerobic and strength exercise is most commonly used in research for treatment of body-esteem and its complications, it may not be the only form of exercise to produce positive results. High intensity interval training (HIIT) is a relatively new mode of exercise that has not yet been researched as a treatment for increasing body-esteem. Based on the information currently available concerning HIIT, it may be a possible training modality used to increase body-esteem. An evaluation of its current research, as well as further research studies concerning body image are needed to assess its feasibility as a treatment option.

**HIIT as a Form of Exercise**

The most cited barriers to exercise were lack of time and monotony (Godin et al., 1994; Reichert et al., 2007). Many individuals do not make the time necessary throughout their day to perform a lengthy exercise routine. Due to the high level of intensity of the workouts, HIIT can be performed for a shorter period of time than regular aerobic and strength training protocols. HIIT can be a time-efficient exercise intervention to improve obesity-related health risk factors (Nie et al., 2012). HIIT protocols can also use aerobic and strength exercises modified to meet an individual’s
EFFECTS OF HIIT ON BODY-ESTEEM

needs. The routines can utilize any exercises an individual is capable of doing, therefore reducing the monotony of performing the same routine time and time again.

While HIIT is relatively new, there are studies showing similar metabolic adaptations as those found in moderate intensity continuous training in both normal populations (Nybo et al., 2010) and patients with chronic diseases including obesity (Little et al., 2011; Sijie, Hainai, Fengying, & Jianxiang, 2012; Tjonna et al., 2008). With focus being on thinness as a beauty standard, many women may seek to improve their abdominal areas. A study involving HIIT induced a reduction in abdominal fat in non-obese (Trapp, Chrisholm, Freund, & Boutcher, 2008) and obese women (Gillen, Percival, Ludzki, Tarnopolsky, & Gibala, 2013). Due to a shorter duration of exercise, it is important to understand how HIIT compares to other continuous training routines. Research has shown HIIT to be just as effective (Whyte et al., 2010; Macpherson et al., 2011), or more effective (Trappe et al., 2008) than moderate intensity endurance training in reducing abdominal and whole-body fat mass.

Based on the current research regarding HIIT compared to other training modalities, as well as the understanding of the most common barriers to exercise, it is important to continue research in this area. The ability to increase health and decrease obesity, and obesity related illness could prove HIIT to be an effective exercise treatment for individuals with low body-esteem. It is recommended that research continues to pursue HIIT as a treatment option for body dissatisfaction as there is little information available on the topic.
Summary

A vast majority of women show signs of negative body image. The media continues to advertise unrealistic physiques, leading women to body shame and strive for a difficult, if not impossible, to attain “perfect body.” Body dissatisfaction has many known negative psychological and physical effects that can be detrimental to an individual. College females are at risk for negative body image due to the transitional period occurring in their lives and also the social environment that places emphasis on physical appearance. Many women are pressured by society’s beauty standards to become ultrathin, which is extremely unrealistic for most women. Due to the emphasis on being thin, many women have negative body images due to weight. It has been shown that those with a higher BMI are more likely to have body dissatisfaction. One form of weight reduction and management is exercise. Exercise has been known to increase positive moods, health, and body image. In our fast-paced society, many forms of exercise are more difficult to engage in due to the time commitment necessary. Although relatively new, HIIT has been shown to produce similar effects in weight and abdominal fat reduction as continuous moderate intensity exercise, and requires less time to complete. Therefore, evaluating HIIT as a form of exercise to improve body image could provide a more time-efficient answer to positively influencing body-esteem.
Chapter Three

Methods

Participants

A recruitment email was sent to instructors and sororities to share with students at a small Midwestern University. The recruitment information can be found in appendix A. A sample of nine participants aged 20-24 at a small were recruited, with four completing the study. Participants were all required to complete a health history questionnaire to attest they were apparently healthy and were not contraindicated to vigorous exercise. Participants were required to view an introduction video before beginning the study. Before beginning the questionnaire, participants were required to read and electronically sign an informed consent by selecting the accept option. The informed consent can be found in appendix B.

Instrumentation

Health history questionnaire. Participants were required to fill out a health history questionnaire in order to assess their risk for cardiovascular disease. Participants who were considered low risk by American College of Sports Medicine (ACSM) guidelines (ACSM, 2014) were allowed to complete the study. According to ACSM guidelines, a person can be stratified as low risk while having numerous risk factors for cardiovascular disease, as long as they do not display any signs or symptoms, and have not been diagnosed with any cardiovascular, pulmonary, or metabolic diseases. Although the ACSM guidelines allow a participant to have one risk factor and still be considered low risk, digression was used when allowing participants with risk factors to complete the study. The health history questionnaire can be found in appendix C.
Introduction video. Participants were required to view an introduction video before beginning the study. The video consisted of a review of their responsibilities as a participant, including accurately answering the pre and post exercise questionnaire, participating in all exercise sessions, and asking any questions they may have in order to complete the study properly. The introduction video showed participants how to set and use the interval timer, as well as, how to use the Borg rate of perceived exertion (RPE) scale to ensure they were exercising at the correct intensity. Lastly, the video reviewed all exercises, including the warm-up and cool down exercises, showing the participants how to properly execute the movements and any modifications to reduce the chance of injury during exercise.

Body-esteem questionnaire. Each participant was required to complete a questionnaire before beginning the exercise program and after completing the program. The Body-Esteem Scale (BES: Franzoi & Shields, 1984) was utilized to measure body-esteem in all participants. The scale required participants to rate 35 body parts and functions on a five point Likert scale. The scale ranged from one to five with one meaning “I have strong negative feelings” and five meaning “I have strong positive feelings.” The scale consists of three gender-specific dimensions, this study utilized the 31 questions concerning the female dimensions. The three subscales included sexual attractiveness (body scent, lips, ears, chin, chest or breasts, appearance of eyes, cheeks/cheekbones, sex drive, sex organs, sex activities, body hair, and face), physical condition (physical stamina, reflexes, muscular strength, energy level, biceps, physical coordination, agility, health, and physical condition), and weight concerns (appetite, waist, thighs, body build, buttocks, hips, legs, figure or physique, appearance of stomach,
and face). There were 12 items on the sexual attractiveness subscale, with a total of 60 possible points. The physical condition subscale consisted of nine items, totaling 45 possible points. The weight concerns subscale consisted of 10 items, totaling 50 possible points. The higher the score, the higher the body-esteem. Several studies have used this scale, which produced valid and reliable results (Cecil & Stanley 1997; Franzoi, 1994; Franzoi & Herzog, 1986; Franzoi & Klaiber, 2007; Silberstein, Striegel-Moore, Timko, & Rodin, 1988; Thomas & Freeman, 1990). The body-esteem questionnaire can be found in appendix D.

Additional questions. As established in the review of literature, low body-esteem can have a variety of causes and a negative effect on women, both physically and mentally. Questions were generated by the researcher in order to assess possible correlations between specifics causes and/or effects of low body-esteem. Participants were asked about their regular exercise habits, and possible reasons for participating or not participating in exercise. To assess societal and media influence on body-esteem, participants reported whether or not they ever felt pressured to change their appearance by the media, peers, family members, or other sources. Questions regarding participant’s social media habits and influences, such as how often they use social media, if it has ever caused them to feel negatively about their physical appearance, and if there were specific sources on social media that encouraged their negative feelings. Participants were asked if they felt uncomfortable exercising in public in order to assess possible social physique anxiety. Finally, information about possible eating disorders was obtained by asking if participants have ever felt pressured to change their eating habits in an unhealthy way in
EFFECTS OF HIIT ON BODY-ESTEEM

order to lose weight or appear a certain way. All questions from the pre and post questionnaire are located in appendix E.

**Body mass index.** Height and weight information was collected in order to calculate body mass index (BMI). Body mass index is a proportion of height versus weight that is an easy way to assess obesity in most individuals. Studies have indicated that BMI is a strong predictor of body dissatisfaction in females (Kostanski & Gullone, 1998; Stice & Whitenton, 2002). Although BMI does not differentiate between fat mass and fat free mass, for this study it measured any weight loss or body mass changes that may have resulted from the exercise program which could have a positive correlation with increased body-esteem.

**Interval timer.** Participants were instructed to download the Simple Interval Timer application on their phones. To increase the chances of the application being used correctly, instructions on how to use the application were included in the introduction video. The interval timer allowed the participants to enter the number of sets of exercises to be completed, the amount of time the action needs to be performed, and the rest period between exercises. The timer was used to ensure the participants completed the set amount of exercises and perform each exercise and rest period for the prescribed amount of time.

**Training protocol.** Several studies include a high intensity interval training protocol using sprints on treadmills or cycle ergometers (Perry et al., 2008; Shepherd et al., 2015; Skelly et al., 2014; Zhang et al., 2015). While this protocol has been shown to be effective, it requires access to equipment that may not be realistic for many individuals. Utilizing sprints as a training protocol may become monotonous and may
not be an enjoyable form of exercise. The protocol for this study utilized body weight exercises done in intervals. This routine provides exercises that are challenging, use high intensity full body movements, and can be done at home without any equipment. Since the routine can be done at home, the participants can perform the routine when they have time and it does not limit participants to those who have access to a gym or equipment.

The ACSM (2014) exercise guidelines recommend that vigorous intensity activity be performed for 20-60 minutes per session, at least three days per week. The protocol for this study consisted of training sessions that lasted 30 minutes each, performed three times per week for a total of four weeks. The routine consists of a five minute warm up, 20 minutes of interval body weight exercises, followed by five minutes of cool down. The warm up consisted of five exercises done for one minute each and included high knees, butt-kicks, karaoke, arm circles, and arm hugs. The HIIT protocol consisted of two rounds of ten exercises performed for 40 seconds with a 20 second rest between exercises. The exercises chosen for the routine represented a variety of full-body exercises combining lower and upper body work, as well as core training. Body weight exercises were chosen in order to eliminate equipment barriers. The routine was designed to include challenging exercises for vigorous intensity. The exercises included in the HIIT routine were squat kicks, three way pushups (normal, pike, and tricep), lunges with pulses at the bottom of the movement, burpees, planks lowering to forearms and back up to full arm with a leg raise at the end of the movement, oblique side-to-side leg lowers, four jump squats switching to four switch lunges, ten mountain climbers followed by one pushup, skaters, and double leg raise with reverse crunch at the end. All exercises
were demonstrated in the introduction video, and participants were encouraged to contact
the researcher if they had any questions. The cool down stretches were performed for at
least 30 seconds on each side beginning on the right, and included a shoulder stretch with
the arm across the chest, a tricep stretch, hamstring stretches, quad stretches, cobra or
sphinx pose, and child’s pose. Diagrams of exercises and stretches can be found in
appendix F.

**Borg RPE scale.** The intensity of exercise was monitored by the Borg rate of
perceived exertion (RPE) scale. The RPE scale evaluates participant’s perceived
exertion and has been shown to be a valid instrument and guideline for measuring
exercise intensity in different populations (Asadi, 2014). The scale ranges from 6-20 and
measured the rate of perceived exertion. The RPE scale can be a useful tool in assessing
exercise intensity for the majority of individuals without needing to assess participants or
use equipment such as a heart rate monitor (Skatrud-Mickelson, Benson, Hannon, &
Askew, 2011). The introduction video explained to each participant how to use the scale.
The scale is for the participants to evaluate how hard they feel they are working, with six
being no effort and 20 being maximal effort. Participants were encouraged to warm up
at a moderate level of 10-11 and exercise at a level of 15-17 to ensure they were
exercising at a high intensity.
Chapter Four

Results

SPSS (version 20 for Windows; IBM SPSS Inc., Chicago, Illinois, October 09, 2014) was utilized to perform statistical analyses. Of the nine original participants, four completed the study. Therefore, the study had a 55.55% dropout rate. No participants reported injury or exercise-related issues as a reason for discontinuing the study. The participants ranged in age from 20-24 ($M = 22.25$). Demographics of the study participants are shown in Table 1. Participants reported an average BMI of 23.025 (range = 21.5-25.7) with no changes from pre to post intervention.

Table 1

<table>
<thead>
<tr>
<th>Demographic Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

All four participants reported feeling pressured by the media to change their appearance and three participants felt pressured by peers to change as well. Every participant reported spending between one and three hours on social media per day and felt that the images presented negatively affected their body image. Of the content on social media, three participants reported that stories about celebrities influenced how they felt about their bodies, while one participant reported that photos and stories shared by their peers influenced their body- esteem. Two participants reported feeling that others
were staring at and judging them when they exercise in public, and three of the participants all reported feeling uncomfortable exercising around others. Of the four participants, three individuals reported that they have felt pressured, at some point, to develop unhealthy eating habits in order to lose weight or look a certain way.

A paired-samples $t$ test was calculated comparing the mean scores of pre and post scales for sexual attractiveness (SA), weight concern (WC), and physical condition (PC), paired sample statistics can be found in Table 2. The mean of pre SA was 48.75 ($SD = 13.86$) and the mean of post SA was 44.75 ($SD = 10.372$). No significant difference from pre to post SA was concluded ($t(3) = 1.197, p = 0.317$). The mean of pre WC was 30.75 ($SD = 9.74$) and the mean of post WC was 32.50 ($SD = 9.29$). The analysis showed no significant difference in pre to post WC ($t(3) = -0.870, p = 0.448$). The mean of pre PC was 29.50 ($SD = 6.02$) and the mean of post PC was 33.25 ($SD = 6.55$). Pre to post PC scores showed no significant differences ($t(3) = -0.791, p = 0.487$). The results of the paired samples test can be found in Table 3.
### Table 2

**Pre and Post Exercise Intervention Means**

<table>
<thead>
<tr>
<th>Pairs</th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre SA</td>
<td>48.75</td>
<td>4</td>
<td>13.865</td>
<td>6.933</td>
</tr>
<tr>
<td>Post SA</td>
<td>44.75</td>
<td>4</td>
<td>10.372</td>
<td>5.186</td>
</tr>
<tr>
<td>Pre WC</td>
<td>30.57</td>
<td>4</td>
<td>9.743</td>
<td>4.871</td>
</tr>
<tr>
<td>Post WC</td>
<td>32.50</td>
<td>4</td>
<td>9.292</td>
<td>4.646</td>
</tr>
<tr>
<td>Pre PC</td>
<td>29.50</td>
<td>4</td>
<td>6.028</td>
<td>3.014</td>
</tr>
<tr>
<td>Post PC</td>
<td>33.25</td>
<td>4</td>
<td>6.551</td>
<td>3.276</td>
</tr>
</tbody>
</table>

### Table 3

**Pre and Post Paired Samples Test**

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Mean Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>95% confidence interval of the difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Pair 2 PreSA-PostSA</td>
<td>4.000</td>
<td>6.683</td>
<td>3.342</td>
<td>-6.635</td>
</tr>
<tr>
<td>Pair 3 PreWC-PostWC</td>
<td>-3.750</td>
<td>8.617</td>
<td>4.308</td>
<td>-17.461</td>
</tr>
<tr>
<td>Pair 4 PrePC-PostPC</td>
<td>-1.750</td>
<td>4.425</td>
<td>2.213</td>
<td>-8.792</td>
</tr>
</tbody>
</table>
Chapter Five
Discussion

The purpose of this study was to examine the effects of high intensity interval training (HIIT) on body-esteem in college-aged females. There have been no known studies concerning the effect HIIT has on body-esteem. The researcher was interested in changes in body-esteem that occurred post exercise intervention using HIIT. Exercise has been shown to increase body-esteem (Burgess et al., 2006; Gehrman et al., 2006; Hausenblas & Fallon, 2006). Although exercise has many benefits, there are often barriers to exercising. Time limitations are often cited as one barrier to exercise (Reichert et al., 2007), which led the researcher to question whether HIIT would be a feasible exercise modality to increase body-esteem. Due to the vigorous intensity used in HIIT, the prescription for exercise duration is less than moderate intensity continuous exercise and has shown similar metabolic adaptations (Nybo et al., 2010; Zhang et al., 2015). It was hypothesized that HIIT would have a positive effect on participants’ body-esteem.

The HIIT protocol was constructed to incorporate strength and aerobic training with different exercises to avoid monotony. Bodyweight exercises were used in order to include participants who may not have access to weights or time to visit a gym. While the majority of HIIT studies use cycle or sprint intervals, the researcher found bodyweight intervals to be a more feasible option for most individuals due to the ability to perform the routine in most locations and without needing extra equipment. Modifications to exercises were also given to ensure that participants with any training level could complete the routine.
Participants were asked to self-report their height and weight in both pre and post questionnaires in order to obtain BMI information. The researcher was interested in determining if there was a correlation between weight and body-esteem. BMI was chosen to represent body mass due to the ease of the self-report method, as well as being considered a strong predictor of body dissatisfaction in females (Duarte, Ferriera, Trindade, & Pinto-Gouveia, 2015; Forrest & Struhldreher, 2007; Pilafova et al., 2007). While no reductions in BMI were found, M=23.025 (range = 21.5-25.7), it is conceivable that the participants failed to weigh themselves after the completion of the program. A possible explanation for the lack of change in weight, is that four weeks may not have been a long enough period for a small sample of participants to lose the amount of weight that would affect BMI. Oberlin, Smith, Ritsche, and Wideman (2015) completed a study utilizing HIIT three times per week in increasing intensities for three weeks. The results of this study found no change in BMI from the beginning to the end of the study, supporting the theory that the study could have been too short to produce changes in body mass. Participants were not asked to change their diet during the study, which might have also affect their ability to lose weight. It could be speculated that if measurements had been recorded by the researcher, or a method to measure body fat was used, the study may have yielded different results.

All participants reported a negative influence on their body-esteem by the media, while three of the four participants also reported a negative influence from their peers. Negative influence on body-esteem from media and peers is a common occurrence in Western society (Bamford & Halliwell, 2009; Lin & Reid, 2009; Myers & Crowther, 2009; Tiggemann, 2014). Of the three participants who felt the media had a negative
influence on their body-esteem, all reported stories about celebrities to be the cause. One question concerning different issues involved in social physique anxiety revealed that three of the four participants felt uncomfortable exercising around others, and two of the four participants felt others would stare and judge them while they exercised. While feeling uncomfortable exercising around others did not hinder their ability to exercise, this may be reason to consider an exercise program that can be done at home or at least in a private setting to increase adherence. Stice and Shaw (2002) found a link between body dissatisfaction and eating disorders, so it is not a surprising finding that three of the four participants have felt pressured to begin unhealthy eating habits in order to lose weight or look a certain way.

The Body-Esteem Scale (Franzoi & Shields, 1984) was chosen to assess body-esteem in participants. The BES proved to be the most valid and reliable multidimensional body-esteem questionnaire (Franzoi, 1994; Robertson, Shaver, & Wrightsman, 1991) accessible to the researcher for this study. The scale consists of three subscales with 31 questions total for the female scale. The scale assessed the participants' satisfaction with different areas and functions of their body. The subscales assessed included sexual attractiveness (SA), weight concerns (WC), and physical condition (PC). Participants assessed each area or function on a 5 point Likert scale, the higher the rating, the more satisfied the participant was with that particular body part or function. Each subscale had its own maximum score (SA = 60, WC = 50, PC = 45). While no statistically significant changes between pre and post scores in any subscales were found, small increases in the weight concern and physical condition subscales were found. The small increase in subscale scores is consistent with the findings from the pilot
study, which also produced a trend of increasing body-esteeem scores. A pilot study was conducted similarly to the current study apart from for the length. The pilot study lasted two weeks, and did not produce significant results, leading the researcher to duplicate the study with new participants for four weeks. The pilot study did not produce statistically significant results, which could be explained by a low number of participants as well. The increasing trend in the results from the pilot and present study led the researcher to speculate that a larger study could produce more significant findings.

The most surprising finding of the current study was the downward trend in the sexual attractiveness subscale scores. There was not a statistically significant drop in the score, however the mean score dropped four points from pre to post intervention (pre M = 48.75, post M = 44.75). While there is no explanation from the participants as to the drop in sexual attractiveness scores, speculations can be made. If participants began presenting a more muscular appearance, it is possible they may have viewed themselves as being more masculine. According to the researchers who developed the Body-Esteem Scale, Franzoi and Shields (1984), the sexual attractiveness subscale is based on an individual’s sense of attractiveness and sexuality. Participants who viewed themselves as having a more masculine figure, as opposed to a thinner more feminine figure, could have felt less sexually attractive after the study. The small sample of participants may also have affected the results since there were very few scores to compare.

Limitations and Future Research

There has been no known research assessing the effects of HIIT on body-esteeem. The researcher acknowledges that the study had limitations that could have affected the results of the study. One limitation of the study included the self-report aspect. While
self-report is an easier form of collecting data, it may not be the most accurate. The participants were instructed to answer all questions honestly to avoid skewing any data, however it is not possible to ensure all participants reported honest answers. This is not an uncommon limitation; as any study using a subjective questionnaire cannot be certain if it was completed incorrectly or dishonestly.

Body mass index has been shown to have a correlation with body-esteem (Mendelson et al., 2000; Pilafova et al., 2007), however it is not able to differentiate between fat mass and fat free mass, therefore, a person may be considered obese by BMI standards, but could have a low body fat percentage. It is suggested that future research include a more accurate form of body fat assessment such as skinfold measurements, Bodpod, or DEXA scans. Utilizing a measurement of body fat may yield more significant findings regarding the relationship between body fat and body-esteem.

Another limitation of the study included unsupervised exercise sessions. Unsupervised exercise sessions present a more “real life” scenario for individuals as many exercisers perform their routines alone or without professional supervision. All participants were given an instructional video outlining and explaining the exercise routine and expectations of the program. Modifications for exercises were given in order to accommodate for all levels of experience. Participants were expected to contact the researcher with any questions or concerns they had involving the study. Future studies may consider having some or all sessions supervised by the researcher or an exercise specialist in order to assure the protocol is performed correctly.

It is suggested that future research include a variety of ethnicities. Previous studies have found that ethnicity can affect body-esteem (Fujioka et al., 2009; Latner et
al., 2011) therefore it is important to assess any differences in results between the ethnic backgrounds. It is possible that ethnic groups would respond differently to the study. Diversity was encouraged for the study, however participation was voluntary and resulted in only Caucasian participants. Other studies have incurred issues concerning ethnic diversity among participants resulting in a majority of Caucasian individuals (Greenleaf, McGreer, & Parham, 2006; Pilafova et al., 2007).

The small sample size can also be considered a limitation of the study. It can be speculated that the lack of statistically significant results found in this study could stem from a small sample of participants. Hackshaw (2008) suggests that a sample of less than 20 participants is too small to produce precise results. A larger sample of participants would allow for more data to compare, which could yield more significant findings. A new research hypothesis may benefit from a smaller sample in the first few studies in order to avoid overuse of resources, time, and finances if there is no correlation between variables, however a larger study is suggested to confirm such results (Hackshaw, 2008). Future research should consider a larger sample size in order to assess if any significant increases in body-esteem occur from HIIT.

Conclusions

Based on the results of this study, the hypothesis was not supported. No statistically significant increases in body-esteem were found after the exercise intervention, however the low number of participants may have affected the results. Negative body-esteem is a common occurrence in Western cultures and can lead to mental and physical issues, therefore it is necessary to research healthy and feasible options to increase body-esteem. Although there have been many studies conducted
EFFECTS OF HIIT ON BODY-ESTEEM

concerning body-esteem and many assessing the metabolic changes occurring from HIIT, this is the first study to research whether HIIT would affect body-esteem. Due to the slight changes in BES scores and the knowledge that research on this subject is in its infancy, a larger study may find more conclusive results.


Doi:10.1111/j.1460-2466.2009.01420.x


aerobic versus relaxation training for patients with mild to moderate depression. 

*Journal of Clinical Psychiatry, 70*(6), 790-800.


EFFECTS OF HIIT ON BODY-ESTEEM


loss or exercise-induced weight loss in men. A randomized, controlled trial.  

*Annals of Internal Medicine, 133*, 92-103.


EFFECTS OF HIIT ON BODY-ESTEEM


Appendix A

Recruitment Email

Research study: Body-Esteem & High Intensity Interval Training (HIIT)

- “Body dissatisfaction is experienced by up to 80% of college women.”
  - (Neighbors & Sobal, 2007; Vohs, Heatherton, & Herrin, 2001)
- Research Question: Is HIIT a feasible and effective exercise mode to increase body-esteem in college-aged females?
- HIIT involves bouts of high intensity exercises mixed with short rest intervals for recovery.
- PARTICIPANT REQUIREMENTS
  - College-aged females (18-25)
  - Apparently healthy (no known diseases or contraindications to vigorous exercise).
- Complete 2 short questionnaires (pre and post exercise program).
- Send one weekly email to ensure adherence to the program.
- 20 minute HIIT sessions (30 min w/ warmup/cool down).
- 3x’s week/4 weeks.
- Email: ckduncan@eiu.edu Chelsea Duncan, before Sunday February 14, 2016.
Appendix B

Informed Consent

Participation information

The purpose of this study is to examine the effects of high intensity interval training (HIIT) on body-esteem in college age females.

What will I be asked to do?
Your participation in this study is completely voluntary. If you choose to participate in the study, you will be asked to complete a short questionnaire before beginning a high intensity interval exercise protocol. The exercise protocol consists of a 20-minute high intensity interval program with a 5 minute warm up and 5-minute cool down session. The exercise program consists of body weight exercises that can be performed at home at any time of day you choose. The program needs to be performed 3 days a week for 4 weeks. After completing 4 weeks of the exercise program, you will be asked to answer another short questionnaire which will complete the study.

What are the potential risks involved?
The potential risks are minimal. There is a risk of injury associated with any strength task, but every possible effort will be made to minimize risks. The researcher will instruct you on how to properly and safely perform each exercise. All efforts will be made to maintain your confidentiality and anonymity. Data will be stored securely and any data that results from your participation will be made anonymous.

What are the benefits of participating?
Participating in exercise can be extremely beneficial. Engaging in high intensity interval training can promote weight loss, reduce stress and anxiety, enhance mood, increase energy levels, increase self-confidence, and improve body image. By participating, you may notice psychological, physical, and academic benefits. Additionally, participating in this study will provide the researchers with valuable information that may contribute to the current knowledge on healthy and effective ways to increase body esteem in college age females.

Who can I contact if I have questions?
You may contact Ms. Chelsea Duncan at ckduncan@eiu.edu or Dr. Amber Shipherd at (217) 581-2215 or amshipherd@eiu.edu. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (217) 581-2125.

By checking agree, I consent to the above terms of participation in the study.

• agree
Appendix C

Health History Questionnaire

Personal Medical History
Do you have a recent or past history, or has a physician ever diagnosed you with any of the following?

Heart disease/cardiac surgery
Irregular heart beats
Defective heart valve(s)
Heart murmur
Angina (chest pain)
Hearth attack(MI)
Stroke
Peripheral vascular disease
Pulmonary disease(bronchitis, emphysema, etc)
Asthma
Diabetes
Thyroid disease
Liver disease
Renal(kidney) disease
Pre-diabetes
High blood pressure
High cholesterol levels
Cancer Type?
Migraine headaches
Epilepsy
Lightheadedness/fainting
Fatigue
EFFECTS OF HIIT ON BODY-ESTEEM

Arthritis
Back pain
Joint pain

Do you currently smoke?
If you previously smoked, when did you quit?

Do you drink caffeinated beverages?
How much/how often?

Do you drink alcohol?
How much/how often?

Are you currently following a special diet?
Specify

Is there any chance you may be pregnant?

Family Medical History
Do any of the following family members have a history of heart attack or heart disease (coronary artery disease): females prior to age 65, males prior to age 55. If yes, please explain

Mother
Sister
Daughter
Father
Brother
Son

Do you exercise on a regular basis?
If yes, please explain your regular routine
How many total minutes do you spend doing planned aerobic activity each week?
How long have you been exercising on a regular basis?
Appendix D

Body-Esteem Questionnaire

From this point in the questionnaire on, please look at each body part and function. Read each and indicate how you feel about this part or function of YOUR OWN body using the following scale:

1 star: have strong negative feelings
2 stars: Have moderate negative feelings
3 stars: Have no feelings either way
4 stars: Have moderate positive feelings
5 stars: Have strong positive feelings

Body Scent ★★★★★
Appetite ★★★★★
Nose ★★★★★
Physical Stamina ★★★★★
Reflexes ★★★★★
Lips ★★★★★
Muscular Strength ★★★★★
Waist ★★★★★
Energy Level ★★★★★
Thighs ★★★★★
<table>
<thead>
<tr>
<th>Body Part</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ears</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Biceps</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Chin</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Body Build</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Physical Coordination</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Buttocks</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Agility</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Chest or Breasts</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Appearance of Eyes</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Cheeks/Cheekbones</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Hips</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Legs</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Figure or Physique</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Sex Drive</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Sex Organs</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Appearance of Stomach</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Health</td>
<td>★★★★☆☆</td>
</tr>
<tr>
<td>Sex Activities</td>
<td>★★★★☆☆</td>
</tr>
</tbody>
</table>
EFFECTS OF HIIT ON BODY-ESTEEM

Body Hair ★★★★★

Physical Condition ★★★★★

Face ★★★★★

Weight ★★★★★
Appendix E

Additional Questions on Questionnaire

Please enter your email address

What is your age?
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25

How tall are you?

What is your weight in pounds?

What is your ethnicity

What is your collegiate level
- freshman
- sophomore
- junior
- senior
- graduate student
- not in college
EFFECTS OF HIIT ON BODY-ESTEEM

Do you exercise regularly (at least 3 times per week for the last 6 months)
- [ ] Yes
- [ ] No

What types of exercises do you usually perform? (select all that apply)
- [ ] Cardio
- [ ] Strength Training
- [ ] Flexibility training
- [ ] I don’t exercise regularly

What is/are your reason(s) for engaging in exercise?
- [ ] To lose weight
- [ ] because I am unsatisfied with how I look
- [ ] Because it makes me feel better about myself
- [ ] It gives me more energy
- [ ] I enjoy it
- [ ] I feel pressured to look a certain way
- [ ] for my health
- [ ] I don’t exercise
- [ ] other

What is/are your reason(s) for not engaging in exercise?
- [ ] I’m happy with the way I look
- [ ] I don’t have time
- [ ] I never get the results I want
- [ ] I don’t have access to a gym or place to exercise
- [ ] gyms are too expensive
- [ ] I feel like others are judging me when I work out
- [ ] I do not enjoy exercise
- [ ] other
Have you ever felt pressured to change your appearance? Click all that apply
- [ ] yes, by the media
- [ ] yes, by my peers
- [ ] No
- [ ] other

How much time do you usually spend on social media daily?
- [ ] none
- [ ] 1-3 hours
- [ ] 4-6 hours
- [ ] 7-9 hours
- [ ] more than 10 hours

Have images or content on social media ever made you feel negatively about your physical appearance?
- [ ] Yes
- [ ] No

How often does social media have a negative effect on your body image?
- [ ] not very often
- [ ] somewhat often
- [ ] about half of the time
- [ ] very often
- [ ] almost every time I use social media

What content usually triggers your feelings of negative body image on social media? Check all that apply
- [ ] photos of peers
- [ ] photos or stories about celebrities
- [ ] comments of peers
- [ ] articles about body image
- [ ] other
EFFECTS OF HIIT ON BODY-ESTEEM

Check all that apply:

- ☑ I feel like others judge my appearance negatively when they look at me.
- ☑ I feel like others stare and judge me when I work out.
- ☑ I feel like others will judge me if I wear tighter exercise clothing.
- ☑ I feel uncomfortable working out around other people.
- ☑ other

Have you ever changed, or felt pressure to change your eating habits in an unhealthy way in order to lose weight or look a certain way?

- ☑ yes
- ☑ no
Appendix F

Training Protocol

Warm Up Exercises:

- High Knees
- Butt Kickers
- Karaoke
- Small and Large arm circles, Arm Hugs
HIIT Exercises:

- Squat Kicks
- three way pushups (normal, pike, and tricep)
- lunges with pulses at the bottom
- burpees
planks lowering to forearms and back up to full arm with a leg raise

oblique side-to-side leg lowers

four jump squats switching to four switch lunges
EFFECTS OF HIIT ON BODY-ESTEEM

ten mountain climbers followed by one pushup skaters

double leg raise with reverse crunch
Stretches:

Shoulder

Tricep

Quadriceps

Hamstring

Cobra

Child’s Pose