Exercise & Physical Activity in Middle-Aged Women: The Role of Self-Compassion

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

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Graduate Program in Education

The Ohio State University

2014

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Abstract

Americans do not engage in sufficient physical activity and exercise (PA/Ex). PA/Ex declines with age and women are less active than men. Research suggests a focus on immediate benefits of PA/Ex may increase PA/Ex motivation. Self-compassion, a psychological construct comprised of self-kindness, mindfulness and common humanity, is correlated with several indicators of acute positive affect. In the last four years, 10 published studies have explored the relationship between self-compassion, body image and exercise in youth or young-adult populations. This study’s purpose was to contribute to such research by investigating self-compassion’s influence on body image, exercise motivation and PA/Ex in middle-aged women. Women were eligible for this study if they were 35-60 years of age, not pregnant (or within one year postpartum), and able to be physically active.

Participants were recruited from the ResearchMatch database and completed a survey developed using Qualtrics Research Suite. In September 2013, 1,303 participants accessed the on-line survey. After allowing for individuals who did not consent to take the survey, data errors, and treatment for missing values and outliers, 1,213 complete cases were available for data analysis. Of these, 1,122 non-African American participants were initially analyzed as the literature indicated African American women may differ significantly from other ethnic groups in perceptions of body image.
Average age and BMI of the 1,122 women participants were 48, and 28 kg/m$^2$, respectively. Seventy-one percent of the participants met or exceeded the 150-minute recommended level of moderate aerobic activity per week, as compared to 50% of women aged 35-64 in the 2011 Behavioral Risk Factor Surveillance System. A confirmatory factor analysis conducted within structural equation modeling (SEM) using LISREL indicated appearance evaluation, health/fitness evaluation, health/fitness orientation, and body appreciation were significant dimensions of body image ($p < .001$, in all cases), while amotivation, extrinsic motivation, identified motivation, and intrinsic motivation were significant aspects of exercise motivation ($p < .001$, in all cases) Appearance orientation and introjected motivation were not significant dimensions of body image ($p = .136$) and exercise motivation ($p = .646$), respectively.

The final structural equation model indicated that in this population of middle-aged women, self-compassion positively predicts body image, which in turn predicts autonomous exercise motivation and consequently, higher levels of PA/Ex participation ($SRMR = .05$, and $GFI = .952$). Further, contrary to hypotheses based upon the literature, Body Mass Index (BMI) and age were not significant predictors of PA/Ex participation in this sample of women, though BMI and age were both significantly and positively correlated with self-compassion levels.

In depth analysis of the relationship between self-compassion and body image suggests self-compassion might be viable as a coping mechanism to relieve negative repercussions of poor body image, encourage body appreciation and ultimately lead to increases in PA/Ex levels in the population of middle-aged women. Future research
should focus on examining commonalities between self-compassion and distinct aspects of body image and how increases in levels of self-compassion and body appreciation can increase the likelihood that middle-aged women will autonomously adopt and maintain more active lifestyles.
Acknowledgements

I acknowledge the help of all mentors, colleagues, co-workers, friends and family who have made this research and this document possible. To those few who I am certain I will forget to mention by name, I am eternally grateful regardless.

First to my amazing dissertation committee, Dr. Janet Buckworth, Dr. Diane Habash and Dr. Maryanna Klatt, thank you for your brilliance, knowledge, common sense and unlimited supply of patience. A special thanks to Dr. Richard Lomax and Dr. Joseph Gliem for their statistical wizardry, analytical guidance and general geek support. I also want to acknowledge the incomparable guidance of Rose Hallern and CCTS in recruiting my sample. Without her assistance I could not have even begun my study. And finally to two special friends who have taught me to put my head down, barrel through and “git-er-done,” John Borowski and Dr. Chris Hearon. Thanks for always getting my back!

I cannot imagine weathering graduate studies without the camaraderie of colleagues and co-workers who made the Fish Bowl come to life. You know who you are, no names will be dropped. You made life fun, interesting, bizarre, and sometimes, just bearable. To a special group of women who supported me through laughter and tears, I express the utmost in gratitude, and I support you right back. To Liz Balk, who
could always put a smile on my face, regardless of the situation, and to Chris Wilks for reminding me to silence the committee in my head, thank you, thank you, thank you.

Coming to the OSU and successfully navigating a new city, a new home, a new job, a new academic program and a traumatic car accident wasn’t easy. But it wasn’t impossible because of two great people, my mom, and my friend Vikkie. My mom supported me financially, medically, logistically and emotionally; she is the best mom I know and put up with me even when I was beyond impossible. Vikkie rose to all occasions, from taking care of my dog after my accident, to welcoming me into her home, her family and her life. I was never alone because she shared so much with me.

And finally a big thanks to the following:

- My next-door neighbor Jed for …too many things to say and count.
- My daddy for looking in on me from time to time.
- My dog Eppy for being exactly as she is.
- My friend Ayla for cluing me in to the “blue hairs,” and keeping me safe.
- The universal subconscious mind for the Law of Attraction.

I’d also like to acknowledge the groundbreaking work of several scholars without whom I would never have gotten here: Kristin Neff, Naomi Wolf, Edward Deci and Richard Ryan, again, my amazing advisor, Janet Buckworth, Chris Germer, John Kabat Zinn and Jay Kimiecik. It’s been an honor to immerse myself in your knowledge and develop my research study on the backbone of your findings.

With gratitude, peace and humility, M-
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Publications


Fields of Study

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Chapter 1 - Introduction

According to the World Health Organization, physical activity plays an important role in achieving and maintaining optimal health (2012). Physical activity and Exercise (PA/Ex) can help reduce disease risk (e.g., cardiovascular disease, type 2 diabetes, and some cancers), facilitate weight management and improve bone and muscle strength (Centers for Disease Control and Prevention, 2012b). In addition, PA/Ex offers mental health benefits, such as sharper cognitive ability and improved mood. Several research reviews indicate it is effective in preventing and treating depression (Daley, 2008; Perraton, Kumar, & MacHotka, 2010; Teychenne, Ball, & Salmon, 2008). While most Americans are knowledgeable about the health benefits of exercise, that knowledge does not necessarily translate into action (Morrow, Krzewinski-Malone, Jackson, Bungum, & FitzGerald, 2004). The most recent comprehensive review of exercise correlates indicates knowledge is not correlated with level of PA/Ex (Trost, Owen, Bauman, Sallis, & Brown, 2002).

Current statistics indicate that Americans do not get the recommended amounts of physical activity, and that women are less active than men (Centers for Disease Control and Prevention, 2012a). Exercise research continues to document that 50% of individuals who begin exercise programs discontinue participation within the first six months (Dishman, 2001; White, Ransdell, Vener, & Flohr, 2005). There is also a significant
body of research indicating correlates of physical activity and exercise are moderated by age and gender (Trost et al., 2002). Middle-aged women represent a segment of American society with the lowest levels of physical activity; they experience unique barriers to exercise, such as time constraints due to household management responsibility, intimidation in workout environments and unrealistic expectations of quick weight loss (Hendry, Solmon, Choate, Autrey, & Landry, 2010; White et al., 2005).

In 2007, a joint meeting between the American Medical Association and the American College of Sports Medicine announced the “exercise is medicine” initiative, a return to the philosophy originally touted by Hippocrates, 2,400 years earlier (Berryman, 2010). A current Google search of “exercise is medicine” yields 175,000 hits and reflects the increase in advertising and promotion of the health benefits of PA/Ex. But, if knowledge of the long-term health benefits of physical activity is not correlated with increased PA/Ex behavior, is this promotional frame effective?

Exercise science scholars continue to explore new theoretical approaches, interventions and constructs in an effort to understand the particular combination of factors in a specific population that yields higher levels of PA/Ex, not just for six months, but throughout a lifetime (Greaves et al., 2011). Several areas of research point toward a need to re-frame promotion of PA/Ex to the general public. Over the past 20 years, exercise research objectives have shifted from identifying and validating health outcomes to understanding and predicting behavior change related to initiating and maintaining physically active lifestyles (Courneya, 2010). Further, recent research addressing the impact of social and cultural messaging on PA/Ex indicates acute improvements in
quality of life and daily living are more effective in promoting PA/Ex than perceptions of long-term health benefits or disease avoidance in some populations (Segar, Eccles, & Richardson, 2011).

Self-Determination Theory (SDT), which has grown in application within PA/Ex research over the past 10 years, highlights the importance of intrinsic motivation in establishing and maintaining human behavior (Fortier, Duda, Guerin, & Teixeira, 2012). A multi-component theory grounded in the need to meet basic psychological needs for autonomy, competence and relatedness, SDT posits that behaviors failing to meet these needs will at best be extrinsically motivated and not maintained long-term (Deci & Ryan, 2002b). Per SDT, goals that meet basic psychological needs and reflect an individuals’ true values will better facilitate behavior than culturally-suggested goals that are not integrated into the self (Deci & Ryan, 1995).

Self-determination theory supports the re-framing of PA/Ex media messaging in that promoting exercise as something one does to enhance one’s daily life is a more intrinsically appealing message than promoting it as necessary for one’s long-term health (Segar, Updegraff, Zikmund-Fisher, & Richardson, 2012). If the “exercise is medicine” messaging approach leaves individuals feeling that PA/Ex is just another item they need to add to their burgeoning list of things they “should” do, the behavior is then cast as extrinsic (Segar, Spruijt-Metz, & Nolen-Hoeksema, 2006).

Several intervention studies with goals to increase PA/Ex have been designed and conducted using SDT-based strategies and have yielded positive results among middle-aged women (Fortier et al., 2012; Silva, Vieira, et al., 2010). Such interventions use
strategies that include creating an autonomy-supportive environment, focusing on the
experience as opposed to the long-term outcome, increasing confidence in engaging in
physical activity and meeting the need for social support (Silva et al., 2008).

Body image has been the focus of a great deal of research over the last several
decades and continues to be of significant interest within the study of PA/Ex behavior,
particularly among women (Davis, 1997; Engeln-Maddox, 2006; Murnen & Smolak,
2009). Social, cultural and media messages convey an overtly thin ideal for the female
body which has led to significant body dissatisfaction among women over the course of
their lifetime (Blood, 2005). Recent research indicates that body-shape motives may
actually have a negative influence on PA/Ex participation among middle-aged women,
who appear to be more motivated to exercise to improve quality of life than to change
their body shape (Segar et al., 2011; Segar et al., 2006).

Significance
As previously noted, middle-aged women are a demographic group with
inadequate levels of physical activity, distinctive barriers to initiating and maintaining a
physically active lifestyle, and a potential for being negatively influenced by exercise-
related media messages and images of ideally thin women. While PA/Ex has a multitude
of positive short-term and long-term benefits, significant numbers of middle-aged women
continue to lead sedentary lives. Per data from the 2011 Behavioral Risk Factor
Surveillance System (BRFSS), just 18% of adult women met Health and Human Services
physical activity guidelines (Harris et al., 2013). Further, the rates of Americans meeting
the physical activity guidelines are 10% and 17% lower for women between the ages of
45 and 54, and 55 and 64, respectively compared to younger age groups. While middle-aged women’s physical activity levels have remained low, the rates of obesity for these age groups have increased over the past five decades. Obesity in women 20 to 39 years has increased from 9.3% to 34% (Flegal, Carroll, Ogden, & Curtin, 2010; Flegal, Carroll, Ogden, & Johnson, 2002). For women aged 40 to 59 the rate has increased from 18.5% to 38%. National Health and Nutrition Examination Survey (NHANES) data for 2008 indicate absolute rates of obesity among women aged 20 to 39 and 40 to 59 exceed those of men by 23% and 11%, respectively (Flegal et al., 2010).

Self-compassion is a relatively new construct in psychosocial research that holds potential for helping middle-aged women overcome barriers to PA/Ex by helping women look past the lens of socially-acceptable body image, and increase healthful behaviors. Self-compassion has origins in the broader Buddhist concept of human compassion and is comprised of three components: Self-kindness, mindfulness and common humanity (Neff, 2003b). Physical self-acceptance, or valuing the complete self is also an inherent aspect of self-compassion (Neff, 2003b). Acceptance of one’s body, in whatever form or condition it currently takes would be characteristic of physical self-acceptance. Self-compassion also encompasses a desire to take care of oneself in a holistic sense (body, mind and spirit). Taken together, self-compassion’s elements of physical self-acceptance and valuing self-care imply that self-compassion should be correlated with proactive health behaviors, of which PA/Ex is one.
Statement of Purpose
The purpose of this research project is to assess the magnitude and direction of relationships among several personal variables and their correlation with physical activity/exercise (PA/Ex) level in middle-aged women. These variables are: Self-compassion, body image, motivation for exercise, age, and body mass index (BMI).

Further, this study will add to the current research examining self-compassion and health-promoting behaviors, and help establish a basis for future research to test the efficacy of using self-compassion as an intervention to increase PA/Ex among middle-aged women. Using a cross-sectional design, a national sample of middle-aged women will be surveyed using Qualtrics Research Suite during fall 2013.

Hypotheses
This study is designed to address the following hypotheses:

Primary hypotheses:

1. Body image is predicted by BMI and self-compassion.
2. Motivation for exercise is predicted by self-compassion and body image.
3. Exercise level is predicted by motivation for exercise, age and BMI.
4. BMI and Age are positively correlated.

Secondary hypotheses are:

1. Body image is a multi-dimensional construct. Specifically, in this population of middle-aged women, the following are dimensions of body image:
   a. Appearance evaluation
b. Appearance orientation

c. Health/Fitness evaluation

d. Health/Fitness orientation

e. Body appreciation

2. Motivation for exercise exists on a continuum from externally to internally-derived. In this population of middle-aged women, the following are functions of exercise motivation:

   a. Amotivation
   b. Extrinsic motivation
   c. Introjected motivation
   d. Identified motivation
   e. Intrinsic motivation

This study will use structural equation modeling (SEM) to test the stated hypotheses, further clarified in the diagram below. The diagram represents a theoretical model of the hypothesized relationships that exist among the variables and is consistent with the style of presentation utilized in SEM.

Hypothesized relationships are based upon supporting literature included in Chapter 2.
Figure 1.1. Model of Hypothesized Relationships to be Tested Using Structural Equation Modeling.
**Definition of Terms**

**Body Appreciation:** unconditional approval and respect of the body; an aspect of positive body image (Avalos, Tylka, & Wood-Barcalo, 2005).

*Operational definition:* scores on the Body Appreciation Scale; higher scores indicate greater levels of positive body image (Avalos et al., 2005).

**Body Image:** a multi-dimensional, psychological self-conceptualization of embodiment that includes an individual’s perceptions, cognitions, beliefs, emotions and behaviors about and in regarding to their body and its appearance (Cash, 2004).

*Operational definition:* scores on the appearance evaluation and orientation, fitness evaluation and orientation, and health evaluation and orientation subscales of the Multidimensional Body-Self Relations Questionnaire (MBSRQ) (Cash, 2000).

**Body Mass Index (BMI):** body mass index is a number derived to estimate body fatness based on an individual's weight and height, also known as Quetelet index.

*Operational definition:* the formula weight (lb) / [height (in)]² x 703 will be applied to self-reported weight and height.

**Exercise:** a planned, organized activity that is intended to result in specific outcomes related to health or fitness. Outcomes may include items such as increased cardiorespiratory endurance, maintenance of muscle strength or change in body composition (NIH, 2011).
**Latent Variable:** constructs that are not directly observable but can be assessed using various methods and instruments (Schumacker & Lomax, 2010).

**Middle-aged:** period of time between youth and old age. “The period of life from about 40 to about 60 years of age,” (Merriam-Webster Dictionary, 2014).

**Operational definition:** 35 to 60 years of age (Segar et al., 2006).

**Mindfulness:** paying attention in a particular way: on purpose, in the present moment and non-judgmentally (Kabat-Zinn, 1994).

**Motivation:** the impulse, emotional desire, or internal driver that causes an individual to engage in an act or to behave in a particular way (Webster's New World Dictionary of the American Language, 1979). It can be seen as an incentive to act, or as a feeling that results in action or behavior. Within the context of SDT, motivation exists on a continuum and is classified based upon the degree to which its origin is more extrinsic (due to external cues) or intrinsic (self-derived).

**Operational definition:** Motivation for exercise measured by scores on the intrinsic regulation, identified regulation, introjected regulation, external regulation and amotivation subscales of the Behavioral Regulations for Exercise Questionnaire 2 (BREQ-2) (Markland & Tobin, 2004).

**Obesity:** a measure of body fatness.
**Operational definition:** a BMI (see operational definition of BMI) $\geq 30$ (CDC, 2014).

**Observed Variable:** a variable which can be measured using a discrete measure or test (Schumacker & Lomax, 2010).

**Overweight:** a measure of body fatness.

**Operational definition:** a BMI (see operational definition of BMI) between 24.9 and 29.9 (CDC, 2014).

**Physical Activity:** a movement generated by skeletal muscle that results in the expenditure of energy. Commonly used umbrella term which includes all aspects of exercise, as well as non-structured activities without specific health or fitness objectives, such as: activities of daily living (such as walking for transport), occupational activities, house and garden work, recreational sports, social dance, etc.

**Physical Activity/Exercise (PA/Ex):** for purposes of this research, this term will refer to any activity that would be included as defined under physical activity or exercise.

**Operational definition:** total sport, leisure, and recreational energy expenditure (in kilocalories) per week measured by self-report using the Modified Paffenbarger Physical Activity Questionnaire (Unick, Jakicic, & Marcus, 2010).
Quality of Life: “individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment” (World Health Organization, 1997, p. 1).

Self-Compassion: a psychological construct including components of self-kindness, mindfulness and common humanity.

Operational definition: scores on the Self-Compassion Survey, where higher scores indicate self-perception of greater self-compassion (Neff, 2003a).


Structural Equation Modeling: a multivariate statistical tool that includes elements of multiple regression, factor analysis and path modeling (Schumacker & Lomax, 2010).

Well-being: psychological health and life satisfaction, including the ability of the individual to recognize feelings of vitality, a deep sense of wellness and adaptability to dynamic life experiences (Deci & Ryan, 2000).
Assumptions

- Participant recruitment with the assistance of the Center for Clinical and Translational Research will provide a representative sample of middle-aged women.
- The Qualtrics Research Suite is valid for on-line data collection.
- Responses garnered via self-report survey reflect reality to the degree that conclusions drawn will represent knowledge that can be utilized to advance the field of research.

Limitations

- Findings are limited to mid-life women.
- Because a convenience sample will be utilized, results cannot be extrapolated beyond the sample.
- The sample will not be representative of the greater population in terms of ethnicity, SES, education, number of children, etc.
- Self-report data will be collected for all variables. This limits accuracy of the data to be collected and increases the likelihood of measurement error.
- Cross-sectional design implies causality and directionality of data cannot be inferred.
Chapter 2 – Literature Review

Organization
A review of the literature relevant to the project’s purpose was conducted. WorldCat and Google Scholar were used to search for peer-reviewed articles using the following key words alone and in combination: self-compassion, physical activity, exercise, body appreciation, body image.

The literature review is organized in sections as follows:

- Self-Compassion – Overview
- Self Determination Theory and Motivation
- Self-Compassion & Self-Determination Theory
- Body Image - Overview
- PA/Ex and Body Image in Middle-aged Women
- PA/Ex and Body Image in Self-Compassion Research
- Discussion and Conclusion

Self-Compassion – Overview
Self-compassion is a construct of recent focus in psychological research with origins in the broader Buddhist concept of human compassion (Neff, 2003b). While a quick database search using compassion as a keyword yields over 5,000 peer-reviewed articles published in English between 1906 and 2012, a similar search under the keyword
self-compassion yields a mere 124 articles. The historical pattern of research and publication enjoyed by compassion in the last century mirrors that of self-compassion in the last decade. Of the 5,000 plus compassion articles, the majority was published in the last two decades; nine articles were published on self-compassion between 1999 and 2006 with increasing numbers published in each of the five years since then.

The first two articles using the term self-compassion in the title were published in 2003 by Kristen Neff. The first describes her conception of self-compassion and its origins in the umbrella concept of compassion, and then continues by differentiating this construct from other related psychological constructs (Neff, 2003b). The second summarizes development and creation of the Self-Compassion Scale (SCS) and the three studies completed to vet its validity and reliability (Neff, 2003a).

**Historical perspectives and a contemporary construct.**
Compassion is a key concept within Buddhist tradition (Rinpoche, 1992). It encompasses the ability to recognize the needs of others, to feel empathy and a sense of oneness with their suffering and a keen desire to take action to alleviate that distress (Rinpoche, 1992). Within Eastern philosophy, there is no distinction between compassion for self and compassion for others (Bennett-Goleman, 2001). It is thought that in order to be compassionate toward the external world, one must initially apply the concept inward; the term implies the self and others are treated with equanimity (The Dalai Lama, 2001).

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1 Database search was performed via WorldCat “quick search” and may include duplicate references. The information is included to provide frame of reference regarding comparative volume of research published on compassion versus self-compassion.
Within Western culture, compassion is similarly defined but no implication of compassion toward the self is noted (Davidson & Harrington, 2002; Guralnik, 1979). The construct of self-compassion as defined by Neff reflects an effort to bring the fullness of Buddhist compassion to bear in Western research addressing positive emotional affect and psychological well-being. Self-compassion is comprised of three components: *Self-kindness, mindfulness* and *common humanity* (Neff, 2003b).

Self-kindness is described as treating the self with as much benevolence as we attempt to bestow on others. It requires recognizing one’s own human frailties and responding with understanding instead of self-criticism, and implies attention to both acute and lifelong needs as balance of the two yields optimal well-being. In this construct, caring for the self includes engaging in health-promoting behaviors to ensure current and future wellness, as well as adopting healing behaviors during times of pain and suffering (Neff, 2011).

As described by Jon Kabat-Zinn, “Mindfulness means paying attention in a particular way: on purpose, in the present moment and non-judgmentally” (1994, p. 4). In the context of self-compassion, mindfulness means allowing oneself to become aware of both positive and negative emotions and accepting reality for what it is in any given moment, so that one can make cognitive and behavioral decisions that favor optimal well-being (Neff, 2011). A fairly extensive body of research on mindfulness indicates it is associated with decreased incidence of depression and anxiety and chronic pain. Mindfulness interventions have also been effective in changing negative behavior patterns related to eating disorders and substance abuse (Hölzel et al., 2011).
Common humanity is a belief in equality among oneself, other beings that inhabit our world, and the environment that sustains our life. Expressions of common humanity can be seen in an individuals’ treatment of others with kindness, respect and a sense of equality. The concept of common humanity implies that all people are equally deserving of happiness and our common goal should be to reduce any and all forms of human suffering through collective effort (Neff, 2011).

Note that Neff views self-compassion as an overarching combination of the three components noted above (2003a, 2003b). While they are each unique in terms of how they are defined, observed and experienced, self-kindness, mindfulness and common humanity are interrelated and each facilitates the others (Neff, 2003b). The SCS developed by Neff to measure the construct of self-compassion reflects this reciprocality as it yields a single summated score. While it does consist of six subscales (self-kindness/self-judgment, mindfulness/over-identification, common humanity/isolation) that can be individually sub-totaled, a comprehensive assessment of the self-compassion construct is only reflected in the total score (Barnard & Curry, 2011; Neff, 2003a).

The SCS has been used extensively since Neff developed it in 2003; it has been shown to have strong validity and reliability in a variety of studies (Barnard & Curry, 2011; MacBeth & Gumley, 2012; Neff, 2003a). A short-form (12 items) of the SCS was recently developed and validated (Raes, Pommier, Neff, & Van Gucht, 2011). In addition, the original SCS has been translated into Turkish and has been assessed as valid and reliable within that population (Deniz, Kesici, & Sumer, 2008).
Self-compassion research. Barnard and Curry (2011) completed a recent review of self-compassion interventions and correlates. They note findings from several cross-sectional studies which indicate self-compassion is positively associated with well-being, life satisfaction, happiness, emotional intelligence, beneficial coping strategies and positive affect, and negatively associated with anxiety, depression, negative affect, rumination, procrastination and maladaptive perfectionism. They also discuss two interventions referred to as “induction” studies designed to increase self-compassion (Barnard & Curry, 2011). In the first, Adams and Leary (2007) explored the impact of self-compassion in relation to restrictive eating patterns. In the second, Leary, Tate, Adams, Allen, and Hancock (2007) induced it to decrease negative emotional response following difficult events. Both inductions resulted in increases in self-compassion and related improvements in situational outcomes.

Finally the authors assessed Compassionate Mind Training (CMT) as a new therapeutic method to treat patients plagued by extreme levels of shame and self-criticism, noting that while only two studies had been published, they both yielded positive results (Barnard & Curry, 2011). A 2012 study comparing Cognitive Behavior Therapy (CBT) to CMT indicated CMT was as effective as CBT in significantly decreasing anxiety, depression and trauma-related symptoms in subjects who had recently experienced a traumatic incident (Beaumont, Galpin, & Jenkins, 2012).

MacBeth and Gumley (2012) completed a meta-analysis of studies assessing the relationship between self-compassion and psychopathology. Key findings included robust evidence for the buffering effect of self-compassion in relation to depression,
anxiety and stress in the 14 publications and 20 subject samples they identified and assessed. Their meta-analysis resulted in a significant, large effect for the relationship between compassion and psychopathology \( (r = -.54, p < .0001) \), (MacBeth & Gumley, 2012).

In preparing this current review, 79 articles were identified that included a substantial focus on self-compassion. Of these, 15 were published by Neff, or Neff, in collaboration with other authors. These included four conceptual articles, two studies that summarized development of measurement scales (the original SCS and the subsequent short form), and nine other studies.

Neff’s studies varied in focus and assessed the association between self-compassion and a number of factors including psychological well-being, cognitive and interpersonal attributes, goals, self-esteem and relationship health. Further, the studies used a variety of subject pools (adolescents, college students, experienced meditators and cross-cultural groups). Generally, Neff’s study results indicate a strong positive association between self-compassion and various indicators of psychological well-being including resilience, self-regulation and life satisfaction. It is also interesting to note that self-compassion was correlated with “true self-esteem” as defined by Deci & Ryan (1995; Neff, 2003a). The association between these two concepts will be addressed further in the Self-Compassion and Self-Determination Theory section of this literature review.

The remaining 64 articles are categorized for review as follows:
• Health & psychological well-being (11 studies: health, well-being, subjective well-being, pain management)
• Cognitive function & interpersonal relationships (5 studies: adaptability, emotional intelligence, burnout, coping skills, relationship skills)
• Physical activity & body image (6 studies: exercise, athletes, yoga, Taiji)
• Psychological indicators & therapeutic treatment (14 studies: depression, anxiety, PTSD, social anxiety disorder, addictions, CMT, paranoia)
• Induction/Intervention (5 studies: eating, stress, self-criticism, creativity)
• Motivation (2 studies)
• Cross-cultural (10 studies: similar types to those noted above)
• Conceptual analysis (7 articles: applications to nursing, business management, youth, stress, therapy and mindfulness)
• Miscellaneous (4 articles)

Discussion.
These articles and studies cut across many disciplines (e.g., business, education, healthcare), subject pools (clinical vs. nonclinical; child, young-adult, adult and older adult), cultures (U.S., Turkey, Thailand, Norway, etc.) and types of research (quantitative, qualitative, case study, etc.) and the results appear wholly encouraging. Self-compassion shows positive correlation with correlates of well-being and negative correlation with correlates of “ill-being.” The degree and breadth of interest in self-compassion over the past several years is indicative of these initial positive findings.
In spite of interest and passion in this area of research, a number of limitations should not be overlooked in conducting future studies. Most of the research is correlational and does not indicate that change in self-compassion causes positive changes in well-being. Authors noted in this review seem united in the belief that objective measures of self-compassion should be sought and/or developed. While this is often the goal with psychosocial constructs that cannot be easily observed, it is often challenging and sometimes not possible. For example, objective measures of PA/Ex are often recommended in articles suggesting future directions for research, yet most often PA/Ex levels are still assessed via self-report.

Moreover, mechanisms through which self-compassion may work to affect well-being are not yet clear. Multiple mediators such as mindfulness, guilt, and positive affect have been explored and results assessed, but replication is necessary to develop a more conclusive understanding of relationships among variables. Further, assessment of the impact of moderators on the relationship between self-compassion and a variety of outcome measures is still in its infancy. Gender has been reviewed as a potential moderator, but results vary across studies. Initial results of cross-cultural studies indicate ethnicity may play a key role in moderating the effects of self-compassion.

Finally, Neff and Germer (2013) recently developed an 8-week Mindful Self-Compassion Program to teach individuals how to develop self-compassion. Initial pilot testing indicated the program resulted in increases in self-compassion, mindfulness and well-being outcomes that were maintained one month and one year post-intervention (Neff & Germer, 2013). While the program will require further validation of pilot-test
results, if self-compassion proves to be a characteristic that can be acquired as a learned skill, interventions to increase self-compassion could prove fruitful in a variety of contexts.

**Self-Determination Theory & Motivation**

Deci and Ryan’s Self-Determination Theory (SDT) was first used to explain human behavior in the late 1970’s, and has grown in application to a variety of disciplines since that time (Deci & Ryan, 2002a). It developed out of the authors’ primary objective to explain how two contrary psychological views of human nature could both reflect accurate representations of human behavior (Deci & Ryan, 2002b). Per Deci and Ryan, humanistic, psychoanalytic and developmental psychology views the self as inherently motivated toward growth, unity and responsible behavior, while behavioral, cognitive and post-modern psychology characterizes the self as fragmented, and motivated to act in response to cultural and environmental cues.

Self-Determination Theory unites these seemingly discrepant depictions of human motivation and behavior. It conceptualizes human beings as actively motivated to develop a unique sense of self and to integrate new experiences and dynamic social contexts, while concurrently acknowledging that some social contexts facilitate this process, while others impede it (Deci & Ryan, 2002b). Assuming this dialectical view of human nature, SDT explains a broad range of behavioral outcomes and encompasses optimal psychological function as well as dysfunction (Ryan & Deci, 2000).

Delineated in four mini-theories, SDT is actually a metatheory grounded in the psychological view of human nature just described, and the universal concept that all
human beings are subject to basic psychological needs (Deci & Ryan, 2002b). The four mini-theories are cognitive evaluation theory, organismic integration theory, causality orientations theory and basic needs theory and are described briefly:

- Cognitive evaluation theory purports that social contexts and environments provide varying degrees of support (or lack thereof) for individuals’ self-determined behavior. The degree to which support is present or absent impacts the individuals’ motivation for the noted behavior.

- Organismic integration theory discusses intrinsic versus extrinsic motivation and explains the processes by which behaviors that are initiated for extrinsic reasons can be integrated into self-concept and become intrinsically valued.

- Causality orientations theory addresses individual variability in comfort with self-directed behavior and how this impacts response to differing environmental and contextual situations.

- Basic needs theory posits that all individuals maintain a desire to meet basic psychological needs for competence, autonomy and relatedness. The degree to which these needs are met in a given behavioral context will determine the individual’s motivation to engage in the behavior both short-term and over time.

Ryan and Deci (2000) identified competence, autonomy and relatedness as the three basic psychological needs upon which human beings depend for optimal function, social development and a sense of well-being. Within SDT, these universal, psychological needs form the basis for explaining much of human behavior and support
the concepts postulated in each of the other three mini-theories. Competence, autonomy and relatedness were specifically selected to ground SDT based upon Deci and Ryan’s review of previous psychological research, and their understanding of the integral importance of these needs to psychological well-being.

In SDT, competence refers to an individual’s need to find opportunities to express personal capacity within social and environmental contexts. Deci and Ryan (2002b) note that competence is affective, a feeling state, rather than a skill or ability itself. The need for competence will drive individuals to engage in behaviors that yield an appropriate challenge for their capabilities or provide the likelihood of maintaining or acquiring skill sets. Overall, this leads to feelings of confidence in ability to direct behavior.

The need for relatedness encompasses the desire to be appreciated for one’s unique self and to similarly appreciate others, as well as to have a sense of belonging within one’s community (Deci & Ryan, 2002b). While relatedness may be gained through traditional means such as immediate family, religious affiliation and marriage, because it is affective, physical and contextual environment alone do not assure feelings of relatedness. For example, an individual’s family environment may cause feelings of disconnectedness or ostracism just as well as relatedness. Feelings of relatedness are not tied to particular outcomes (e.g., marriage or children), but rather an awareness of one’s integration and fit within social contexts. Such feelings tend to change over time. Inherent in relatedness is a sense of security, unity and commitment (Deci & Ryan, 2002b).
Autonomy refers to action that occurs as a result of an individual’s self-selected choice. Behavior that is considered autonomous originates from an individual’s desire to engage in the behavior as a reflection of who they are. While autonomous behavior is often self-directed, it can be initiated based upon suggestion or recommendation of an outside source. As long as the behavior is consistent with the individual’s values, or interests, it may be considered autonomous. The key to autonomy is that individuals consider themselves to be the director of their own behavior (de Charms, 1968).

A key component of SDT is its detailed concept of motivation, and its use of motivation in relation to the basic psychological needs to explain behavior. Per SDT, motivation exists on a continuum from amotivation to intrinsic motivation. The type and degree of motivation that exists for a given behavior is dictated by the extent to which the behavior meets an individual’s need for competence, autonomy and relatedness (Ryan & Deci, 2007). Complete absence of motivation is termed amotivation. Extrinsic motivation may be under external regulation (behave to avoid punishment/gain reward), introjected regulation (behave to avoid guilt/disapproval or gain approval criterion), identified regulation (behave to achieve personal values), or integrated regulation (behave to meet personal needs). Intrinsic motivation is typified by behavior that is done for the sole purpose of enjoyment and has no specific outcome or reward attached to it. Figure A.1 in Appendix A includes a diagram of SDT’s motivation continuum.

Several aspects of this multidimensional view of behavioral motivation are critical to understanding its importance. Self-determination theory posits that the more intrinsically motivated a behavior is, the greater the individual’s energy, excitement and
persistence will be to engage in the behavior consistently and over time (Ryan & Deci, 2000). Further, while integrated and identified regulation are categorized as types of extrinsic motivation, they reflect a greater degree of internalization and an increasing level of basic psychological need gratification (Deci & Ryan, 2000).

Organismic integration theory highlights the process by which an initially externally-regulated behavior may become more valued and eventually integrated within the self (Ryan & Deci, 2007). Alternatively, an individual may choose to engage in a new behavior for extrinsic reasons, and find it enjoyable or fun, completely transitioning to intrinsic motivation. Both scenarios and placements on the motivation continuum can facilitate long-term, consistent behavior.

A considerable amount of research has been conducted using SDT to facilitate behavior change related to PA/Ex (Fortier et al., 2012). Self-determination theory provides a strong theoretical basis for examining PA/Ex correlates such as motivation, competence and social support as a result of its mini-theories and motivational continuum (Teixeira, Silva, Mata, Palmeira, & Markland, 2012). In a recent review of SDT and PA/Ex research, authors found a strong and consistent relationship between intrinsic motivation and long-term exercise adherence (Teixeira, Carraça, Markland, Silva, & Ryan, 2012). In addition, competence was associated with increased levels of exercise participation. These findings are particularly encouraging in light of statistics regarding exercise program attrition and the challenges involved in maintaining life-long commitment to PA/Ex (Dishman, 2001).
A study of 292 middle-aged women exploring the impact of intrinsic versus extrinsic goals on several PA/Ex outcomes found that intrinsically-based goals positively predicted physical self-worth, exercise behavior, psychological well-being and basic need satisfaction as posited within SDT (Sebire, Standage, & Vansteenkiste, 2009). Of particular interest was the authors’ note that because well-being is so subjective the only way to set intrinsic goals is to turn inward to determine what might feel good. This idea of going within oneself to assess one’s needs and desires is a key component of not only SDT, but self-compassion as well.

**Self-Compassion & Self-Determination Theory**

As noted earlier, SDT draws some of its perspectives from the earlier research of humanistic psychologists who put forth initial works on motivation, personal agency and self-actualization (Deci & Ryan, 2000). While the origins of self-compassion lie in the Buddhist philosophy of compassion, Neff notes that the concept of a non-judgmental, unconditionally-accepting self, endorses early concepts of the self that also grew out of humanistic psychology (2003b). Further she points to the pivotal work of Maslow as evidence of the importance of knowing oneself completely, including acceptance of strengths, weaknesses, emotions, and potentialities. Such knowledge of one’s self seems likely to facilitate what is referred to in SDT as “autonomous behavior,” in that people cannot strive to self-direct behavior if they are not first aware of what they need and desire.

The work of Emmons on “personal strivings,” or goals, also seems to highlight an intersection between SDT and self-compassion. A primary focus of Emmons’ research
was the critical nature of goal contents relation to well-being (Emmons, 1999). Deci and Ryan (2000) note that Emmons’ studies indicate the pursuit and realization of intrinsic goals increase psychological well-being, while the accomplishment of extrinsic goals does not affect well-being. Emmons’ understanding of the importance of self-acceptance and self-definition in development of goals designed to facilitate well-being resonates with Neff’s construct of self-compassion. When individuals engage in self-kindness, mindfulness and common humanity their behavior tends to be necessarily self-motivated and intrinsically satisfying (Neff, 2011).

In general, the importance of goal contents to motivation, behavior and well-being is well-documented within SDT and its related research (Deci & Ryan, 1995, 2000; Ryan & Deci, 2007). Aspirations associated with personal growth, intimacy, health and community manifest in development of intrinsic goals, while those related to financial success, fame and attractiveness lead to setting extrinsic goals (Deci & Ryan, 1995). The former help individuals meet psychological needs for competence, autonomy and relatedness, yielding integrity and well-being (Deci & Ryan, 2000). Again, self-compassion aligns well with intrinsic versus extrinsic goals, as it derives from Buddhist philosophy that is grounded in the “four immeasurables,” which are love, compassion, joy and equanimity (Hanh, 1997).

As previously noted, Deci and Ryan’s “true self-esteem” was shown to correlate with self-compassion during initial construct testing (Neff, 2003a). True self-esteem, also referred to as secure self-esteem, differs from contingent, or fragile self-esteem (Deci & Ryan, 1995; Kernis & Paradise, 2002). Deci and Ryan (1995) define true self-esteem
as a stable, sense of worth that develops from the integrated self as viewed through the lens of SDT. This secure type of self-esteem does not require evaluation in terms of external references or criteria. It is continually enhanced through the meeting of basic psychological needs and derives from intrinsically-motivated goals and behaviors. Contingent self-esteem develops from a false self-concept that is constantly re-evaluated in terms of external criteria and is therefore fragile (Deci & Ryan, 1995; Kernis & Paradise, 2002). Attempts to bolster esteem through evaluation and social comparison can result in development of contingent self-esteem, which may result in negative side effects such as egotism and neurotic perfectionism (Baumeister, Heatherton, & Tice, 1993).

Within the context of SDT, secure, or true, self-esteem is inherent. This means that it isn’t earned but is a measure of an individual’s worth as a being (Kernis & Paradise, 2002). It is then appropriate for self-compassion to positively correlate with this construct of self-esteem, as self-compassion clearly views each human being as worthy based upon simple existence (Neff, 2003b). Neff found true self-esteem to be moderately correlated with self-compassion, indicating commonality between the constructs, but not complete overlap (Neff, 2003a). Further, self-compassion is described by many authors as having the advantage of applicability as a coping mechanism, differentiating it further from any form of self-esteem (Barnard & Curry, 2011).

Intersections between mindfulness and SDT have also been studied (K. W. Brown & Ryan, 2003). While mindfulness is defined more narrowly within self-compassion it still retains key components of the general construct (Neff, 2011). Brown and Ryan note
overlap between self-regulation, considered a key component of mindfulness and autonomy as included within SDT. Connections can also be drawn between the need for competence as defined within SDT and the mindfulness concepts of non-judgment and non-reactivity. In addition, mindfulness tends to cultivate a sense of connection and belonging which is mirrored in SDT as the basic need for relatedness (Kabat-Zinn, 1994). Finally, in order to be autonomous in behavior, individuals must be conscious of their own emotions, cognitions and needs and act in accordance with them, as opposed to the societal or cultural norm (K. W. Brown, Ryan, & Creswell, 2007). Both mindfulness and SDT suggest this is the best course of action to follow in order to achieve psychological well-being.

A final intersection between mindfulness and SDT is self-compassion. As discussed earlier, true self-esteem develops when basic needs for competence, autonomy and relatedness are met. Individuals develop an innate sense of worth, a realistic sense of self and an acceptance of social contexts without the need to make external comparisons and evaluations (Deci & Ryan, 1995). Neff and Germer’s (2013) work suggests that when self-compassion is practiced through its three components, it also cultivates true self-esteem. Mindfulness yields a balanced awareness of needs and helps people see themselves as but one part of a larger whole, inherently worthy of love and happiness and able to act autonomously to meet needs without judgment or comparison to others (Neff, 2003b). Clear connections appear between these two sets of concepts in relation to true self-esteem.
The term body image was first used by Paul Schilder in 1935 in his pivotal book, *The Image and Appearance of the Human Body*, and by 2004, Thomas Cash introduced the inaugural issue of a journal devoted specifically to the study of body image, *Body Image: An International Journal of Research* (Cash, 2004). Cash (2004), a key scientist studying body image over the last 35 years, and Editor-in-Chief, notes in the inaugural issue that body image research has grown exponentially in the last several decades (Blood, 2005). A key term search of two major databases, PsychINFO and PubMed, yielded approximately 2,000, 3,200 and 5,200 citations for the 1970’s, 80’s and 90’s, respectively (Cash, 2004). A similar search covering the years 2000 to the present produced 10,300 citations. A quick Google search generated 3 million hits, which indicates body image is of interest to academicians and lay people alike.

But what exactly is body image, and why is it so important? The primary objectives of this brief overview are to provide answers to these questions, as well as to present key aspects of body image assessment and its connection to the study of exercise science. Further, this section provides a basis for exploration of this construct in the current study and for understanding later sections that will discuss recent research on the intersection among PA/Ex, body image and self-compassion in middle-aged women.

Body image is a term that may conjure up different meanings for different people. There are several dictionary definitions of body image and a plethora of terms are commonly substituted for it. In addition, body image and its meaning may change by cultural or ethnic group. Dictionary.com lists several definitions of body image and related sources. Collins Dictionary defines it as “an individual's concept of his or her own
body,” Merriam-Webster Dictionary and American Heritage Dictionary both state it is “a subjective picture of one's own physical appearance established both by self-observation and by noting the reactions of others,” and finally, Dictionary.com’s own definition says body image is “an intellectual or idealized image of what one's body is or should be like that is sometimes misconceived in such mental disorders as anorexia nervosa” (Dictionary.com, 2013; Merriam-Webster Dictionary, 2013). While such on-line resources are not considered “scholarly,” the variation inherent in these definitions points to diversity in the term’s conception across a variety of academic disciplines and scholars.

Cash described body image as a multi-dimensional, psychological self-conceptualization of embodiment that includes an individual’s perceptions, cognitions, beliefs, emotions and behaviors about and in regard to their body and its appearance (2004). Blood discusses body image as socially-constructed and variable based upon contextual and situational cues, and notes that each individual has many true selves and images of the body (2005). In her body image review, Tiggeman defines the construct as complex and multi-faceted, including perceptual, affective and cognitive aspects and potential for a behavioral component (2004). She also notes that in Western society the primary focus has been on appearance, shape and weight. Grabe, Ward and Hyde (2008) use a definition of body image very similar to that of Cash, as do several other authors. Campbell and Hausenblas define body image as “the internal representation of a person’s outer appearance” (2009, p. 781). The authors reference their definition to a text authored by Thompson, Heinberg, Altabe and Tantleff-Dunn (1999) and published by the
American Psychological Association. However, two meta-analyses of body image, one from a feminist perspective, and one concerned with social comparison did not specifically provide an operational definition of the construct (Murnen & Smolak, 2009; Myers & Crowther, 2009).

The definitions of body image that have been used in the literature vary based on the degree of emphasis placed on appearance, on aspects of multi-dimensionality and on stability over time. These variations are critical for several reasons. First, definition and operationalization of the definition within a study determine variables and measurement tools. Second, most studies of body image have focused on how individuals experience negative body image or have studied negativity related to one of the multi-dimensional aspects of body image. It is critical to detail the level (i.e., global, perceptual, cognitive, etc.) of the body image variable being evaluated so that comparative analyses can be understood within some common and consistent framework. Finally, terminology utilized in the body image literature that has grown out of the field of psychology often differs from terminology utilized in literature related to body image that has originated from other disciplines (i.e., exercise science, sociology, etc.). This makes it challenging, and at times impossible to determine if specific studies and findings are comparable or unrelated.

One of the primary differences in the treatment of body image within the field of exercise science is that the construct is an outgrowth of how conceptions of one’s body affect one’s PA/Ex participation. For instance, one of the earliest examples of how body image was studied in exercise science can be seen in the work of Sonstroem & Morgan.
The authors developed the exercise and self-esteem model (EXSEM), which proposed that global self-esteem is affected by several factors, one of which is “physical acceptance” described as “satisfaction with one’s body” (Levy & Ebbeck, 2005; Sonstroem & Morgan, 1989). Levy and Ebbeck (2005) tested this model in middle-aged women using the body esteem scale to measure physical acceptance and found that physical acceptance was the only variable that significantly explained variance in global self-esteem.

The body esteem scale is gender-specific and includes three subscales for women: sexual attractiveness, weight concerns and physical condition (Franzoi & Shields, 1984). Davis, who authored a chapter on body image and exercise in the 1997 text *The Physical Self: From Motivation to Well-Being*, discussed this concept of body esteem as originating in the work of Shavelson, Hubner and Stanton (Davis, 1997; Shavelson, Hubner, & Stanton, 1976). Her review of the literature on body image and exercise was angled toward PA/Ex-related findings, and did not broach the topic of the silo-like treatment of body image-related concepts and constructs in psychology and exercise science. Further, there was no discussion of how this disconnectedness might have affected measurement and assessment of constructs.

While the term body image was not specifically used in the exercise literature reviewed, it is clear that there is overlap between the terms physical acceptance, satisfaction with one’s body, body esteem and body image. But the degree of commonality versus degree of difference is not clear. In reading the literature across disciplines such as psychology, medicine, exercise science, communications and
sociology it is not uncommon to come across a variety of terms that seem related to the term body image. While it is beyond the scope of this overview of body image literature to detail an inclusive list of all body image terminology utilized in various disciplines, such a resource would facilitate interdisciplinary research.

One final measurement scale commonly used within exercise science should be mentioned here. The physical self-perception profile (PSPP) which measures general physical self-worth includes four specific sub-domains including body attractiveness and physical condition (Fox & Corbin, 1989). Again, there is clear overlap between the concepts of physical self-worth, the noted sub-domains and body image.

One of the reasons for a strong interest in research investigating relationships between constructs such as body image, physical self-worth, self-acceptance and the like is that research regarding exercise correlates has consistently indicated that poor body image is negatively correlated with PA/Ex level (Bauman, Sallis, Dzewaltowski, & Owen, 2002; Trost et al., 2002). Bauman, Sallis, Dzewaltowski, and Owen (2002) also note that body image is an exercise correlate that is not included in any major behavioral theory. This lack of theoretical basis is also noted in a recent study published in *Body Image* that assessed the impact of body satisfaction on physical activity behavior change using the transtheoretical model (TTM) as a theoretical framework (Johnson, Fallon, Harris, & Burton, 2013). The authors found that in their sample of middle-aged women, body satisfaction significantly explained 2-8% of the variance in TTM constructs associated with stage progress toward behavior maintenance. It is also relevant to note that the authors used the term body satisfaction, which they defined as an individuals’
“global subjective evaluation of their satisfaction with their body” (Johnson et al., 2013, p. 164)

While research in the area of body image has grown extensively, it is equally matched by growth of interest among the popular media and the populace in general (Grabe et al., 2008). Much of the focus in recent years, both in the media and in scholarly research, has been on negative body image experienced by women, and the impact of this negativity on women’s mental and physical health (Blood, 2005). Negative body image is a significant predictor of obesity, depression and low self-esteem, as well as a major risk factor for eating disorders (Cash & Henry, 1995; Grabe et al., 2008). As just noted, negative body image is also correlated with decreased levels of PA/Ex, which leads to additional health risks (Bauman et al., 2002; Trost et al., 2002).

Several comprehensive studies and analyses indicate negative body image has reached normative levels (Cash & Henry, 1995; Grabe et al., 2008; Murnen & Smolak, 2009; Tiggemann, 2004). In a 1995 survey, almost 50% of women had negative opinions of their appearance and worried about being or becoming overweight; these perceptions had increased from 30% reported in a similar 1985 survey (Cash & Henry, 1995). This same survey also noted black women’s rates of negativity were significantly lower than those of white and Hispanic women. 2008 and 2009 meta-analyses reported 50% to 80% of girls and college women experience negativity in body image, respectively (Grabe et al., 2008; Myers & Crowther, 2009). Tiggeman’s (2004) body image review quoted a 1997 survey that reported 56% of women had a negative body image, 66% were unsatisfied with their weight, and 89% wanted to lose weight.
A recent review of the epidemiology of body image dissatisfaction noted that variability in the reported prevalence of negative body image results from the lack of large-scale surveys conducted with nationally representative samples using valid and reliable measurement tools (Frederick, Jafary, Gruys, & Daniels, 2012). They found only three such surveys since Cash and Henry’s 1995 survey (noted above). One survey assessed body image in 2,200 UCLA college students in 2005-06 and found 50% of women were not satisfied with their bodies overall (Frederick et al., 2012). The other survey gathered on-line data from 52,000 adults aged 18-65 on websites sponsored by ELLE magazine and MSNBC.com in 2003 (Frederick, Peplau, & Lever, 2006). While this did not use validated measures, it yielded results similar to those already noted. Women reported the highest levels of body dissatisfaction, with 63% dissatisfied about their weight (Frederick et al., 2006).

When negative body image was assessed across life span it appeared relatively stable for women (Tiggemann, 2004). Several reviews note lack of sufficient data available to fully evaluate the impact of ethnicity/race on body image concerns among women (Grabe et al., 2008; Tiggemann, 2004). This noted, the same authors conclude that available data seems to indicate higher rates of negative body image among white women when compared to black women.

The noted reviews and meta-analyses point to potential factors that may be partially responsible for the increase in women’s negative body image over the last several decades. Social comparison, whether to images shown in the media, or to individuals encountered in everyday life, is correlated with greater negativity, as is
exposure to, and internalization of media portrayals of thin, idealized women (Grabe et al., 2008; Myers & Crowther, 2009). Tiggeman (2004) notes that while negative body image is stable across life span, two dynamic factors that offset each other are actually resulting in this “stable” image. As women age, their dissatisfaction with body image does increase, but, concurrently, the value they place on their appearance decreases. The net effect is a consistently negative body image over the time span of women’s lives.

Media ideals of the perfect female body have shifted over the years, from hippy, curvaceous and full-figured in the 1950’s to ultra-thin and narrow by the turn of the century, and finally to thin, toned and full-busted in 2010 (Sypeck, Gray, & Ahrens, 2004; Tiggemann, 2011). An opposing change has occurred to the average middle-aged woman’s body. Rates of obesity among adult women aged 20-39 and 40-59 have risen from 9.3% and 18.5%, respectively, in 1962 to 34% and 38%, respectively in 2008 (Flegal et al., 2010; Flegal et al., 2002). These increases in obesity occurred fairly steadily over the 46 year time period, with the exception of the obesity rate for 40-59 year old women, which vacillated between 35% and 41% from 2000 to 2008 (Flegal et al., 2010). It seems possible that social idolization of the thin feminine body concurrent with an increase in the size of the average female body could play a role in the increasing rates of women’s body dissatisfaction (Tiggemann, 2011). Further, in light of shifts in body image ideals, and increases in average body size, it is of no surprise that research indicates a significant percentage of the variance in body image is explained by variance in BMI or body fat percentage (Ålgars et al., 2009; Catikkas, 2011; Davis, 1997; Neighbors & Sobal, 2007).
This focus on negative aspects of women’s body image points to further inconsistencies in terminology. So far here, “negative body image” has been used to convey the concept of unfavorable perceptions, thoughts, emotions and beliefs about one’s own body. This term was chosen for simplicity; body image was previously defined and preceding it with the word “negative” is fairly straightforward. A more commonly used term in the literature is “body dissatisfaction” which appears to be used with similar meaning (Tiggemann, 2004). Myers & Crowther (2009) used a definition of body dissatisfaction that referred to these negative feelings as “dysfunctional” because they lead to the host of mental and physical infirmities noted earlier.

Markland (2009) uses perceptual discrepancies in body size to reflect body dissatisfaction in his SDT-based study exploring the relationship between body dissatisfaction and decreased PA/Ex levels in adult women. He found autonomous forms of regulation mediated the relationship between body size discrepancy and exercise. Absent from the article is discussion of how perception of body size discrepancy relates to body dissatisfaction. Per Cash’s (2011) construction of body image, perception is but one conceptual component of the overall construct.

Body image is a complex, multi-dimensional construct that has evolved over time; a complex set of measurement tools has evolved alongside it (Cash, 2004). A body image meta-analysis categorized these tools in order to accurately calculate effect sizes (Grabe et al., 2008). The three categories utilized were: body dissatisfaction, body self-consciousness (or self-objectification) and internalization of thin body ideals. The authors identified 14, 3 and 5 different scales in these categories, respectively.
A recent summary of measurement tools available to evaluate various aspects of body image categorized these tools as either perceptual (reflecting body image disturbance or distortion) or attitudinal (R. M. Gardner, 2011; Menzel, Krawczyk, & Thompson, 2011). Attitudinal scales were then further categorized as global measures of satisfaction, affective measures, cognitive measures and behavioral measures (Menzel et al., 2011). The authors noted 21 global measures, three affective measures, five cognitive measures and four behavioral measures. Of the total of 33 measures, only three assess body image from a positive perspective versus a negative perspective.

The body area satisfaction scale (BASS) is a subscale of the multidimensional body-self relations questionnaire (MBSRQ) and measures satisfaction with specific body parts (T. A. Brown, Cash, & Mikulka, 1990). Similarly the body satisfaction scale measures degree of satisfaction with 16 body parts (Menzel et al., 2011). The only scale measuring overall positive body image is the body appreciation scale (BAS) which approaches body image from a positive psychology perspective (T. L. Tylka, 2011). It assesses positive body image based on four thematic areas: Favorable body opinions without respect to appearance, unconditional acceptance of the body, respecting the body by engaging in healthy behavior, and rejecting unrealistic and harmful media images.

Similar to positive psychology’s perspective that eliminating pathology does not necessarily engender flourishing, the absence of body dissatisfaction does not equal body appreciation (Seligman & Csikszentmihalyi, 2000; T. L. Tylka, 2011). Further, Tylka noted that body appreciation predicted several indicators of well-being in women when controlling for the impact of negative body image (T. L. Tylka, 2011).
Physical Activity/Exercise & Body Image in Middle-aged Women

Two meta-analyses explored the relationship between exercise and body image. In the first, Hausenblas and Fallon (2006) looked at both interventional and correlational studies to assess the effect of exercise on body image, and concluded that regardless of design, exercise had a positive impact on body image. They found this effect was greater in men than women and greater in adults than in college-aged or elderly individuals. In the second meta-analysis, Campbell and Hausenblas (2009) looked at the effect of exercise interventions on body image and assessed moderators impacting effect size. The authors found significant effects of exercise on body image, but contrary to results of the first meta-analysis, they found the effect was greater for women than men, although this difference was not significant. They also found greater effects for adults and older adults, similar to the first meta-analysis. Authors of these two meta-analyses note limitations that recall several issues already discussed here (Campbell & Hausenblas, 2009; Hausenblas & Fallon, 2006). Studies consistently lack a theoretical basis and clear identification of the specific aspect or component of body image to be measured. Further, an extensive variety of measurement tools have been utilized making it difficult to summarize results.

Several original research studies have focused on PA/Ex and body image in middle-aged women. A 2-year longitudinal study of 141 women found that exercise improved body image, lowered BMI and improved overall self-esteem (Elavsky, 2010). Mentioned earlier, Levy and Ebbeck (2005) found physical self-acceptance explained 12.6% of the variance in global self-esteem in a cross-sectional survey of women with an
average age of 46. Tiggeman and Williamson (2000) found that exercise was associated with increased body satisfaction among middle-aged women in a cross-sectional survey across gender and age.

Segar has conducted a number of studies that explore relationships among body image, PA/Ex and motivation in middle-aged women. Middle-aged women are defined as 35 – 60 years of age based upon the work of Segar, Spruijt-Metz and Nolen-Hoeksema (2006). In a 6-week cognitive-behavioral intervention with 50 middle-aged women total PA/Ex participation increased post-intervention and was maintained at 9-month follow-up (Segar, Jayaratne, Hanlon, & Richardson, 2002). In a cross-sectional survey of 59 middle-aged women, participants with body shape motives were significantly less likely to engage in PA/Ex than those with other motives (Segar et al., 2006).

A similar cross-sectional survey was conducted on a larger scale (N = 262) to further classify and understand middle-aged women’s exercise goals (Segar, Eccles, Peck, & Richardson, 2007). A list of 18 goals was compiled from a comprehensive review of the literature, participants were asked to select most and least important goals, and then cluster analysis was performed to detect groupings of exercise goals. Five clusters were identified: 1) health benefits, 2) weight loss, 3) weight maintenance/toning, 4) sense of well-being, and 5) stress reduction. Health benefits was the largest cluster of goals, representing 40% of the participants’ reasons for exercising. Clusters 2 and 3 were combined to reflect “body and weight-related exercise goals” and comprised 33% of participants’ reasons for exercising. Finally, clusters 4 and 5 were combined as “improving mental health and mood” and reflected 26% of participants’ reasons to
exercise (Segar et al., 2007). The authors noted that the study was limited by its cross-sectional nature as exercise goals were not tested for translation to exercise behavior.

The participants in the cross-sectional survey just described were further enrolled in a longitudinal study to assess goals and exercise participation at baseline, 1 month and 1 year follow-ups (Segar et al., 2007; Segar et al., 2011). The longitudinal study used qualitative methods to inductively determine participants’ “superordinate exercise goal,” or why their original concrete goal was important to them. Then quantitative analysis was conducted to test the effects of the superordinate exercise goals on exercise participation at the 3 data-collection time points (Segar et al., 2011). The authors found that participants with superordinate exercise goals related to quality of life (i.e., better sleep and feeling centered) engaged in the highest levels of exercise, 34% more than those with weight/appearance goals, 25% more than those with current health goals, and 15% more than those with healthy aging goals. These results indicate immediate quality of life exercise outcomes may be better motivators for inducing exercise among middle-aged women than long-term health or weight-related goals (Segar et al., 2011).

Segar, Eccles and Richardson (2008) conducted a similarly designed longitudinal study assessing PA/Ex goals at baseline, one month and one year and found that participants with weight loss and health benefit goals were less active than those with goals related to well-being and stress reduction. While the terms “motives” and “goals” were specifically used in the 2006 and 2008 studies, respectively, the authors appear to use the terms interchangeably. In the 2006 study, qualitative methods were used, participants were asked to imagine themselves being physically active, and they were
then asked “what would your most important goal be for doing your imagined physical activity?” As noted earlier, results were still discussed in terms of “motives” as opposed to “goals” (Segar et al., 2006). In the 2008 study, quantitative methods were used, participants were asked to select their 3 most important goals for exercising (from a list of 18 goals compiled from the literature), and goal clusters were then identified through cluster analysis (Segar et al., 2008).

Segar’s recent work explores the idea of shifting the focus of exercise messaging from health and weight-related outcomes to short-term improvements in well-being (Segar et al., 2012). A stratified random sample of 1,690, 40 – 60 year old overweight and obese men and women were randomly exposed to one of three advertisements touting the benefits of physical activity. The three advertisements differed in benefit frame, one promoted “better health,” one promoted “weight loss,” and one promoted “daily well-being.” After exposure to one of the three advertisements, participants were asked to complete measures of exercise motivation and body image. The motivation measures were adapted from questionnaires developed based upon SDT. Results indicated both gender and BMI interactions. Overweight women exposed to the daily well-being ad had less extrinsic regulation, more intrinsic regulation and more favorable body image than those exposed to the health and weight loss ads. Contrarily obese women experienced more extrinsic regulation and less favorable body image when exposed to the daily well-being ad. The authors note obese women may not respond positively to the well-being ad because they may see this as one more thing they need to
do on a list that already includes losing weight and improving their health (Segar et al., 2012).

Reframing exercise to focus on more immediate benefits was also the focus of an 8-month intervention that utilized social cognitive theory and stages of change theory to increase self-worth and physical activity levels in middle-aged women ($N = 56$) (Huberty, Vener, et al., 2008). Authors used a book-club format to explore ways in which participants could improve feelings of self-worth, learn to prioritize their own needs, see physical activity as a means to improve quality of life, and decrease feelings of negativity toward their bodies. Results included increases in both physical activity and self-worth (Huberty, Vener, et al., 2008).

Middle-aged women who completed a 12-week physical activity behavior change pilot program within the previous 3 years were invited to participate in a qualitative study to identify and address facilitators of long-term exercise adherence in women (Huberty, Ransdell, et al., 2008). Data were gathered from 19 women (average age = 46) using a combination of focus groups, interviews and emails and analyzed using grounded theory. Dominant themes among adherers (at least 150 minutes of PA/Ex per week for at least 1 year prior to the study) were high self-worth, prioritizing “me-time,” self-acceptance in regard to body image, and motivation to maintain high quality of life. Among non-adherers, motivation was negatively affected by previous attempts to lose weight or maintain weight loss, and perceived lack of time to be active. Further, taking care of themselves was not a priority and body image was low (Huberty, Ransdell, et al., 2008).
The studies by Segar et al., and Huberty et al., point to key factors correlated with maintaining adequate PA/Ex levels in middle-aged women - motivation, self-worth and quality of life. There is clear overlap with the principles of SDT, which indicate that when behavior is autonomously motivated and self-regulated it tends to endure over time. De-emphasizing body image and weight-loss goals while increasing self-acceptance, personal value and quality of life are also consistent with the construct of self-compassion.

Physical Activity/Exercise & Body Image in Self-Compassion Research
A review of the literature yielded seven studies published between 2010 and April 2013 that focused on SC and PA/Ex or SC and body image, or SC and both PA/Ex and body image (see Table B.1 in Appendix B for a summary of these studies). Subjects were primarily young females; four studies were cross-sectional, two were interventions and one was qualitative. In three of the cross-sectional studies, subjects were young females, 15 to 22 years of age. Key findings included significant correlations between self-compassion and motivation for exercise, social physique anxiety and body concern (Magnus, Kowalski, & McHugh, 2010; Mosewich, Kowalski, Sabiston, Sedgwick, & Tracy, 2011; Wasylkiw, MacKinnon, & MacLellan, 2012). In two of these studies, self-compassion predicted unique variance in dependent variables beyond self-esteem (Magnus et al., 2010; Mosewich et al., 2011). The last cross-sectional study examined the role of self-compassion in body dissatisfaction among female patients with eating disorders and women from the general population (Ferreira, Pinto-Gouveia, & Duarte,
Results indicated lower levels of self-compassion were associated with greater body image dissatisfaction and disordered eating.

The cross-sectional study conducted by Magnus, Kowalski and McHugh (2010) used SDT as a theoretical basis to assess correlations among self-compassion, motivation for exercise, goal orientation, social physique anxiety and obligatory exercise behavior. The authors found that self-compassion explained unique variance in motivation, social physique anxiety, ego goal orientation, and obligatory exercise. While the subjects were young, very active women in a cross-sectional study, and results cannot be extrapolated beyond the sample, the results are encouraging. The application of SDT to a self-compassion study looking at both exercise and a body image construct (social physique anxiety) establishes a basis for future research in this area.

The two interventions were mind-body focused and assessed changes in self-compassion and quality of life indicators utilizing a control group design (Gard et al., 2012; Nedeljkovic, Ausfeld-Hafter, & Wirtz, 2012). Average age of participants was 22 and 35, respectively. Women comprised 73% of participants in the Gard et al. (2012) study and 66% in the Nedeljkovic (2012) study. Key findings included a significant increase in self-compassion in both treatment groups (Gard et al., 2012; Nedeljkovic et al., 2012). Further, self-compassion mediated the effect of the treatment on quality of life & perceived stress in one of the studies (Gard et al., 2012).

Finally, the qualitative study used an interview format with five young adult women and employed empirical phenomenology to explore the potential intersection between self-compassion and body appreciation (Berry, Kowalski, Ferguson, & McHugh, 2013).
The authors noted findings consistent with Neff’s construct of self-compassion and specifically identified three themes common to the five women: Appreciating one’s unique body, taking ownership of one’s body and engaging in less social comparison. Further, the authors discussed the wide range of body image and physical self constructs that have been developed and researched, but concluded that body self-compassion may provide a unique opportunity for helping women cope with negative body image.

**Discussion and Conclusions**

A comprehensive view of the literature encompassing SDT, self-compassion, body image and exercise within the population of middle-aged women points to several aspects of potential integration. Self-determination theory, self-compassion and body appreciation all have ties to positive psychology in terms of their philosophical and psychological bases (Waterman, 2013). They appear well-suited to use concurrently to explore significant predictors of PA/Ex and relationships among these predictors in a population of middle-aged women.

Several recent studies have used SDT as the theoretical basis for exploring relationships between body image and PA/Ex (Brunet & Sabiston, 2009; Palmeira et al., 2009; Sabiston, Brunet, et al., 2010). All authors concluded that body image can negatively affect PA/Ex and future interventions should consider ways to positively influence this critical variable. Self-compassion is considered a coping mechanism and helps to alleviate self-criticism and procrastination while encouraging mindfulness and resilience (Barnard & Curry, 2011). Perhaps promoting self-compassion could be used as a method to decrease negative body image and increase body appreciation.
Segar’s work on PA/Ex and body image in middle-aged women uses SDT as the primary framework for understanding and explaining behavior. The idea of re-framing exercise to promote immediate, short-term benefits instead of long-term outcomes (i.e. decreased health risk and weight loss) is supported by SDT and Neff’s construct of self-compassion (Segar et al., 2012). Segar has noted that feeling positive about one’s existence and having a positive sense of self-worth are critical to self-regulation and long-term behavior maintenance, which are consistent with Neff’s construct of self-compassion that is based in the belief that all individuals are inherently worthy of respect and self-kindness (Neff, 2003b). Finally, Segar incorporates SDT, self-compassion and positive psychology when she states “striving toward well-being is inherently autonomous and, as such, may foster a key aspect of the basic psychological needs that promote flourishing and optimal motivation, as posited by SDT” (Segar et al., 2012, p. 14).

A qualitative study of young-adult women was conducted by Wood-Barcalow, Tylka and Augustus-Horvath (2010) and explored positive body image in subjects classified as having this trait. The resulting holistic model linked ability to filter source information about body image, incorporate positive messages and reject negative ones to decreased attachment to appearance. Further, these women mentored other women to love their bodies and surrounded themselves with individuals who were open to taking care of their health. These are behaviors that would also be promoted via improvements in self-compassion, specifically in the areas of decreasing self-criticism, increasing self-kindness and engaging in a sense of common humanity (Neff, 2003b).
Self-compassion may prove helpful in understanding and promoting a physically-active lifestyle. Engaging in mindfulness and considering personal needs as important within the context of middle-aged women’s lives may facilitate removal of barriers to PA/Ex (Hendry et al., 2010). Self-kindness and concern for one’s own well-being seem to be characteristics that would lead to or be associated with making time for PA/Ex as a health enhancing behavior. An increased sense of self-worth should legitimize time spent in personally gratifying behaviors and a sense of common humanity would lead to helping others to do the same. Self-compassion is correlated with psychological well-being, which is also correlated with exercise (Barnard & Curry, 2011; Trost et al., 2002). In addition, self-compassion, as well as true self-esteem, avoid the need for performance evaluation, and may encourage individuals who are not comfortable or experienced with exercise to consider physical activity. Viewing all humanity with equality and believing in the connectedness among individuals can be translated to the self when one feels self-compassion, and thus serve as a protective barrier against negative effects of social comparison on body image. Finally, self-compassion urges us to avoid harsh judgment when we fail or engage in less than desirable behavior. Exercise science literature assures us that even the most consistent exercisers sometimes relapse. Self-compassion is well-suited to encourage individuals to accept their unsuccessful behavior (e.g., relapse) and move forward with re-establishing healthy PA/Ex patterns.

Research investigating the relationships among SDT, self-compassion and body image appears to hold potential for a better understanding of the social, emotional and cognitive factors affecting physical activity in middle-aged women. Perhaps self-
compassion could be utilized to increase feelings of self-worth and autonomy, improve body appreciation and help middle-aged women view PA/Ex as a means to enhance daily living. If middle-aged women can learn to re-frame their sense of self and view PA/Ex in a new light it would facilitate new methods to effectively promote PA/Ex in this population and encourage establishing PA/Ex as a lifelong habit. Ultimately, including PA/Ex as a regular part everyday life could lead to improved physical and psychological health, increased quality of life, and middle-aged women who are comfortable living in their bodies.
Chapter 3 - Methodology

Organization
This chapter outlines key elements of the proposed research study as follows:

- Selection of Analytical Basis: Structural Equation Modeling
- Population & Sample Size Determination
- Sampling Design
- Theoretical Design
- Instrumentation
- Data scoring: Calculation of Variables
- Collection and Analysis of Data

Selection of Analytical Basis: Structural Equation Modeling
This chapter begins with a discussion of the methods used to perform data analysis, as it is central to both the theoretical basis of the research project and will provide a framework for understanding other sections, such as sample size determination and treatment of variables. The structure of this study is cross-sectional and will utilize survey data to evaluate relationships among several variables. Cross-sectional survey design was chosen for a number of reasons. First, self-compassion research is in its infancy, and few studies looking at exercise and self-compassion have been conducted. Second, the population of interest, middle-aged women has not been studied in this
context. Third, while exercise motivation has been shown to predict exercise participation, the impact of body image on this relationship has not been well-studied. Finally, this research is designed to explore relationships among several variables, some of which have been extensively studied, others of which have not. There is no one theoretical model that explains or predicts how all these variables will interact. Initial investigation of these relationships is suited to cross-sectional survey design, and further, to analysis via Structural Equation Modeling (SEM).

Known by several names including covariance structure analysis, analysis of covariance structures and latent variable analysis, SEM is a sophisticated multivariate tool that combines elements of factor analysis and multiple regression (Hair, Black, Babin, & Anderson, 2010; Vogt, 2005). To place SEM historically, regression analysis was developed during the 1800’s, factor and path analysis in the early- to mid-1900s, and SEM was first introduced in 1972 (Schumacker & Lomax, 2010). It wasn’t until 1993, with the release of LISREL8 with a simple command language and a dialog-box format, that statistical analysis using SEM became more common. The inaugural issue of Structural Equation Modeling: A Multidisciplinary Journal, was published in 1994 (Hershberger, 2003). Between 1994 and 2001, SEM increased as a technique used in published studies and it gained status equivalent to other multivariate techniques among those fluent in statistical analysis (Hershberger, 2003).

Structural Equation Modeling offers several unique advantages over other statistical methods (Schumacker & Lomax, 2010):
• Concurrent analysis of multiple dependent variables, reducing estimation error and facilitating confirmation of complex relationships

• Simultaneous analysis of variables measured using different scales (continuous, categorical, etc.)

• Inclusion of latent variables (constructs not directly observable) and latent variable measurement using multiple assessment tools

• Testing and validation of complex theoretical models, and suggestion of alternative models based on the data to improve model fit

These advantages make SEM the best choice for this research project. Perhaps the most critical reason to use SEM in this case is that while the literature supports associations for a number of these variables, they have not been simultaneously tested using a multivariate technique that allows exploration of potential interacting relationships. Structural equation modeling is based on the idea that researchers should approach the statistical analysis with a pre-conceived model strongly supported by the literature, yet allows for modification indicated by the data (Hair et al., 2010). Such modifications are made based upon the data structure, the viability of the change as indicated in the relevant literature and the judgment of the researcher (Schumacker & Lomax, 2010).

As noted, a latent variable cannot be directly measured, while observed variables are those that can be directly measured. In psychosocial research, it is common to treat latent variables as observed variables. A construct of interest in this research is used as a simple example: body image. There are varying definitions for the construct and its
component elements, as well as multiple categories of measurement tools, and many questionnaires in each category that measure different aspects of body image (R. M. Gardner, 2011; Menzel et al., 2011). Structural equation modeling calls this a latent variable because the researcher cannot directly observe or measure a subject’s body image. Yet when body image is measured in studies that do not use SEM, the fact that body image is a latent variable is typically not mentioned. Often several measurement tools are used in the same study in order to acknowledge the complexity in measuring such a construct (Grabe et al., 2008). Still, unless SEM is used, there is no convenient way to evaluate the effectiveness of each of several measurement tools while concurrently assessing relationships of body image to other variables of interest.

In SEM, a factor analysis can be used to assess the questionnaires selected to measure the latent variable “body image,” and a path analysis can be used to construct structural equations representing the theoretical relationships between it and other variables (Schumacker & Lomax, 2010). When a measurement model (factor analysis of at least one latent variable) and a structural model are used in the same statistical analysis, this is called a “full” model and optimally uses the advantages of SEM. The relationships between all variables are simultaneously evaluated and the fit of the full model is assessed using a number of selected fit indices (Hair et al., 2010). If the fit is not acceptable per established criteria, modifications to the model are considered.

It is also relevant to note here, that within SEM, a variable that is truly latent can still be treated as an observed variable. Again, using self-compassion as an example from the proposed study, we can begin to see how this occurs. Currently there is only one
measurement tool available to assess an individual’s self-compassion, and that tool does not allow direct, objective, observable measurement. In SEM, this variable is then treated as both a latent and observed variable. Measurement error cannot be assessed as it can with a true latent variable, but this is no different than running a regression analysis with the same variable. An example of a true observed variable is age. Age can be measured and unless there is a reason for a subject to be motivated to lie, there is reasonable certainty that this measurement will be accurate (Schumacker & Lomax, 2010).

Prior to conducting an SEM analysis, two steps occur: Model Specification and Model Identification (Schumacker & Lomax, 2010). In model specification, variable relationships are specified; this is usually done through a visual diagram of variable interactions, based upon theoretical relationships supported in the literature. Model identification involves calculating the number of parameters to be estimated and comparing it to the number of observations in order to ensure that a unique solution to the model fit can be estimated.

Once data are collected, three steps occur in SEM data analysis: Model Estimation, Model Testing and Model Modification (Schumacker & Lomax, 2010). Model estimation defines how the SEM software will estimate parameters in the model. The most commonly used estimation method is Maximum Likelihood Estimation. Also at this time, assumptions are evaluated, such as normality, homogeneity, etc. Model testing is the actual running of the data to evaluate how well the model fits the dataset. Software output provides factor loadings for factor analysis, correlation and covariance
matrices and structural equation coefficients as well as a multitude of fit indices that are used to assess the overall model. Finally, it is uncommon for the initially specified model to meet criteria for goodness-of-fit, and model modifications are considered as previously noted (Schumacker & Lomax, 2010).

LISREL, an acronym for Linear Structural RELations, is one of the prominent software packages that provides SEM statistical analysis, and was used for data analysis in this research project (Schumacker & Lomax, 2010). LISREL includes a complementary software program called PRELIS, which handles raw data in terms of manipulation, transformation, imputation, etc. The user environment is continuous between LISREL and PRELIS, such that the researcher does not have to determine which portion of the program to operate. Raw data can also be treated within Excel or SPSS and then imported into PRELIS. Alternatively, raw data can be completely managed by any software program and analysis can be done in LISREL as long as a correlation or covariance matrix is available to begin analysis in LISREL.

Population & Sample Size Determination
Middle-aged women (35-60 years of age)

Inclusion criteria.

- Female
- 35-60 years of age (middle-aged criterion per (Segar et al., 2006))
- Ability to read and understand English

Exclusion criteria.

- Pregnancy
- Within 1 year postpartum
• Any physical or mental condition that could potentially limit ability to engage in PA/Ex. Examples include: heart disease, cancer, chronic fatigue syndrome, chronic obstructive pulmonary disorder, depression

Sample size was determined using two sets of criteria: (1) sample size adequate to conduct regression and correlation analysis, and (2) sample size adequate to conduct SEM analysis.

(1) Several power analysis were conducted (G*Power Version 3.1.5, developed by Franz Paul, Germany). In each analysis, power was set at .80, maximum allowable alpha error was set at .05, and effect size was estimated based upon review of the literature. Relevant correlations are noted in Table 3.1.
### Table 3.1. Key Variable Correlations for Power Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pearson Product Moment Correlation Coefficient (“r”)</th>
<th>p-Value or Related Statistic</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC &amp; Body Appreciation</td>
<td>$r = .60$</td>
<td>$p &lt; .01$</td>
<td>(Wasylkiw et al., 2012)</td>
</tr>
<tr>
<td>SC &amp; Body Dissatisfaction</td>
<td>$r = -.50$ to -.54</td>
<td>$p &lt; .01$</td>
<td>(Mosewich et al., 2011)</td>
</tr>
<tr>
<td>SC &amp; Motivation</td>
<td>$r = .19$ to .41</td>
<td>$p &lt; .05$</td>
<td>(Magnus et al., 2010)</td>
</tr>
<tr>
<td>Body Appreciation &amp; Motivation</td>
<td>$r = .21$ to .34</td>
<td>$p &lt; .05$</td>
<td>(Sabiston, Brunet, et al., 2010)</td>
</tr>
<tr>
<td>Body Dissatisfaction &amp; PA</td>
<td>$r = -.35$</td>
<td>$p = .007$</td>
<td>(Segar et al., 2006)</td>
</tr>
<tr>
<td>Body Appreciation &amp; PA</td>
<td>$r = .27$</td>
<td>$p &lt; .05$</td>
<td>(Sabiston, Brunet, et al., 2010)</td>
</tr>
<tr>
<td>Motivation &amp; Physical Activity</td>
<td>$r = .35$ to .46</td>
<td>$p &lt; .01$</td>
<td>(Wilson, Rodgers, Fraser, &amp; Murray, 2004)</td>
</tr>
<tr>
<td></td>
<td>$r = .20$ to .32</td>
<td>$p &lt; .01$</td>
<td>(Edmunds, Ntoumanis, &amp; Duda, 2006)</td>
</tr>
</tbody>
</table>

Correlations between the variables to be tested range from a low of $r = .19$, $p < .05$, to a high of $r = .60$, $p < .01$. In the interests of conservatism, all power analyses were run assuming an $r = .20$. This resulted in a required sample size of 193 subjects. Allowing for 10% contingency (missing data, outliers, etc.), recruitment of at least 215 subjects was desired.
Note that in the table above, measures of both body appreciation and body dissatisfaction are reported. Because body image has been measured in both a positive and negative light, it is critical to understand the nature of these correlations. In cases where body appreciation has been measured, correlations with measures of motivation and/or PA have been positive (as one’s appreciation for their body increases, so does the motivation for, and engagement in exercise). In cases where body dissatisfaction has been measured, correlations with measures of motivation and/or PA have been negative (as one’s dissatisfaction with their body increases, their motivation for, and engagement in exercise decreases).

(2) Hair et al. (2010) recommend considering several factors to determine sample size:

- Multivariate normality: data should be assumed to be fairly normal but in order to allow for some degree of non-normality, one should allow for 15 subjects per parameter. (Based upon 14 observed variables in the proposed SEM analysis, $14 \times 15 = 210$ subjects, minimum).

- Estimation technique: when using maximum likelihood estimation, sample size should be in the range of 100 – 400. Allowing for a moderate degree of missing data ($< 10\%$), non-normality and measurement error, 200 subjects should yield good results.

- Model complexity: the greater the complexity of the model, the greater the size of the sample size required to generate optimal results. Multi-
group, multi-CFA models are considered more complex and would indicate a higher minimum number of subjects required (i.e. 200 – 400).

- Missing data: regardless of method selected to handle missing data, if it is expected to be greater than 10%, again, sample size should be increased.
- Communality: this refers to the amount of shared variance among the variables. If communality is low, sample size should be increased.

Hair et al., (2010) summarize recommendations regarding sample size by noting that 150 subjects is a reasonable sample size minimum to use for an SEM analysis that includes less than seven constructs with modest communalities and no under-identified constructs.

Schumaker and Lomax (2010) suggest several options for running power analyses and ultimately conclude that a minimum sample size of 200 subjects is sufficient in most cases. Based upon the authors’ recommendation a power analysis was run (G*Power Version 3.1.5, developed by Franz Paul, Germany) to generate a non-centrality parameter critical chi-square. Alpha was set at .05 and power was set at .80. The resulting critical chi square value was 3.84; this was compared to a sample size table from the noted text, which indicated a minimum sample size of 170 subjects.

Based upon all sample size considerations and calculations noted here, minimum sample size for this study was set at 215 subjects.

**Sampling Design**

The sample was nationally recruited on-line with assistance from the Center for Clinical and Translational Science (CCTS) using ResearchMatch. ResearchMatch is a
free and secure registry of potential research volunteers who receive information about studies anonymously. Their information is not released until they decide their level of interest and choose to allow the researcher to see it. The current study was listed per criteria required by ResearchMatch. The sample was a convenience sample based upon response to requests for participation in the survey. The unit of statistical analysis was individuals.

The on-line survey was initially planned to remain open for at least 2 weeks in order to allow a sufficient amount of time for interested participants to respond to the survey recruitment email. Further it was intended to close within 30 days unless the minimum number of required participants (215) was not reached, and a second recruitment email was considered worthwhile by CCTS personnel. Actual dates and times the survey was available on-line are reported in Chapter 4 – Results (see page 84).

**Theoretical Design**

Self-Determination Theory is the theoretical basis for conceptual relationships between the tested variables. Based upon hypothesized relationships among self-compassion, body image, motivation for exercise and level of PA/Ex discussed in the introduction and literature review, Figures 3.1, 3.2, and 3.3 display the proposed model.
Figure 3.1. Depiction of the Full SEM Model
Figure 3.2. Depiction of the Measurement Model
Figures 3.1 – 3.3 depict the models that will be tested via SEM and reflect the research hypotheses based upon the paths delineated, directionality and observed versus latent variables. Note that arrows indicate the hypothesized direction of each relationship. Note that the curved arrow in figures 3.1 and 3.3 depicts a correlational relationship between BMI and age. These independent variables are predicted to covary.

**Instrumentation**
Table 3.2 summarizes the questionnaires selected to measure study variables and their reliability and validity. Each measurement tool is then described in further detail.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement Tool</th>
<th>Reference for Reliability &amp; Validity</th>
<th>Reliability (Cronbach’s α)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Compassion</td>
<td>SCS- Self-Compassion Scale</td>
<td>(Neff, 2003a)</td>
<td>.92</td>
</tr>
<tr>
<td>Motivation for Exercise:</td>
<td>BREQ-2-Behavioral Regulations in Exercise Questionnaire</td>
<td>(Markland &amp; Tobin, 2004)</td>
<td>.73-.86</td>
</tr>
<tr>
<td>Amotivation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Regulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introjected Regulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identified Regulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrinsic Regulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Image: Body Appreciation</td>
<td>BAS- Body Appreciation Scale</td>
<td>(Augustus-Horvath &amp; Tylka, 2011; Avalos et al., 2005)</td>
<td>.91-.94</td>
</tr>
<tr>
<td>Body Image: Appearance Evaluation</td>
<td>MBSRQ Multidimensional Body-Self Relations Questionnaire</td>
<td>(T. A. Brown et al., 1990)</td>
<td>.77-.91</td>
</tr>
<tr>
<td>Appearance Evaluation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appearance Orientation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fitness/Health Evaluation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fitness/Health Orientation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of Physical Activity/ Exercise:</td>
<td>PAQ-Paffenbarger Modified Physical Activity Questionnaire</td>
<td>(Pereira et al., 1997) (Unick et al., 2010)</td>
<td>.58-.73*</td>
</tr>
<tr>
<td>Kilocalories per week</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Cronbach’s alpha not available. Data is for Pearson’s “r” and reflects test-retest reliability.

Table 3.2. Reliability and Validity of Measurement Instruments

**Self-Compassion Scale (SCS).**
The Self-Compassion scale was developed by Neff (2003a) to measure the construct of SC posited to be comprised of three components: self-kindness, mindfulness and common humanity. The 26-item scale includes six subscales that are totaled to yield a composite SC score, where higher scores indicate greater degrees of SC. Three subscales measure the three noted components of SC, while three additional scales
measure the negative aspect opposing each component: self-judgment, over-identification and isolation, respectively. Each of the six subscales have internal consistency reliability ranging from .75 - .81, and test-retest reliability ranging from .80-.93. Each item is scored on a Likert-type, 5-point scale from “1” (almost never) to “5” (almost always).

Validity of the SCS was first established in Neff’s (2003a) original studies based upon construct, convergent and divergent measures. Construct validity was supported in several ways. First, correlation between SC and a measure of social desirability was insignificant. Second, significant differences were found between high and low SC individuals and their respective degrees of compassion toward others. High SC individuals reported equal amounts of SC and compassion towards others, but low SC individuals directed more compassion towards others than the self. Equivalence between compassion for self and compassion for others is a central tenet of SC (Neff, 2003b).

Third, when undergraduates were compared to practicing Buddhists, total self-compassion scores (and each of the six sub-scale scores) were significantly higher for the Buddhists than they were for the undergraduates. Further, among the Buddhists, SC scores were significantly correlated with years of Buddhist practice.

Convergent and divergent validity were confirmed by testing SCS scores against measures of related constructs such as self-criticism, emotional intelligence, anxiety, neurotic perfectionism, anxiety, depression and life satisfaction. Significant but moderate correlations in the hypothesized direction were found for each, indicating support for a similar but unique construct.
Behavioral Regulation in Exercise Questionnaire-2 (BREQ-2).
Motivational regulation was measured using the Behavioral Regulation in Exercise Questionnaire-2 (BREQ-2). The original scale (BREQ) was developed by Mullan, Markland and Ingledew (1997) and was later modified as the BREQ-2 by Markland & Tobin (2004). The BREQ-2 includes 19 items that are scored on a Likert-type, 5-point scale from “0” (not true for me) to “4” (very true for me). Five subscales assess intrinsic regulation, identified regulation, introjected regulation, external regulation and amotivation. A Relative Autonomy Index (RAI) provides a weighted average of the subscales but will not be used in this study.

Body Appreciation Scale (BAS).
The Body Appreciation Scale measures the degree to which individuals have a positive concept or image of their body (Avalos, et al., 2005). It is a 13-item, unidimensional tool that assesses body image on a Likert-type scale from “1” (never) to “5” (always). The items consist of statements about one’s body and instructions are to indicate whether the item is “true” for the individual completing the survey. An example statement is “My feelings toward my body are positive, for the most part.”

Multidimensional Body-Self Relations Questionnaire (MBSRQ).
The MBSRQ is a 69-item scale, comprised of subscales that measure 10 dimensions of body image: appearance evaluation and orientation, fitness evaluation and orientation, health evaluation and orientation, illness orientation, body area satisfaction, overweight preoccupation and self-classified weight. Health and fitness orientation and
evaluation scales can be averaged to yield composite scores for Health/Fitness orientation and Health/Fitness evaluation. Other sub-scales cannot be combined (Cash, 2000). The first 57 items are likert-type and responses range from 1 – 5 indicating “definitely disagree” to “definitely agree,” respectively. Items 58 – 60 are likert-type and responses range from 1 – 5 indicating “never” to “very often,” respectively. Items 61 – 69 are likert-type and responses range from 1 – 5 indicating “very dissatisfied” to “very satisfied,” respectively.

Evaluation subscales indicate how the subject feels in regard to the aspect of body image being assessed, while orientation subscales reflect the degree to which the subject values that aspect of body image (T. A. Brown et al., 1990). For example appearance evaluation is a general measure of how an individual feels about their physical looks, or attractiveness. High scores indicate positive feelings while low scores indicate feelings of unattractiveness. Appearance orientation measures how much the subject is invested in physical appearance; high scores indicate a subject cares a great deal about how they look and that they take care in presenting the best appearance possible. Low scores indicate ambivalence about appearance and low effort expended to look good.

This study only used data collected for the following MBSRQ subscales: appearance evaluation and orientation, fitness evaluation and orientation, health evaluation and orientation. Examples of statements included in each of these subscales are as follows:

- Appearance evaluation: “I dislike my physique.”

- Appearance orientation: “It is important that I always look good.”
Fitness evaluation: “I am very well coordinated.”
Fitness orientation: “I try to be physically active.”
Health evaluation: “I am a physically healthy person.”
Health orientation: “I take my health for granted.”

Health and fitness orientation and evaluation scales will be averaged to yield composite scores for Health/Fitness orientation and Health/Fitness evaluation.

**Paffenbarger Modified Physical Activity Questionnaire (PAQ).**
The PAQ estimates total sport, leisure, and recreational energy expenditure (in kilocalories) per week based upon self-reported stair-climbing, walking, moderate sport/recreational activity and vigorous sport/recreational activity (Pereira, et al., 1997), modified by Unick, Jakicic, and Marcus, 2010. Increasing amounts of total kilocalories expended per week indicate greater levels of PA/Ex.

**Demographic variables.**
In addition to the five scales noted, demographic data will be collected and will include the following variables:

- Age
- Height (feet and inches) and weight (pounds) to allow calculation of BMI
- Race
- Ethnicity
- Education
- Marital Status
• Pre-, peri, or Menopause status (*Status is being collected as it will allow future analysis of variance in PA/Ex levels, exercise motivation and body image in menopausal women.*)

• Currently, which of the following statements best describes you?
  - I am not trying to change or maintain my weight
  - I am trying to lose weight
  - I am trying to gain weight
  - I am trying to maintain my present weight
  (*These perceptions about weight are being collected as they relate to body image and may provide supplementary information about actual body size versus perceived body size.*)

• How did you find out about this research study?

• Which state do you live in?

In addition, three open-ended questions will be posed to allow participants to indicate specific perceptions about PA/Ex in their own words:

1. What is your favorite form of physical activity or exercise?
2. If you could offer a fellow woman a word of advice about how to get and stay physically active it would be…
3. What is the most important thing you need to be physically active?

**Order of questionnaires.**

In determining the order of the questionnaires included in the survey, several factors were considered. First, Cash (2011) notes that if more than one factor is being assessed and/or if multiple measurement tools are used to assess the same construct, researchers must opt for a questionnaire order that will minimize reactivity and facilitate honest and accurate representations of self-reported data. In this research, the order of
surveying weight, exercise level, exercise motivation, and body image could have affected responses, and two questionnaires assessing body image should not be ordered consecutively. Based upon these considerations, questionnaires were ordered as follows:

- Partial Demographics (non-weight related)
- Self-compassion – SCS
- Body image – BAS
- Exercise level – PAQ
- Exercise Motivation – BREQ-2
- Body Image – MBSRQ
- Partial Demographics (weight-related)

In addition, each section was preceded by instructions appropriate to the individual questionnaire as dictated by the authors who created each tool. When each questionnaire was created in its on-line survey format, it was translated to appear as similar as possible to its original form in order to maintain consistency.

**Data scoring: Calculation of Variables**

**SCS items by subscale.**

Self-Kindness Items: 5, 12, 19, 23, 26

Self-Judgment Items: 1, 8, 11, 16, 21

Common Humanity Items: 3, 7, 10, 15

Isolation Items: 4, 13, 18, 25

Mindfulness Items: 9, 14, 17, 22

Over-identified Items: 2, 6, 20, 24
Subscale scores are calculated as the mean of noted items. Total self-compassion is calculated by reverse-scoring the negative subscales (self-judgment, isolation, and over-identification) and then computing a mean value for the six subscales. Alternatively, reverse-scored items can be subtracted and a constant of 6 is added for each reverse scored item as follows (Cash, 2000):

\[
\text{self-kindness/judgment} = (i5 + i12 + i19 + i23 + i26 - i1 - i8 - i11 - i16 - i21 + 30)/10
\]

Where “i” is an item number, 30 is the number of reverse scored items (5) times the constant (6), and 10 reflects the total number of items included in the scale.

The alternate method will be used to make these calculations during data analysis as it reflects a more efficient coding method.

**BREQ-2.**
Means for each of the subscales were calculated from the related items as follows (Markland & Tobin, 2004):

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amotivation</td>
<td>5 9 12 19</td>
</tr>
<tr>
<td>External regulation</td>
<td>1 6 11 16</td>
</tr>
<tr>
<td>Introjected regulation</td>
<td>2 7 13</td>
</tr>
<tr>
<td>Identified regulation</td>
<td>3 8 14 17</td>
</tr>
<tr>
<td>Intrinsic regulation</td>
<td>4 10 15 18</td>
</tr>
</tbody>
</table>

**BAS.**
Because the BAS measures a single construct without subscales, the only calculation made was to average the scores for the 13 items.
MBSRQ items by subscale.
APPEARANCE EVALUATION: 5 11 21 30 39 42* 48*

APPEARANCE ORIENTATION: 1 2 12 13 22 23* 31 32* 40* 41 49* 50

FITNESS EVALUATION: 24 33* 51

FITNESS ORIENTATION: 3 4 6* 14 15* 16* 25* 26 34* 35 43* 44 53

HEALTH EVALUATION: 7 17* 27 36* 45* 54

HEALTH ORIENTATION: 8 9 18 19 28* 29 38* 52

To calculate the subject score for each subscale, starred items are reverse-scored, after which a mean is calculated. Alternatively, reverse-scored items can be subtracted and a constant of 6 is added for each reverse scored item as follows (Cash, 2000):

Appearance evaluation subscales score = (i5 + i11 + i21 + i30 + i39 – i42 – i48 + 12)/7

Where “i” reflects an item number, 12 reflects the number of reverse scored items (2), times the constant (6), and 7 reflects the total number of items included in the subscale.

The alternate method was used to make these calculations during data analysis as it is a more efficient coding method.

PAQ.
Please see Appendix C for the worksheet that was utilized to calculate energy expenditure.
Variables and scales.

Note that in SEM any variable that is predicted by another variable is considered a dependent variable; independent variables are those not predicted by another variable (Schumacker & Lomax, 2010). As such, the following variables were treated as dependent: Body image, motivation for exercise, exercise level. Independent variables were: Age, BMI, and self-compassion. All variables were treated as continuous unless initial model estimation indicated this treatment was not valid based upon testing of normality or homoscedasticity of residuals.

Collection and Analysis of Data

An “Initial Review of Human Subjects Research” form was submitted to the Office of Responsible Research Practices requesting expedited review. The Ohio State University Institutional Review Board (IRB) approved collection of data on September 4, 2013 (See Appendices D, E and F for materials included in the IRB submission process).

Data were collected using the Qualtrics Research Suite. An on-line survey was developed that included the noted measurement tools and a demographic questionnaire. Recruited participants were able to access the survey via any internet connection. Analysis of the data collected was conducted through the Qualtrics Research Suite, Excel, LISREL and SPSS.

When all participants completed the on-line survey, data were reviewed for completeness, accuracy and viability. Outliers and missing data were reviewed, assessed and appropriately handled prior to data analysis. Initial data cleaning was done via
Qualtrics and Excel. Raw data were imported into SPSS and the PRELIS program of LISREL for further review and assessment prior to running SEM in LISREL.

**Handling outliers.**

An outlier is a piece of data, or a case that reflects an extreme value, or combination of values, in comparison to the mean, and/or, characteristics of other cases (King & Minium, 2008). In regard to this data analysis, we were concerned with outliers on key variables of interest. Consideration and handling of outliers is critical, prior to conducting data analysis because outliers can significantly affect the outcome of such analysis and may not be representative of the population under study. Also, depending upon the size of the sample and the extremity of the value, an outlier can bias both mean and standard deviation (Field, 2009).

Several steps should occur before making a decision to delete or retain an outlier (Hair et al., 2010):

1. Create a plan to detect outliers and then apply it consistently to the data.
2. Detect, review, understand, and categorize outliers.
3. Determine if each outlier will be retained or deleted.

Outliers can be detected using several methods, including frequency distributions, histograms, and statistical tests (Hair et al., 2010). Once detected, they should be categorized to assist in determining retention or deletion. Outliers can be categorized as errors (procedural or data processing), extraordinary events, or extraordinary
observations. Errors should be corrected or deleted as part of data cleaning. Extraordinary events and observations should be assessed in terms of the objectives of the research and whether they represent the defined population (Hair et al., 2010). If outliers are deleted when they truly reflect a small but significant part of the population, then generalizability of results is threatened. Contrarily, retaining extreme outliers may skew results to such a degree that statistical tests are no longer meaningful to the average population.

Finally, treatment of outliers may vary dependent upon the size of the sample. Hair et al., (2010) indicate outliers in small samples are more likely to affect results than those in large samples. When using standard deviation from the mean to detect outliers, the authors recommend ± 2.5 standard deviations with small samples and as much as ± 4 standard deviations for large samples. While large sample size is not specifically quantified in this section of the text, the authors describe samples of fewer than 80 subjects as small, and describe samples of greater than 400 – 500 subjects as large in other chapters of their text (Hair et al., 2010).

**Treatment of missing data.**
Based upon previous experience with survey data, a small percent (< 5%) of missing data was anticipated, and the following stipulations were applied. If missing data amount was low, cases with missing data would have been deleted listwise or pairwise, depending on number of surveys completed. If missing data percentage was between 5% and 10%, mean substitution would have been utilized. If missing data percentage was
greater than 10%, multiple imputation as described by McKnight, McKnight, Sidani and Figueredo would have been considered (2007).

**Data analysis.**
SEM analysis was conducted in five steps as described. A confirmatory factor analysis was done to assess factor loadings of the BAS versus the MBSRQ on body image and loadings of the BREQ-2 subscales on motivation, and which scales were appropriate to continue to the structural model. Path analysis was used to evaluate the fit of the model. It evaluated all pathways depicted in the diagrams shown previously.

The following criteria were utilized to evaluate fit of the model (Schumacker & Lomax, 2010):

- *RMSEA* should be < .05
- *SRMR* should be < .05
- *CFI* should be > .95

After the initial model was tested, modifications were considered based upon criteria previously noted, and revisions were tested until fit indices met the noted criteria, or suggested additional modifications were not supported by the literature.

**Assumptions.**
1. Data are assumed to be interval/ratio.
2. Sample size is assumed to be sufficient to observe effects noted and to draw appropriate conclusions.
3. Data is assumed to be normal unless indicated non-normal on model estimation. In this case, data transformation or robust statistics would be considered.

4. Data is considered to be free of homoscedasticity unless otherwise indicated.

5. Missing data is properly treated.

6. Data is assumed to be linearly related.

Limitations.
As noted in Chapter 1, cross-sectional designs can limit generalizability of results as they reflect a snapshot in time. In addition, correlational studies limit the ability of the research to determine the direction of the observed relationships.
Chapter 4 – Results

The purpose of this research study was to examine several correlates of exercise and how they impact exercise level in a population of middle-aged women. Specifically, the magnitude and direction of relationships among several personal variables and their correlation with physical activity/exercise (PA/Ex) level in middle-aged women was measured and assessed. These variables were: Self-compassion, body image, motivation for exercise, age, and body mass index (BMI).

Further, this study will add to the current research examining self-compassion and health-promoting behaviors, and help establish a basis for future research to test the efficacy of self-compassion as an intervention to increase PA/Ex among middle-aged women.

Primary research hypotheses were:

1. Body image is predicted by BMI and self-compassion.
2. Motivation for exercise is predicted by self-compassion and body image.
3. Exercise level is predicted by motivation for exercise, age and BMI.
4. BMI and age are positively correlated.

Secondary research hypotheses were:
1. Body image is a multi-dimensional construct. Specifically, in this population of middle-aged women, the following are dimensions of body image:
   a. Appearance evaluation
   b. Appearance orientation
   c. Health/Fitness evaluation
   d. Health/Fitness orientation
   e. Body appreciation

2. Motivation for exercise exists on a continuum from externally to internally-derived. In this population of middle-aged women, the following are functions of exercise motivation:
   a. Amotivation
   b. Extrinsic motivation
   c. Introjected motivation
   d. Identified motivation
   e. Intrinsic motivation

This chapter presents results of the research study and is organized in five sections as follows:

- Recruitment
- Treatment of Data
- Descriptive Statistics
Recruitment
Between September 12 and September 19, 2013, the ResearchMatch (RM) database was used to email recruitment information regarding this study to 13,072 women aged 35 to 60. Figure 4.1 depicts the format and content of the email. Between

![Email Content](image)

Figure 4.1. ResearchMatch Recruitment Email.
September 13 and September 30, 2,546 (19.5%) individuals selected the “Yes, I’m interested” button, which put their contact information in a RM dashboard queue only accessible to the study co-investigator.

On September 13, information for the first group of potential participants was downloaded from the queue to an Excel worksheet, saved in “comma-separated value” format, and uploaded to Qualtrics. From Qualtrics, this group was emailed a link to the survey, using the following email template:

“Thank you for being a part of RM and for your interest in taking my survey regarding ‘Exercise & Physical Activity in Women: The Role of Self-Compassion.’ Please follow this link to the Survey: XXXXX. You will be asked to read a consent form, click to indicate consent and then continue to take the survey. At the end you will have the opportunity to enroll in the gift card drawing and register to receive results of the survey! If you have any questions, or need assistance, please contact me at: [study co-investigator email address].”

As indicated, recruitment was a two-step process: In the first phase, participants responded to an anonymous email generated through the RM database, indicating they were interested in taking the survey; in the second phase, participants followed a link to the survey and chose to complete it.

Table 4.1 details the dates on which contact information for the 2,546 first-phase responders was downloaded from the RM dashboard queue.


<table>
<thead>
<tr>
<th>Date</th>
<th>New Responders</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 13</td>
<td>1,404</td>
</tr>
<tr>
<td>September 16</td>
<td>242</td>
</tr>
<tr>
<td>September 18</td>
<td>46</td>
</tr>
<tr>
<td>September 19</td>
<td>672</td>
</tr>
<tr>
<td>September 20</td>
<td>71</td>
</tr>
<tr>
<td>September 23</td>
<td>58</td>
</tr>
<tr>
<td>September 25</td>
<td>31</td>
</tr>
<tr>
<td>September 27</td>
<td>20</td>
</tr>
<tr>
<td>September 30</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 4.1. ResearchMatch Recruitment Responses by Date

Of these 2,546 first-phase responders, 1,303 second-phase responders (10% of available RM members, 51% of first-phase responders) followed the link to the survey and completed it between September 13 and October 4, 2013. Of the second-phase responders, 77% took the survey in the first week, 19% took it in the second week, and 4% took it over the last 10 days.

The Qualtrics system recorded all start and end times for the surveys taken. The mean survey duration of 66 minutes is not reflective of actual time spent taking the survey because the system allowed participants to take the survey in multiple sessions over several days. After excluding all surveys of greater than 90 minutes and less than 5 minutes (75 surveys, 5.8%), the mean survey duration time was 26 minutes.

ResearchMatch requires investigators who use their database for recruitment to update the RM dashboard queue to indicate status of first-phase responders. The co-investigator updated the queue twice; first to indicate the email with the survey link was sent, second to indicate a survey was completed. Because the survey itself was anonymous, contact information was not available on participants who did not elect to
enroll in the gift card drawing or register to receive study results. It was only possible to update the RM queue for second-phase responders who elected to participate in the gift card drawing, or signed up to receive study results.

The survey and enrollment for gift card drawing/study results were officially closed on October 4, 2013. Of the 1,303 participants, 1,178 enrolled in the gift card drawing. On October 24, 1,174 participants who did not win a gift card were sent an email thanking them for their participation in the research study and informing them that they did not win a gift card. They were also sent an attached file indicating how winners were selected. Please refer to Appendix G for a summary of gift card drawing methods and the correspondence sent to participants.

The four winners of $25 gift cards were separately contacted by email and asked to provide a mailing address to receive their rewards. Cards were purchased at a local store and mailed via U.S. postal service (priority mail with insurance) to winners on October 30. Participants were asked to email the co-investigator when they received their gift card. By November 6, all four winners had replied by email indicating they were in receipt of their gift cards.

**Treatment of Data**

**Data handling.**

All raw data were downloaded from Qualtrics to Excel (Microsoft® Excel® 2013) for review prior to uploading to SPSS for analysis. A comprehensive Excel workbook was used to organize the raw data, summarize coding, and document key
variable calculations to be made within SPSS. This workbook included several tabbed worksheets:

- **Data Dump** – Complete set of raw data downloaded directly from Qualtrics, no alterations made.
- **Data Edit** – Data Dump edited for information not reflective of participant responses (instructions, question numbers, etc.)
- **Code General** – Each column of data from the Data Edit worksheet was documented for Qualtrics code, question number, type of data collected and scale of appropriate responses, if applicable.
- **Code by Questionnaire** – A worksheet for each questionnaire was created to describe how items would be consolidated in SPSS to calculate key variables to be analyzed using SPSS and LISREL.

Raw data from the Data Edit worksheet were uploaded to SPSS (IBM® SPSS® Statistics Version 21) for data analysis. The following 13 key variables were created from the raw data based upon formulas noted in the Methods chapter under Data Scoring and further documented in the Excel file noted above: Self-compassion, Body Appreciation, Appearance Evaluation, Appearance Orientation, Health/Fitness Evaluation, Health/Fitness Orientation, Exercise Motivation – Amotivation, Exercise Motivation-Extrinsic, Exercise Motivation-Introjected, Exercise Motivation-Identified, Exercise Motivation-Intrinsic, BMI, and PA/Ex Kcals expended per week. The 14th key variable, age, did not require calculations.
In completing calculations for PA/Ex Kcals expended per week, all blank fields for days and minutes of moderate and vigorous exercise were recoded as zeroes. This is necessary within SPSS as blank fields result in errors when encountered during computation of a new variable. Blank answers for number of days and minutes of moderate and vigorous exercise were interpreted as zero values as there was no indication that they should be interpreted as a refusal to answer the question, or that there was a technical problem with the questionnaire. The principal investigator and the co-investigator agreed on this interpretation, and values were recoded accordingly.

**Data cleaning.**
All key variable calculations made in SPSS were validated in Excel. This was done by downloading the first 20 cases from the SPSS file and comparing values for each key variable as calculated in SPSS versus Excel. Appropriate formulas were created in Excel and key variables were calculated. Key variable values as calculated in Excel were subtracted from those calculated in SPSS. A resulting value of zero indicated calculations in SPSS were valid. All calculations returned zero value; SPSS key variables were considered accurate and ready for further analysis.

**Missing values.**
As recommended by McKnight et al., (2007), data for the 1,303 participants were evaluated to determine classification of missing values, as well as the cause, dimensions and amount/pattern of missing data. Evaluation of the missing data was restricted to the
114 survey items that were components of the 14 key variables from which hypotheses were to be tested. Table 4.2 delineates these items:

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Number of Items</th>
<th>Key Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td>4</td>
<td>Age, Race, Height, Weight</td>
</tr>
<tr>
<td>Self-compassion Survey</td>
<td>26</td>
<td>Self-compassion</td>
</tr>
<tr>
<td>Body Appreciation Survey</td>
<td>13</td>
<td>Body Appreciation</td>
</tr>
<tr>
<td>Paffenbarger PAQ</td>
<td>3</td>
<td>PA/Ex Kcals expended per week</td>
</tr>
<tr>
<td>Behavioral Regulations in Exercise Questionnaire</td>
<td>19</td>
<td>Amotivation, Extrinsic, Introjected, Identified, and Intrinsic Motivation</td>
</tr>
<tr>
<td>Multidimensional Body-Self Relations Questionnaire</td>
<td>49</td>
<td>Appearance Evaluation and Orientation, Health/Fitness Evaluation and Orientation</td>
</tr>
</tbody>
</table>

Table 4.2. Survey Items Included in Missing Value Analysis

Missing values can be classified as Missing Completely at Random (MCAR), Missing at Random (MAR), or Missing Not at Random (MNAR) (McKnight et al., 2007). This classification system provides information regarding the probable level of bias the missing values would have upon the statistical analysis to be conducted, with MCAR reflecting negligible bias, and MNAR reflecting potentially damaging bias. Little’s MCAR test was performed on the present dataset to determine if missing values could be considered of statistically negligible bias (Little, 1988). Results indicated very little likelihood that missing values were anything other than MCAR ($p = .066$, chi-square = 2917.62, $df = 2804$).

Per McKnight et al., (2007) further review of the missing values was also done to describe the reasons for missing values and their dimension and distribution throughout the dataset. Of the 1,303 cases of data, 64, or 5%, included at least one missing value.
item. Of these 64 incomplete cases, 10 were actually non-participants; they followed the link to the survey and selected “I do not want to participate.” This option was offered after reading the consent form. Also, one male was inadvertently recruited, chose to follow the survey link, identified his gender as male, and was directed out of the survey. Finally, one participant chose not to complete three of the instruments included in the survey. When removing these 12 cases, the remaining number of cases with missing values to be analyzed was 52, or 4%.

The next step was to review the 52 cases to determine if missing data appeared to have a pattern. A detailed missing values analysis was run in SPSS to show which of the 114 survey items were missing for each of these cases. The output of such an analysis is a matrix with cases listed vertically and missing survey items listed horizontally. Missing values are highlighted by a symbol. This matrix was enhanced with color for ease of review when scaled down to page size. A black and white copy is included in Appendix H. This missing values pattern analysis indicated a clear grouping of 24 participants who did not complete items 1-57 of the MBSRQ.

In order to determine why such a high percentage of missing values occurred on the MBSRQ, the survey was reviewed in total, and by individual questionnaire. The MBSRQ differed from the other questionnaires in a few ways. It was the last instrument in the survey and all 57 items were listed on one long survey page. In order to complete it, participants scrolled down through the page. It became clear that the length of this instrument at the end of the survey might have deterred participants from completing these items. The remaining 28 cases with missing values (2%) did not have a clear
pattern and were considered miscellaneous; no specific cause for the missing data could be identified.

The dimensions of missing data refers to three aspects of data that describe it and help provide perspective on its impact: cases, variables or items, and measurements or occasions (McKnight et al., 2007). Because measurements were made on only one occasion, only cases and variables were assessed. Of the 52 participants with missing data, the percent of missing data on the 114 survey items ranged from .7% to 63%. Of the 28 cases of miscellaneous missing data, 27 of the cases were missing .7% to 2.2% of the 114 items. Again, reviewing the missing data from this perspective indicates the largest and only identifiable grouping of missing data occurred on the longest instrument included in the survey, the MBSRQ.

In terms of the second dimension, or the items on which missing data occurred, there were missing values on each of the 114 survey items under review. Leaving aside cases reflecting individuals who did not actually take the survey, and those who did not complete the MBSRQ, 9 of the 114 items were missing data (1 item from the BREQ, 2 items from the BAS, 2 items from the SCS, 3 items from the PAQ, and the race demographic item). Of these 9 items, only one was missing data for more than a few cases. Number of walk minutes on the PAQ was missing data for 15 cases. It is possible that because this item requires a participant to type in a number, these missing values may have been intended as zeroes, but because this occurred in less than 1% of the cases, it did not appear to have a significant impact on the data.
Key factors in determining the handling of missing values were the non-significance of Little’s MCAR test, the low percentage of actual missing data (4%), and no obvious pattern of missing data that would appear to skew results. Further, because the number of participants who completed the survey far exceeded expectations and requirements for adequate power to complete the intended data analysis, all cases with missing values were removed listwise from further analysis. It was not necessary to replace missing values using mean substitution, or to consider multiple imputation methods as discussed in Chapter 3. Deleting cases that include missing values listwise yielded a complete dataset of 1,239 cases.

*Data errors.*
The dataset was then analyzed to confirm that all values for each of the 114 survey items were within anticipated range and did not exhibit any other peculiarities. This analysis revealed 24 cases with data errors. These errors occurred primarily on one question from the PAQ, the number of walk days per week. Participants typed in a number greater than 7, which is not possible, and not correctable. Again, because of the large sample, these cases with identified errors were removed from further review.

*Outliers.*
At this time, the 1,215 complete and clean cases remaining in the dataset were reviewed for outliers. Each key variable was reviewed for the presence of outliers using frequency distribution and histogram. The majority of variables were measured using a Likert-type scale, which results in decreased likelihood of outlier data. Further, because
sample size was large, outliers were less likely to skew the mean, and statistical criterion was set at ± 4 standard deviation for variables not measured on a Likert-type scale (Hair et al., 2010). Outliers were detected for two variables: PA/Ex Kcals expended per week and BMI.

There were 11 Kcal outliers; these participants exhibited physical activity levels greater than four standard deviations above the mean. A detailed review of their responses to individual PAQ items was conducted. The highest outlier had included one inappropriate activity; the data were corrected accordingly. The participant with the second highest Kcals indicated activity levels inconsistent with the population being studied. This participant’s data were removed from the dataset. The remaining nine outliers were retained as extraordinary observations, but still reflective of an element of the population under study.

There were two BMI outliers; these participants had BMI greater than 4 standard deviations above the mean. These participants’ surveys were reviewed in detail to determine if they were representative of an element of the population. The participant with the highest BMI responded to the PAQ and the MBSRQ with inconsistent answers and it was determined that the exercise levels indicated were not plausible. Data for this participant were deleted. The second participant was retained as an extraordinary observation, but still reflective of an element of the population under study.

**Final dataset.**
The remaining 1,213 complete, clean cases, outliers removed, were divided into 2 groups based upon race. As noted there is evidence that African American women may
experience body image differently than other racial groups (Franko & Roehrig, 2011). This sample included 91 African American women, which was not sufficient to power the SEM analysis described in Chapter 3. In order to allow for the possibility that this group of women may reflect differential results from the rest of the sample, an analysis was performed in two parts. The first analysis will be conducted on the 1,122 non-African American cases, and the second analysis will be conducted on the full 1,213 cases. Results will then be compared between the two analyses to determine if significant differences exist. If they do, they may be attributed to racial differences in the variables under study. Based upon time constraints and the focus of this dissertation study, further results and discussion in this document will be limited to the first analysis.

Figure 4.2 illustrates the flow of data through the data cleaning process.

Figure 4.2. Flow Diagram of Participants from Recruitment through Data Cleaning
Testing assumptions.

Normality.
In SEM, the primary assumption to be tested is normality (Schumacker & Lomax, 2010). Normality means that the data are distributed in a way that approximates a normal, or bell curve. There are several methods of evaluating normality of data, including the use of frequency distributions, histograms, and statistical tests. When datasets are large \((N > 200)\), statistical tests for normality, such as Shapiro-Wilk and Kolmogorov-Smirnov, are highly sensitive, and, may not reflect the true significance of deviations from a normally-distributed population (Field, 2009; Hair et al., 2010).

Because the dataset under analysis here is quite large, we followed the recommendation to evaluate normality of large datasets by reviewing frequency distributions and histograms (Field, 2009). In addition, SEM analysis is robust to skewness and kurtosis values of \(\pm 1.5\). Beyond these values, data transformations can be considered, along with the use of supplementary statistical tests that are robust to non-normally distributed data. (Schumacker & Lomax, 2010).

Data were reviewed for normality by key variable. Table 4.3 details skewness and kurtosis values for each key variable.
<table>
<thead>
<tr>
<th>Key Variable</th>
<th>Skewness Statistic</th>
<th>Kurtosis Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.08</td>
<td>1.22</td>
</tr>
<tr>
<td>Self-Compassion</td>
<td>0.05</td>
<td>-0.63</td>
</tr>
<tr>
<td>Body Appreciation</td>
<td>0.26</td>
<td>-0.69</td>
</tr>
<tr>
<td>Appearance Evaluation</td>
<td>0.21</td>
<td>0.88</td>
</tr>
<tr>
<td>Appearance Orientation</td>
<td>0.10</td>
<td>0.22</td>
</tr>
<tr>
<td>Health/Fitness Evaluation</td>
<td>0.34</td>
<td>0.27</td>
</tr>
<tr>
<td>Health/Fitness Orientation</td>
<td>0.15</td>
<td>-0.60</td>
</tr>
<tr>
<td>Amotivation</td>
<td>2.69*</td>
<td>7.54*</td>
</tr>
<tr>
<td>Extrinsic Motivation</td>
<td>1.90*</td>
<td>4.06*</td>
</tr>
<tr>
<td>Introjected Motivation</td>
<td>0.47</td>
<td>0.67</td>
</tr>
<tr>
<td>Identified Motivation</td>
<td>0.50</td>
<td>0.83</td>
</tr>
<tr>
<td>Intrinsic Motivation</td>
<td>0.11</td>
<td>1.22</td>
</tr>
<tr>
<td>BMI</td>
<td>1.09</td>
<td>1.13</td>
</tr>
<tr>
<td>Ex/PA Kcals/wk</td>
<td>2.34*</td>
<td>8.18*</td>
</tr>
</tbody>
</table>

*Asterisks indicate statistics outside the acceptable range.

Table 4.3. Skewness and Kurtosis Statistics.

Amotivation, extrinsic motivation and PA/Ex Kcals/wk were all positively and leptokurtically skewed > the 1.5 acceptable positive limit. Histograms depicting these distributions are presented in Figures 4.3 – 4.5.
Figure 4.3. Frequency Distribution of PA/Ex Kcals per Week

Figure 4.4. Frequency Distribution of Amotivation.
Log and power transformations were considered for each of the three variables (Gelman & Hoff, 2007; Tukey, 1957). Based upon review of histograms, and skewness and kurtosis statistics, square-root transformation was selected for extrinsic motivation, while quarter-root transformation was selected for amotivation and PA/Ex Kcals/wk. After transformation, skewness and kurtosis statistics for amotivation, extrinsic motivation and PA/Ex Kcals/wk were 1.2 and -.34, .53 and -.76, and -51 and .74, respectively. These transformed values were within ± 1.5 and data for these variables were considered acceptable to proceed with data analysis using them.
**Linearity.**
A second assumption that must be satisfied within SEM is linearity. Linearity requires that bivariate relationships that exist between variables are linear (Schumacker & Lomax, 2010). The most common non-linear relationship is curvilinear. When graphed as a scatterplot, a bivariate linear relationship would show dots grouped together along a linear trend, while in a curvilinear relationship the dots would appear to be grouping around a curved shape. Figure 4.6 illustrates the difference between linear and curvilinear bivariate relationships.

![Figure 4.6. Scatterplots of Linear & Curvilinear Bivariate Relationships](image)

Scatterplots were created for bivariate relationships between the key variables with hypothesized relationships as follows (number of plots is shown in parentheses):

- PA/Ex Kcals per week x BMI (1)
- PA/Ex Kcals per week x Age (1)
- PA/Ex Kcals per week x Each Type of Exercise Motivation (5)
• BMI x Body Image (5)
• Self-compassion x Body Image (5)
• Self-compassion x Type of Exercise Motivation (5)
• Each measure of Body Image x Type of Exercise Motivation (25)

The 47 resulting scatterplots were reviewed for any indication of non-linear relationships between each pair of variables; none were noted.

**Tests of Reliability.**
Cronbach’s α tests of internal consistency reliability were run for relevant key variables and results are noted in Table 4.4. Values ranged from .74 to .95, with the majority distributed between .85 and .95. Values above .7 are generally considered to reflect acceptable levels of reliability, while values above .8 reflect good reliability (Field, 2009; Vogt, 2005). Cronbach’s α cannot be calculated for the PAQ. The individual items on the PAQ which provide the data from which PA/Ex Kcals/wk is calculated cannot be tested in this manner because each item reflects a unique component of the calculation (Field, 2009). Test-retest reliability cannot be conducted as data were only collected at one time point.
Descriptive Statistics

<table>
<thead>
<tr>
<th>Key Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>47.59</td>
<td>7.54</td>
<td>N/A</td>
</tr>
<tr>
<td>Self-Compassion</td>
<td>3.19</td>
<td>.75</td>
<td>.91</td>
</tr>
<tr>
<td>Body Appreciation</td>
<td>3.35</td>
<td>.77</td>
<td>.92</td>
</tr>
<tr>
<td>Appearance Evaluation</td>
<td>2.95</td>
<td>.96</td>
<td>.91</td>
</tr>
<tr>
<td>Appearance Orientation</td>
<td>3.25</td>
<td>.71</td>
<td>.88</td>
</tr>
<tr>
<td>Health/Fitness Evaluation</td>
<td>3.42</td>
<td>.78</td>
<td>.84</td>
</tr>
<tr>
<td>Health/Fitness Orientation</td>
<td>3.37</td>
<td>.73</td>
<td>.92</td>
</tr>
<tr>
<td>Amotivation(^1)</td>
<td>0.27</td>
<td>.45</td>
<td>.88</td>
</tr>
<tr>
<td>Extrinsic Motivation(^2)</td>
<td>0.50</td>
<td>.50</td>
<td>.74</td>
</tr>
<tr>
<td>Introjected Motivation</td>
<td>1.60</td>
<td>1.13</td>
<td>.79</td>
</tr>
<tr>
<td>Identified Motivation</td>
<td>2.68</td>
<td>1.07</td>
<td>.85</td>
</tr>
<tr>
<td>Intrinsic Motivation</td>
<td>2.10</td>
<td>1.30</td>
<td>.95</td>
</tr>
<tr>
<td>BMI</td>
<td>28.32</td>
<td>7.28</td>
<td>N/A</td>
</tr>
<tr>
<td>PA/Ex Kcals/wk(^3)</td>
<td>5.86</td>
<td>1.92</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Note. (N = 1,122). SD = Standard Deviation. This table includes transformed mean and SD values for amotivation, extrinsic motivation and PA/Ex Kcals/wk. \(^1\)Untransformed mean for amotivation=0.33. \(^2\)Untransformed mean for extrinsic motivation=0.5. \(^3\)Untransformed mean for PA/Ex Kcals/wk = 1,908.

Table 4.4. Sample Descriptive Statistics for Key Variables

Demographic variables.
The original sample of 1,303 participants included 94 (7.2%) African American woman. The final sample of 1,122 participants was predominantly white (N=1,075), but included the following participants by racial group: American Indian/Alaskan Native=6, Hawaiian/Pacific Islander=1, Asian=14, Multi-Racial=19, and Other=7.

Of the 1,122 cases included in the final analysis, 1,121 completed the demographic question regarding state of residence. States with the highest participation rates are noted in Table 4.5.
<table>
<thead>
<tr>
<th>State</th>
<th>No. of Cases</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>38</td>
<td>3.4</td>
</tr>
<tr>
<td>Arkansas</td>
<td>25</td>
<td>2.2</td>
</tr>
<tr>
<td>California</td>
<td>53</td>
<td>4.7</td>
</tr>
<tr>
<td>Colorado</td>
<td>22</td>
<td>2.0</td>
</tr>
<tr>
<td>Georgia</td>
<td>27</td>
<td>2.4</td>
</tr>
<tr>
<td>Florida</td>
<td>21</td>
<td>1.9</td>
</tr>
<tr>
<td>Illinois</td>
<td>37</td>
<td>3.3</td>
</tr>
<tr>
<td>Iowa</td>
<td>72</td>
<td>6.4</td>
</tr>
<tr>
<td>Maryland</td>
<td>35</td>
<td>3.1</td>
</tr>
<tr>
<td>Minnesota</td>
<td>73</td>
<td>6.5</td>
</tr>
<tr>
<td>Missouri</td>
<td>39</td>
<td>3.5</td>
</tr>
<tr>
<td>New York</td>
<td>59</td>
<td>5.3</td>
</tr>
<tr>
<td>North Carolina</td>
<td>36</td>
<td>3.2</td>
</tr>
<tr>
<td>Ohio</td>
<td>176</td>
<td>15.7</td>
</tr>
<tr>
<td>Oregon</td>
<td>35</td>
<td>3.1</td>
</tr>
<tr>
<td>Tennessee</td>
<td>91</td>
<td>8.1</td>
</tr>
<tr>
<td>Texas</td>
<td>64</td>
<td>5.7</td>
</tr>
<tr>
<td>Virginia</td>
<td>26</td>
<td>2.3</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>21</td>
<td>1.9</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>171</td>
<td>15.3</td>
</tr>
</tbody>
</table>

Table 4.5. Participants by State of Residence ($N = 1,122$)
The women who participated in this study were highly educated. Thirty-five percent held graduate degrees, 39% held undergraduate degrees, 7% held professional degrees, and another 15% had some college experience. They were predominantly married (62%) or divorced (20%), and trying to lose (65%) or maintain (22%) weight. Only 12% indicated they did not focus on their weight. In terms of menopausal status, 39% of the women were pre-menopausal, 22% were perimenopausal, and 39% were menopausal. The average age of women in the pre-, peri, and menopausal groups was 41, 48, and 54, respectively.

As noted in Table 4.4, the mean age of women in the study was 48. Further inspection of Table 4.6 indicates the distribution between the ages of 35 and 60 was fairly flat throughout the range. Further, 54% of the women were in the upper half of the age range (48-60 years old), and 46% were in the lower half (35-47 years old).

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>35-39</td>
<td>225</td>
<td>20</td>
</tr>
<tr>
<td>40-44</td>
<td>201</td>
<td>18</td>
</tr>
<tr>
<td>45-49</td>
<td>196</td>
<td>18</td>
</tr>
<tr>
<td>50-54</td>
<td>239</td>
<td>21</td>
</tr>
<tr>
<td>55-60</td>
<td>261</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 4.6. Sample Distribution by Age Group

As noted in Table 4.4, the average sample BMI was 28. BMI is delineated further in Table 4.7, which shows that 59% of the women in the sample were overweight or obese, with 34% classified as obese (class 1, 2, or 3). In comparison, 65% of the women
indicated they were trying to lose weight, 6% higher than the 59% of women classified as overweight or obese.

<table>
<thead>
<tr>
<th>BMI Category</th>
<th>BMI Value</th>
<th>Percent</th>
<th>Overweight &amp; Obese Cum %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5</td>
<td>1.6</td>
<td>-</td>
</tr>
<tr>
<td>Healthy Weight</td>
<td>18.5-24.9</td>
<td>39.5</td>
<td>-</td>
</tr>
<tr>
<td>Overweight</td>
<td>25-29.9</td>
<td>25.3</td>
<td>25.3</td>
</tr>
<tr>
<td>Obesity Class 1</td>
<td>30-34.9</td>
<td>16.2</td>
<td>41.5</td>
</tr>
<tr>
<td>Obesity Class 2</td>
<td>35-39.9</td>
<td>8.9</td>
<td>50.4</td>
</tr>
<tr>
<td>Obesity Class 3</td>
<td>&gt;40</td>
<td>8.5</td>
<td>58.9</td>
</tr>
</tbody>
</table>

Note. BMI classification is adapted from (CDC, 2014) and (US National Library of Medicine NIH, 2014).

Table 4.7. Sample Distribution by BMI Class

**Key variables.**

**Exercise level.**

As noted previously, exercise level, as reflected by PA/Ex Kcals expended per week was skewed and kurtotic (See Figure 4.3). More than 10% of the women in this sample were inactive, expending less than 150 Kcals per week in PA/Ex. Contrarily, more than 10% were highly active, expending greater than 4,000 Kcals per week in PA/Ex. With this type of distribution it is common to analyze a trimmed mean to gain greater understanding of a variables central tendency (Vogt, 2005). The 80% trimmed mean (10% trimmed from each end of the distribution) yields the following statistics: $N=899$, mean $= 1,558$, skewness $= 0.658$ and kurtosis $= -0.617$. This grouping of the central 80% of the sample is less skewed and kurtotic (within ± 1.5 range) and ranges from 134 PA/Ex Kcals/wk to 4,330 PA/Ex Kcals/wk, a much more compressed range.
Body image measures.
All body image scales used a Likert-type measurement, ranging from 1-5, where 1 reflected less of, or the negative side of the variable being measured, while 5 reflected more of, or the positive aspect of the variable. Body appreciation, the only aspect of body image measured using the Body Appreciation Scale, had a mean value of 3.19, indicating the women in this sample were “sometimes” to “often” appreciative of their bodies. Appearance evaluation, measured on the MBSRQ, had a mean value of 2.95, indicating that on the average, the women “neither agreed nor disagreed” with a positive evaluation of their appearance. Also, a mean value of 3.25 on appearance orientation (MBSRQ) indicated they fell between “neither agreed nor disagreed” and “mostly agreed” when asked about how invested they were in their appearance.

Mean scores for health/fitness evaluation and health/fitness orientation were higher than those for appearance, at $M=3.42$ and $M=3.37$, respectively. This indicates they had a more positive evaluation of their health and fitness status than their appearance, falling more in between “neither agreed nor disagreed” and “mostly agreed” when responding to positive statements about the status of their health and fitness. Also, they were fairly similarly invested in appearance ($M=3.25$) and health/fitness ($M=3.37$).

Exercise motivation measures.
Types of exercise motivation were measured using the BREQ, a Likert-type scale, ranging from 0-4, where 0 reflected less of the type of motivation being measured, while 4 reflected more of the type of motivation. Mean scores on the five types of motivation indicated this sample of women had higher levels of internally-regulated motivation and
lower levels of externally-regulated motivation. The mean score for amotivation of 0.27 indicates statements consistent with a total lack of interest in exercise were generally “not true” for this sample. Similarly, the extrinsic motivation score ($M=0.5$) indicated a lack of motivation for exercise due to external pressure. Introjected motivation had a mean score of 1.6 indicating that for this sample of women it is “sometimes true” that they experience motivation for exercise due to guilt or shame. The identified motivation mean score of 2.68 was the highest of the five types and falls in the lower half of the range between 2 “sometimes true” and 4 “very true,” indicating a motivation to exercise to meet personal values or needs. Finally, in this sample of women, the mean score of 2.1 for intrinsic motivation indicated it was “sometimes true” that they were motivated to exercise for the enjoyment of the activity itself.

The SCS, used to measure self-compassion in this study, is also a Likert-type scale, ranging from 1-5, where 1 reflected less self-compassion displayed in difficult times, while 5 reflected more self-compassion. Unlike other Likert-type scales used in this study, the SCS only assigns verbal cues to the numbers “1” and “5”; no wording is associated with the numbers in between. The mean self-compassion score in this sample was 3.19, just over the midpoint of the range between “1=Almost Never” and “5=Almost Always.” This may be interpreted to mean that the women in this study sometimes acted compassionately toward themselves when experiencing difficult times.

**Bivariate correlations.**
Pearson Product Moment Correlations (“$r$”) for all key variables are included in Table 4.8. The largest correlations are between 0.65 and 0.81 as follows:
• Appearance Evaluation – Body Appreciation, $r = .81$

• Intrinsic Motivation – Identified Motivation, $r = .77$

• Health/Fitness Orientation – Identified Motivation, $r = .77$

• Health/Fitness Orientation – Intrinsic Motivation, $r = .74$

• Self-compassion – Body Appreciation, $r = .65$

• Exercise Level – Health/Fitness Orientation, $r = .65$
<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>-</td>
</tr>
<tr>
<td>Self-Compassion</td>
<td>0.18</td>
</tr>
<tr>
<td>Body</td>
<td></td>
</tr>
<tr>
<td>Body Appreciation</td>
<td>0.09</td>
</tr>
<tr>
<td>Amotivation</td>
<td>-0.03*</td>
</tr>
<tr>
<td>Extrinsic Motivation</td>
<td>-0.02*</td>
</tr>
<tr>
<td>Introjected Motivation</td>
<td>-0.11</td>
</tr>
<tr>
<td>Identified Motivation</td>
<td>0.02*</td>
</tr>
<tr>
<td>Intrinsic Motivation</td>
<td>0.00*</td>
</tr>
<tr>
<td>Appearance Evaluation</td>
<td>-0.02*</td>
</tr>
<tr>
<td>Appearance Orientation</td>
<td>0.04*</td>
</tr>
<tr>
<td>Health/Fitness Evaluation</td>
<td>0.01*</td>
</tr>
<tr>
<td>Health/Fitness Orientation</td>
<td>0.06**</td>
</tr>
<tr>
<td>BMI</td>
<td>0.02*</td>
</tr>
<tr>
<td>Exercise Level</td>
<td>0.00*</td>
</tr>
</tbody>
</table>

Note. N=1,122. *Not significant. **Significant at the .05 level, 2-tailed. All other correlations significant at the .01 level. All correlations were calculated using transformed variables where applicable.

Table 4.8. Pearson's Correlation Coefficients for Bivariate Correlations of Key Variables
Structural Equation Modeling Results

Final sample data (N=1,122) for the 14 key variables calculated within SPSS were downloaded to an Excel spreadsheet and uploaded to LISREL (Student Version 9.1) for SEM analysis. The only changes made to the dataset within LISREL were to delete case number (LISREL treats all data fields as variables to be analyzed) and rename certain variables per naming conventions required within the software. The sample covariance matrix produced from the raw data and used as the basis for all modeling is detailed in Table 4.9. Variable variances are on the diagonal; bivariate covariances are off diagonal.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample Covariance Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>56.8</td>
</tr>
<tr>
<td>Self-Compassion</td>
<td>1.03</td>
</tr>
<tr>
<td>Body</td>
<td></td>
</tr>
<tr>
<td>Appreciation</td>
<td>0.52</td>
</tr>
<tr>
<td>Amotivation</td>
<td>-0.09</td>
</tr>
<tr>
<td>Extrinsic Motivation</td>
<td>-0.09</td>
</tr>
<tr>
<td>Introjected Motivation</td>
<td>-0.97</td>
</tr>
<tr>
<td>Identified Motivation</td>
<td>0.18</td>
</tr>
<tr>
<td>Intrinsic Motivation</td>
<td>-0.02</td>
</tr>
<tr>
<td>Appearance Evaluation</td>
<td>-0.11</td>
</tr>
<tr>
<td>Appearance Orientation</td>
<td>0.19</td>
</tr>
<tr>
<td>Health/Fitness Evaluation</td>
<td>0.04</td>
</tr>
<tr>
<td>Health/Fitness Orientation</td>
<td>0.34</td>
</tr>
<tr>
<td>BMI</td>
<td>1.18</td>
</tr>
<tr>
<td>Exercise Level</td>
<td>-0.01</td>
</tr>
</tbody>
</table>

Note. N=1,122. For any two variables, covariance divided by square root of product of variables variances will yield bivariate correlation found in Table 4.8.
SEM analyses are commonly conducted in five steps; model specification and identification occur prior to data collection and model estimation, testing, and modification occur after data collection (Schumacker & Lomax, 2010). As recommended by Schumacker and Lomax (2010), the measurement model was estimated, tested, and modified, prior to beginning the same three-step process for the structural model. For this SEM analysis, Maximum Likelihood Estimation was used as the basis to estimate parameters in both the measurement model and the structural model. This is the default estimator in LISREL and is recommended for interval and ordinal data with slight to moderate nonnormality (Schumacker & Lomax, 2010). LISREL also includes a variable scale default. Variables with greater than 15 categories are scaled as continuous, and variables with fewer than 15 categories are scaled as ordinal. The default scaling set as continuous was used for all key variables.

**Measurement model.** Model identification is the process of determining the number of parameters to be estimated and the remaining degrees of freedom. Because the original specified model is rarely the final model, identification typically occurs several times during the modeling process. Model identification for original and final measurement models is shown in Table 4.10. Note that one factor loading was set to zero for each latent variable, providing a basis of comparison between the observed variables used to measure the latent variables, and allowing for a unique solution to parameter estimation (Schumacker & Lomax, 2010).
The original and final models had degrees of freedom of 20 and 11, respectively. Both were over-identified (the number of values in S exceeded the number of parameters to be estimated), which allowed the SEM analysis to function properly and estimate a unique set of parameters. The decrease in degrees of freedom from the original to the final model primarily reflects the removal of two observed variables from the model.

The hypothesized measurement model was a reflection of the secondary research hypotheses. In SEM terms, the measurement model functions as a Confirmatory Factor Analysis (CFA) when multiple measurements of a latent variable are available. In this study, it was hypothesized that five aspects of motivation are a function of the overall construct of exercise motivation. It was also hypothesized that body image was a multidimensional construct and five observed variables reflected aspects of body image. Tables 4.11 and 4.12 display the estimated parameters and selected fit indices for the original (hypothesized) and final measurement models.
### Table 4.11. Standardized Estimates & Selected Fit Indices for Original & Final Measurement Models

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Original Model</th>
<th>Final model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor Loadings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Appreciation</td>
<td>.73</td>
<td>.52</td>
</tr>
<tr>
<td>Appearance Evaluation</td>
<td>.93</td>
<td>.52</td>
</tr>
<tr>
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<td>-.06</td>
<td>-</td>
</tr>
<tr>
<td>Health/Fitness Evaluation</td>
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<td>.60</td>
</tr>
<tr>
<td>Health/Fitness Orientation</td>
<td>.89</td>
<td>.97</td>
</tr>
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<td>Exercise Amotivation</td>
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<td>-.57</td>
</tr>
<tr>
<td>Exercise Extrinsic Motivation</td>
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<td>-.32</td>
</tr>
<tr>
<td>Exercise Introjected Motivation*</td>
<td>.02</td>
<td>-</td>
</tr>
<tr>
<td>Exercise Identified Motivation</td>
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<td>.89</td>
</tr>
<tr>
<td>Exercise Intrinsic Motivation</td>
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<td>.86</td>
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<tr>
<td><strong>R^2</strong></td>
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<td></td>
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<tr>
<td>Body Appreciation</td>
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<td>.27</td>
</tr>
<tr>
<td>Appearance Evaluation</td>
<td>.87</td>
<td>.27</td>
</tr>
<tr>
<td>Appearance Orientation*</td>
<td>.00</td>
<td>-</td>
</tr>
<tr>
<td>Health/Fitness Evaluation (HFE)</td>
<td>.49</td>
<td>.37</td>
</tr>
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<td>Health/Fitness Orientation (HFO)</td>
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<td>.95</td>
</tr>
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<td>.10</td>
</tr>
<tr>
<td>Exercise Introjected Motivation*</td>
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<td>-</td>
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<td>Exercise Identified Motivation</td>
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<td>.80</td>
</tr>
<tr>
<td>Exercise Intrinsic Motivation</td>
<td>.79</td>
<td>.74</td>
</tr>
<tr>
<td><strong>Correlation of Independent Variables</strong></td>
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<td></td>
</tr>
<tr>
<td>Body Image &amp; Exercise Motivation</td>
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<td>.88</td>
</tr>
<tr>
<td><strong>Selected Fit Indices</strong></td>
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<tr>
<td>GFI</td>
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<td>.985</td>
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<tr>
<td>CFI</td>
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<td>.993</td>
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<tr>
<td>RMSEA</td>
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<td>.069</td>
</tr>
<tr>
<td>SRMR</td>
<td>.095</td>
<td>.036</td>
</tr>
</tbody>
</table>

Note. Maximum Likelihood Estimation.

*All estimates significantly differ from zero (p < .05), except those noted and removed from the final model.
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Original Model</th>
<th>Final Model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measurement Error Variances</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Appreciation</td>
<td>.28</td>
<td>.44</td>
</tr>
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<td>.51</td>
<td>-</td>
</tr>
<tr>
<td>Health/Fitness Evaluation (HFE)</td>
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<td>.39</td>
</tr>
<tr>
<td>Health/Fitness Orientation (HFO)</td>
<td>.11</td>
<td>.03</td>
</tr>
<tr>
<td>Exercise Amotivation</td>
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<td>.14</td>
</tr>
<tr>
<td>Exercise Extrinsic Motivation</td>
<td>.21</td>
<td>.23</td>
</tr>
<tr>
<td>Exercise Introjected Motivation</td>
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<td>-</td>
</tr>
<tr>
<td>Exercise Identified Motivation</td>
<td>.28</td>
<td>.24</td>
</tr>
<tr>
<td>Exercise Intrinsic Motivation</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Measurement Error Covariances</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appearance Evaluation &amp; Orientation</td>
<td>.06</td>
<td>-</td>
</tr>
<tr>
<td>Appearance Evaluation &amp; HFE</td>
<td>-.10</td>
<td>.15</td>
</tr>
<tr>
<td>Appearance Evaluation &amp; HFO</td>
<td>-.21</td>
<td>.02</td>
</tr>
<tr>
<td>Appearance Orientation &amp; HFE</td>
<td>.08</td>
<td>-</td>
</tr>
<tr>
<td>Appearance Orientation &amp; HFO</td>
<td>.11</td>
<td>-</td>
</tr>
<tr>
<td>HFE &amp; HFO</td>
<td>-.02</td>
<td>-</td>
</tr>
<tr>
<td>Appearance Eval. &amp; Body Apprec.</td>
<td>-</td>
<td>.40</td>
</tr>
<tr>
<td>HFE &amp; Body Appreciation</td>
<td>-</td>
<td>.10</td>
</tr>
<tr>
<td>Amotivation &amp; Extrinsic</td>
<td>.02</td>
<td>.02</td>
</tr>
<tr>
<td>Extrinsic &amp; Introjected</td>
<td>.11</td>
<td>-</td>
</tr>
<tr>
<td>Amotivation &amp; Identified</td>
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<td>-.02</td>
</tr>
<tr>
<td>Extrinsic &amp; Identified</td>
<td>.08</td>
<td>.04</td>
</tr>
<tr>
<td>Introjected &amp; Identified</td>
<td>.33</td>
<td>-</td>
</tr>
<tr>
<td>Amotivation &amp; Intrinsic</td>
<td>.00</td>
<td>-</td>
</tr>
<tr>
<td>Extrinsic &amp; Intrinsic</td>
<td>.03</td>
<td>-.03</td>
</tr>
<tr>
<td>Introjected &amp; Intrinsic</td>
<td>.10</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. Maximum Likelihood Estimation. All estimates significantly differ from zero ($p < .05$).

Table 4.12. Estimated Error Variances & Covariances for Original & Final Measurement Models

Measurement error variances shown in Table 4.12 represent the portion of the observed variable that is measuring something other than the latent variable. The observed variable may be measuring another latent variable in addition to the one measured in this study, or there may be a higher order latent variable (Schumacker &
The highest error variances in Table 4.12 are for those variables with the lowest factor loadings in Table 4.11. Measurement error covariances are indicative of shared variance in the method or type of data collection (Schumacker & Lomax, 2010). Covariances may also indicate common measurement of a secondary latent variable. Finally, covariances are unstandardized whereas correlations are reflected by standardized indicators.

Original model fit indices were not indicative of a good fit. Factor loadings, which indicate the common variation among the measured variables, were significant for all observed variables except introjected motivation and appearance orientation, so these variables were removed from the measurement model to improve fit. Further, modification indices suggested addition of two measurement error covariances for body image measures – one between appearance evaluation and body appreciation, and one between health fitness evaluation and body appreciation. The two latent variables, body image and exercise motivation, were allowed to correlate, and this correlation was significant in both the original and final models.

After removal of the two non-significant factors and addition of the two error covariances, all fit indices for the measurement model were in the acceptable range. Three of the four indices were at the higher end of the acceptable range – GFI and CFI were well above the mid-point of the range of 95 – 99.9, and SRMR was well below .05. RMSEA was not below .05, but was below .08. There is general support for the use of a range of .05 to .08 as criteria for acceptability in structural equation models (Chen, Curran, Bollen, Kirby, & Paxton, 2008; Hair et al., 2010; Schumacker & Lomax, 2010).
Figure 4.7 presents a diagram of the final measurement model.
**Structural and full models.**
After the measurement model was finalized, it was used as the starting point for testing of the original structural model. A model identification table was computed for the original full model and is presented along with the final identification table in Table 4.13. The full model refers to the measurement model and the structural model taken together.

<table>
<thead>
<tr>
<th>Values in Sample Matrix (S)</th>
<th>Estimated Parameters</th>
<th>Original</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed Variables = 12</td>
<td>Factor Loadings</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Multiply by (12+ 1)</td>
<td>Measurement Error Variances</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Sub-Total 156</td>
<td>Measurement Error Covariances</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Divided by: 2</td>
<td>Path Coefficients</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Values in S = 78</td>
<td>Prediction Equation Variances</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Independent Predictor Variances</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Independent Predictor Covariances</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>40</td>
<td>39</td>
</tr>
</tbody>
</table>

Table 4.13. Model Identification Table for Original & Final Full Models

The original and final models had degrees of freedom of 38 and 39, respectively. Both were over-identified (the number of values in $S$ exceeded the number of parameters to be estimated), which allowed the SEM analysis to function properly and estimate a unique set of parameters. The decrease in degrees of freedom from the original to the final model reflects the removal of several non-significant parameters from the model and the addition of one less significant parameter.

The hypothesized structural model was a reflection of the primary research hypotheses. In SEM terms, the structural model consists of a path diagram that describes prediction pathways among several variables, some independent, and some dependent. In
this study, it was hypothesized that three independent variables (BMI, age, and self-compassion) and two dependent variables (body image and motivation) would predict three dependent variables (body image, motivation, and PA/Ex level) as described by three prediction equations:

- Body image = BMI + self-compassion
- Motivation for exercise = self-compassion + body image
- PA/Ex level = motivation for exercise + age + BMI

It was also hypothesized that age and BMI would be correlated. Tables 4.14 and 4.15 display the estimated parameters and selected fit indices for the original (hypothesized) and final structural models.
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Original Model</th>
<th>Final model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor Loadings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Appreciation</td>
<td>.62</td>
<td>.56</td>
</tr>
<tr>
<td>Appearance Evaluation</td>
<td>.59</td>
<td>.56</td>
</tr>
<tr>
<td>Health/Fitness Evaluation</td>
<td>.60</td>
<td>.62</td>
</tr>
<tr>
<td>Health/Fitness Orientation</td>
<td>.87</td>
<td>.97</td>
</tr>
<tr>
<td>Exercise Amotivation</td>
<td>-.54</td>
<td>-.55</td>
</tr>
<tr>
<td>Exercise Extrinsic Motivation</td>
<td>-.33</td>
<td>-.32</td>
</tr>
<tr>
<td>Exercise Identified Motivation</td>
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<td>.84</td>
</tr>
<tr>
<td>Exercise Intrinsic Motivation</td>
<td>.86</td>
<td>.83</td>
</tr>
<tr>
<td><strong>Structural Equation Path Coefficients</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI → Body Image</td>
<td>-.03</td>
<td>-.03</td>
</tr>
<tr>
<td>Self-Compassion → Body Image</td>
<td>.26</td>
<td>.32</td>
</tr>
<tr>
<td>Body Image → PA/Ex Motivation</td>
<td>2.50</td>
<td>2.88</td>
</tr>
<tr>
<td>Self-Compassion → PA/Ex Motivation</td>
<td>-.34</td>
<td>-.50</td>
</tr>
<tr>
<td>BMI → PA/Ex Level*</td>
<td>.01</td>
<td>-</td>
</tr>
<tr>
<td>Age → PA/Ex Level*</td>
<td>.00</td>
<td>-</td>
</tr>
<tr>
<td>PA/Ex Motivation → PA/Ex Level</td>
<td>1.20</td>
<td>1.30</td>
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<td><strong>Independent Variable Covariances</strong></td>
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<td>-.40</td>
</tr>
<tr>
<td>Self-Compassion &amp; Age</td>
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<td>.89</td>
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<td>SRMR</td>
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<td>.050</td>
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</table>

Note. Maximum Likelihood Estimation.
*All estimates significantly differ from zero ($p < .05$), except those noted and removed from the final model.

Table 4.14. Standardized Estimates & Selected Fit Indices for Original & Final Full Models
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Original Model</th>
<th>Final model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measurement Error Variances</strong></td>
<td></td>
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<tr>
<td>Body Appreciation</td>
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<td>.41</td>
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<tr>
<td>Appearance Evaluation</td>
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<td>.62</td>
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<tr>
<td>Health/Fitness Evaluation (HFE)</td>
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<td>.37</td>
</tr>
<tr>
<td>Health/Fitness Orientation (HFO)</td>
<td>.13</td>
<td>.03</td>
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<tr>
<td>Exercise Amotivation</td>
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<td>.15</td>
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<td>Exercise Extrinsic Motivation</td>
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<td>.23</td>
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<td>52.93</td>
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<tr>
<td>Age</td>
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<td>56.80</td>
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<td></td>
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<td>1.80</td>
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<td><strong>Measurement Error Covariances</strong></td>
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<td>.12</td>
</tr>
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<tr>
<td>HFE &amp; HFO*</td>
<td>.04</td>
<td>-</td>
</tr>
<tr>
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<td>.36</td>
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<td>HFE &amp; Body Appreciation</td>
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<td>.07</td>
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<td>.02</td>
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<td>Amotivation &amp; Identified</td>
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<td>-.05</td>
</tr>
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<td>Extrinsic &amp; Identified</td>
<td>.04</td>
<td>.03</td>
</tr>
<tr>
<td>Amotivation &amp; Intrinsic*</td>
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<td>-</td>
</tr>
<tr>
<td>Extrinsic &amp; Intrinsic</td>
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<td>-.03</td>
</tr>
<tr>
<td>Identified &amp; Intrinsic</td>
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<td>.09</td>
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<td>HFO &amp; Body Appreciation</td>
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<td>-.02</td>
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<tr>
<td>Self-Compassion &amp; HFO</td>
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<td>-.14</td>
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</table>

Note.  Maximum Likelihood Estimation.  
All estimates significantly different from zero ($p < .05$), except those noted and removed from the final model.

Table 4.15. Estimated Error Variances & Covariances for Original & Final Full Models
Original full model fit indices were not indicative of a good fit. Factor loadings for all observed variables brought forward from the final measurement model remained significant in the full model. In the hypothesized structural equations, two path coefficients were not significant. BMI did not significantly predict PA/Ex level and age did not significantly predict PA/Ex level. The structural equation for PA/Ex was modified to remove the paths from BMI and age to PA/Ex. In addition, the covariance between BMI and age was not significant, so it was also removed from the model. Error covariances between three sets of observed variables were insignificant and were removed from the model – appearance evaluation and health/fitness orientation, health/fitness evaluation and health/fitness orientation, and amotivation and intrinsic motivation.

Review of the modification indices suggested addition of several error covariances. Error covariances were added between identified motivation and intrinsic motivation, and between health/fitness orientation and body appreciation for consistency with other error covariances between observed variables for exercise motivation and body image. Also, three new sets of error covariances were added to the full model between self-compassion and observed variables for body image – appearance evaluation, body appreciation, and health/fitness orientation. When added to the model, each was significant at $p < .001$.

After removal of non-significant model parameters and addition of the noted error covariances, all fit indices for the measurement model were in the acceptable range. The only index of potential concern was the RMSEA, which remained just above the common
criteria cut-off point of .08, at .083. For purposes of this analysis this was considered acceptable based upon proximity to the criterion level and the arguments made against static cut-off points for RMSEA as noted by Chen, et al. (2008). Figures 4.8 and 4.9 display diagrams of the final structural and full models, respectively.

Figure 4.8. Diagram of Final Structural Model with Path Coefficients
Figure 4.9. Diagram of Final Full Model with Path Coefficients & Factor Loadings
Suppression analysis. During model testing and modification one inconsistency was noted that required further model review and analysis. Correlations between self-compassion and each other key variable were in the anticipated direction and significant at $p < .01$ for 12 of the 13 correlations. Self-compassion was negatively correlated with amotivation, extrinsic motivation, introjected motivation, appearance orientation and BMI. Self-compassion was positively correlated with identified and intrinsic motivation, body appreciation, appearance evaluation, health/fitness evaluation and orientation, age, and PA/Ex level. It was hypothesized that body image and motivation for exercise would be positively predicted by self-compassion, and all correlations appeared to support that hypothesis.

When the full model was run, review of the structural equation for PA/Ex motivation indicated the path coefficient for self-compassion was significant ($p < .001$), but negative. In SEM, path coefficients have a similar interpretation as partial regression coefficients in multiple regression. They reflect the impact of the variable of interest on the dependent variable, holding all other variables constant. In this case, the interpretation of the self-compassion path coefficient implied that for each 1-unit increase in self-compassion there was a corresponding decrease in PA/Ex motivation of .34. This was in sharp contrast to the noted correlations between intrinsic and extrinsic forms of exercise motivation.

To clarify the factors that would cause a path coefficient’s direction to oppose the direction of relevant correlations, a search of the statistical literature was performed and several interim models were run. The first reference to provide a general understanding
of the phenomena observed was an educational tutorial on SEM basics (Grace, 2014). Figure 4.10 highlights the suppression effect described in this tutorial.


Figure 4.10. The Suppression Effect in SEM

As noted in Figure 4.10, the change in sign, from positive to negative between X₂’s correlation with Y and its path coefficient in the structural equation predicting Y is attributed to the influence of a second variable included in the prediction equation, namely, X₁. Further research yielded more support for the occurrence of the suppression effect in SEM (Maassen & Bakker, 2001). According to Maassen and Bakker (2001),
there are three types of suppression, classical, negative, and reciprocal. The example of suppression depicted in Figure 4.10 is negative suppression. Negative suppression is further characterized as causing the suppressor variable to change its correlation sign, and at the same time cause an increase in the effect of the second variable. Several statisticians have studied the suppressor effect and developed different defining characteristics for suppression situations (Maassen & Bakker, 2001). Maassen & Bakker ascribe to the definition put forth by Conger (1974), “A suppressor variable is defined to be a variable that increases the predictive validity of another variable (or set of variables) by its inclusion in a regression equation” (p. 36). The authors also build upon Conger’s work and suggest a numerical proof to identify and quantify negative suppression.

In the current study, it appeared that self-compassion was acting in the role of the suppressor variable and body image, the other variable in the structural equation predicting PA/Ex motivation was influencing the directionality of self-compassion’s effect. As suggested by Maassen and Bakker (2001), the suppression effect can be initially detected by analyzing models with and without the suppressor variable and the second variable influencing it. To provide additional support for the potential negative suppression occurring between body image and self-compassion in predicting PA/Ex motivation, 4 models were created and compared for changes in relevant path coefficients:

- Model 1 = Body Image alone predicts Motivation
- Model 2 = Self-compassion alone predicts Motivation
- Model 3 = Body Image and Self-compassion predict Motivation
- Model 4 = Body Image and Self-compassion predict Motivation, Self-compassion predicts Body Image (original hypothesis)

Table 4.16 compares results of the 4 models.

<table>
<thead>
<tr>
<th>Estimated Parameters</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation Path Coefficients</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Image</td>
<td>2.93</td>
<td>N/A</td>
<td>2.95</td>
<td>3.21</td>
</tr>
<tr>
<td>Self-Compassion</td>
<td>N/A</td>
<td>.42</td>
<td>-.01</td>
<td>-.78</td>
</tr>
<tr>
<td>Model Fit Indices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GFI</td>
<td>.916</td>
<td>.87</td>
<td>.916</td>
<td>.941</td>
</tr>
<tr>
<td>SRMR</td>
<td>.111</td>
<td>.169</td>
<td>.112</td>
<td>.0526</td>
</tr>
</tbody>
</table>

Table 4.16. Negative Suppression in Predicting PA/Ex Motivation

Comparison of the 4 models supports the occurrence of negative suppression. When self-compassion is the sole predictor of PA/Ex motivation, it carries a positive coefficient (Model 2, .42, \( p < .001 \)). When body image is added in Model 3, and joins self-compassion in predicting PA/Ex motivation, self-compassion’s coefficient reverses its sign and becomes insignificant as a predictor of PA/Ex. Finally, in Model 4, consistent with the original hypotheses, self-compassion is added as a significant predictor of body image. In this model, self-compassion’s role as a suppressor is amplified and increases the effect of body image in the prediction of PA/Ex motivation (2.95 \( \rightarrow \) 3.21).

To ensure the potential suppressor effect was not being caused by a composite latent variable comprised of conflicting motivation types, another set of models was created and analyzed. In these models, the PA/Ex motivation prediction equation was
divided into two parts to allow prediction of intrinsic and extrinsic motivation separately. Single observed variables were created (in SPSS) to reflect two forms of PA/Ex motivation – intrinsic and extrinsic. A new dataset excluding the five original types of motivation and including the two new composite forms was uploaded to LISREL, and a new covariance matrix was created based upon the dataset. A new model was run with the same basic format as the originally hypothesized model and structural equations, but with two PA/Ex motivation prediction equations, one for intrinsic PA/Ex motivation and one for extrinsic PA/Ex motivation. Results reinforced findings that a negative suppression effect was likely occurring. In the intrinsic PA/Ex motivation equation, self-compassion’s path coefficient was negative, contrary to the direction of its correlations with internal forms of motivation. In the extrinsic PA/Ex motivation equation the path coefficient was positive, again, contrary to the direction of self-compassion’s correlations with external forms of motivation.

A third and final proof to confirm the presence of a negative suppression effect was completed. A formulaic approach was suggest by Maassen and Bakker (2001), in which correlations between the three variables of interest (the two predictors and the dependent variable) are compared for the following criterion relationship:

\[ k < r_{sp} < 2k(k^2 + 1), \text{ where } k = r_{sy}/r_{py}, S = \text{Suppressor Variables}, P = \text{other predictor variable}, \text{ and } Y = \text{dependent variable} \]
Because both PA/Ex motivation and body image were latent variables comprised of factor loadings from several observed variables, the observed variables with the highest factor loadings for body image and PA/Ex motivation were used to make the necessary calculations to test for the criterion relationship. In the calculation, the suppressor variable was self-compassion, the other predictor variable was health/fitness orientation, and the dependent variable was identified motivation for exercise. The relationships calculated held to the criterion and supported the existence of negative suppression in predicting PA/Ex motivation in the original and final full models.

**Summary of Hypotheses and Results**

In this sample population of mid-aged women, the primary research hypotheses were partially supported by the results. The first hypothesis, body image would be predicted by BMI and self-compassion held true. Body image was significantly predicted by BMI ($p < .001$) and self-compassion ($p < .001$). The second hypothesis, motivation for exercise would be predicted by self-compassion and body image was supported, but due to the negative suppression effect, self-compassion appears as a negative predictor of PA/Ex motivation instead of a positive predictor. Both body image and self-compassion were significant predictors at $p < .001$. The third hypothesis, that exercise level would be predicted by motivation for exercise, age and BMI, was partially supported. Exercise level was significantly predicted by PA/Ex motivation ($p < .001$), but BMI and age did not predict PA/Ex level. Finally, the fourth hypothesis, that BMI and age would be positively correlated was not supported. The correlation between BMI and age was not significant ($r = .022$).
The secondary research hypotheses were also partially supported. In this population of middle-aged women, appearance evaluation, health/fitness evaluation health/fitness orientation, and body appreciation were found to be significant dimensions of body image ($p < .001$, in all cases). Appearance orientation was not a significant dimension of body image ($p = .136$). In addition, a multi-factorial continuum of exercise motivation was supported. Amotivation, extrinsic motivation, identified motivation, and intrinsic motivation were found to be significant factors of PA/Ex motivation ($p < .001$, in all cases). Introjected motivation was not supported as a significant factor of PA/Ex motivation in this population of women ($p = .646$).
Chapter 5 – Discussion

There is often a wide gap between what we know and what we do, and regular physical activity is no exception. Despite the visibility of the “exercise is medicine” health promotion campaign, the burgeoning number of diet and exercise plans, and a culture that prizes feminine thinness, the average middle-aged woman is overweight, underactive and unhappy with some aspect of her appearance (Flegal et al., 2010; Frederick et al., 2012; Harris et al., 2013). The negative physical and psychological effects of excess weight, inactivity and poor body image warrant multidisciplinary research to explore new methods of reversing these trends (Tiggemann, 2011; World Health Organization, 2012).

The primary objective of this study was to evaluate the relationship among self-compassion, body image and motivation for exercise and determine the role self-compassion might play in middle-aged women’s physical activity/exercise (PA/Ex) levels. An overview of study results indicates that in this population, self-compassion positively predicts body image, which in turn predicts autonomous exercise motivation and consequently, higher levels of PA/Ex participation, as depicted in Figure 5.1. While this perspective provides an essential synopsis, it does not detail the specific information necessary to lay the groundwork for positive future change, to increase PA/Ex participation among middle-aged women. A detailed discussion of study results may contribute to a greater understanding of how such change might be achieved.
To place the findings in context, we will initially focus the lens on self-compassion results in this study compared to previous research. The lens will then shift to focus on providing the same context for results regarding body image variables, motivation for exercise, and PA/Ex level. This will create an optimal frame within which to discuss results of the SEM analyses and draw conclusions as to the impact of the findings and propose future directions for continuing research. The remainder of this chapter will be organized in sections as follows:

- Self-Compassion
- Body Image
- Exercise Motivation
- Physical Activity and Exercise Levels
- Correlation and SEM Measurement Model
- SEM Structural Model
- Limitations
Self-Compassion
Self-compassion has been employed as a psychological construct for only 10 years. It was first measured using the Self-Compassion Scale in 2003 (Neff) and new findings are still being published at a rapid pace. At the end of 2012, when the literature review for the current study was completed, 79 articles with a major focus on self-compassion had been published. Just over a year later, approximately 20 new articles describing original research are in print. To further narrow the focus, at the end of 2012, only six studies had been conducted looking at exercise or body image and self-compassion. Since then, three new studies have considered self-compassion as a coping mechanism for body dissatisfaction, and one new study has been conducted using self-compassion as an intervention to reduce self-criticism in a sample of collegiate, women athletes.

Neff’s own studies continue to replicate and confirm findings regarding self-compassion’s impact in varying populations. While some studies have shown that men report higher levels of self-compassion than women, Neff and Pommier (2012) note that these findings don’t appear consistent, and they vary based upon the specific population of men and women under study. The inconsistency implies that additional characteristics of these populations moderate the impact of self-compassion levels in men and women. Neff and Beretvas (2013) found that there was a significant difference ($p \leq .05$) between
men’s and women’s levels of self-compassion in a study of romantic relationships among 104 heterosexual couples.

Age has also been noted as a moderator of self-compassion, but findings are somewhat limited. Neff and Vonk (2009) found age and gender were significantly associated ($p < .001$) with self-compassion in a large survey study ($N = 2,187$). But though self-compassion has been studied in multiple settings, cultures and populations, very few studies have measured self-compassion levels among middle-aged individuals. The majority of research has been conducted on college campuses with undergraduate students, or in community samples of young adults with mean age from 18 to 22 years.

An additional confounding factor in understanding age as a moderator of self-compassion is the potential impact of education. When comparing groups of middle-aged women to female college students, there are two potential moderators, education and age. The literature does not seem to address this. Studies utilizing only college students are drawing upon a fairly homogenous population in respect to education, while studies of middle-aged adults may draw samples whose education levels vary widely. In populations of middle-aged individuals, the distinction between age and education as a potential moderator of self-compassion has not been teased out or discussed, though in many cases, age and education are reported.

To shed further light on these discussions, five studies with some similarity to the current population in terms of gender and age are summarized in Table 5.1.
<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Place</th>
<th>N</th>
<th>% Female</th>
<th>Mean Age (SD)</th>
<th>Mean SC (SD)</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Study</strong></td>
<td>U.S.</td>
<td>1122</td>
<td>100%</td>
<td>48 (7.5)</td>
<td>3.19 (.75)</td>
<td>81% degreed¹</td>
</tr>
<tr>
<td>(Heffernan, Quinn Griffin, McNulty, &amp; Fitzpatrick, 2010)</td>
<td>U.S.</td>
<td>135</td>
<td>95%</td>
<td>63% 41-60</td>
<td>3.49 (.60)</td>
<td>100% degred</td>
</tr>
<tr>
<td>(Neff &amp; Pommier, 2012)</td>
<td>U.S.</td>
<td>400</td>
<td>66%</td>
<td>33 (12.7)</td>
<td>2.95 (.61)</td>
<td>N/A</td>
</tr>
<tr>
<td>(Birnie, Speca, &amp; Carlson, 2010)</td>
<td>CN</td>
<td>51</td>
<td>69%</td>
<td>47</td>
<td>2.90</td>
<td>Avg participant degree</td>
</tr>
<tr>
<td>(Nedeljkovic et al., 2012)</td>
<td>Switz</td>
<td>59</td>
<td>66%</td>
<td>35 (1.5)</td>
<td>3.16² (.09)</td>
<td>78% HS degree</td>
</tr>
<tr>
<td>(Neff &amp; Germer, 2013)</td>
<td>U.S.</td>
<td>21</td>
<td>95%</td>
<td>51</td>
<td>2.58 (.65)</td>
<td>N/A &amp; 77% grad degree</td>
</tr>
<tr>
<td>2 studies</td>
<td></td>
<td>51</td>
<td>80%</td>
<td>50</td>
<td>2.70 (.70)</td>
<td></td>
</tr>
</tbody>
</table>

Note. SC = self-compassion, SD = standard deviation (not available where no number is parenthetically noted), ≈ approximately equal, CN = Canada, Swit = Switzerland, N/A = Not Available.

1 Degreed = Undergraduate degree or higher.
² German version of the SCS (Hupfeld & Ruffieux, 2011).

Table 5.1. Self-Compassion Studies with Comparable Sample Demographics

The five studies identified in Table 5.1 reported mean self-compassion as measured using the SCS, and reflected samples with the most similar age, gender and education levels. Mean self-compassion was not reported separately for men and women, so some degree of potential confounding when comparing to the current study of 100% women is possible. In addition, sample sizes were fairly small, with the exception of Neff and Pommier’s study. Education level was reported in some of the studies, and is noted in the table due to the potential for confounding effect between age and education level.

The mean self-compassion score in the current study exceeded that of the five studies summarized in Table 5.1, with the exception of the study done by Heffernan, et
al., (2010). In that correlational study of self-compassion and emotional intelligence in nurses, mean self-compassion was 3.49. The authors noted that age and life experience might account for higher average self-compassion scores when compared to other published reports of mean self-compassion on the SCS.

Heffernan et al. (2010), compared their results to those of a self-compassion study of undergraduate student populations in the U.S., Taiwan, and Thailand (Neff, Pisitsungkagarn, & Hsieh, 2008). The nurses’ scores were similar to the sample of participants from Thailand ($M = 3.41$), but well above those of the U.S. and Taiwanese groups. Again, the authors hypothesized that the nurses’ mean scores might exceed those of undergraduate students in the U.S. and Taiwan because of differences in age and life experience.

They also noted that the nurses’ scores were similar to those of students in Thailand, perhaps because as children, they grew up in a culture that promotes Buddhist philosophy as a natural way of life (Heffernan et al., 2010). The implication here is that while Buddhist culture fosters individual’s levels of self-compassion early in life, Western culture must rely upon such cultivation through increases in maturity with increasing age. While culture may contribute to the similarity in self-compassion between undergraduates in Thailand and this group of middle-aged nurses in the U.S., there may be other factors at play as well. Perhaps these nurses are more self-compassionate because they are more educated, or because nursing is a helping profession and may engender feelings of compassion that are directed toward others and transfer to oneself. It appears that several moderators may be present in comparing self-
compassion levels between the populations studied by Heffernan et al. (2010), and Neff et al. (2008).

The participants in the Nedeljkovic et al. (2012) study scored similarly to those in the current study (3.16 vs 3.19). But again, it is difficult to tease out the impact of more than one potential moderator. While the participants in the Nedeljkovic et al. study were not college students, and closer in average age ($M = 35$, $SD = 1.5$) to the current study’s participants, they also identified as regular mind-body practitioners. An average of 24 months of mind-body practice had been completed by study participants prior to enrollment in the study. The authors defined such practice as using “the mind to affect physical functioning and promote health” (Nedeljkovic et al., 2012, p. 200). Mind-body practice is often associated with meditation and mindfulness and might result in higher levels of self-compassion (National Institutes of Health, 2013; Neff, 2003b). Yet Neff and Germer’s (2013) study ($N=50$, 80% women) indicated a mean of only 2.70 on the SCS while 77% of participants with a mean age of 50 reported being practicing meditators. Further, the current study was done with women only, while Nedeljkovic et al. included 66% women and Neff and Germer 80% women.

The evidence appears conflicting as to the implications of this finding, but perhaps there are multiple moderators operating simultaneously and confounding results. In the two studies being compared there are several known potential moderators – gender, age, mind-body practice and culture. Nedeljkovic et al. (2012) studied 59 Swiss men and women (66%) with an average age of 35 and 2 years of mind-body practice. Neff and Germer (2013) studied 51 American men and women (80%) with an average age of 50.
and an unknown amount of meditation experience. Based upon the reported information, there is no way to quantify the impact of the moderators mentioned or to present a clear explanation of the difference in mean self-compassion between the two studies.

But that does not mean that the comparison is without merit. It provides a basic and essential understanding of the complications inherent in studying what is most likely a bio/psycho/social construct. Further, the newness of self-compassion and the speed with which studies have been undertaken presupposes the fact that researchers have not had the distinct advantage of a rich and thorough literature to draw upon when designing new studies. Collection of demographic data that addresses potential moderators, reporting of that data in published articles, and reporting of standard mean self-compassion regardless of study objective would help to establish a base of core literature from which to frame the direction of new research.

In addition, as the majority of published studies on self-compassion continues to yield wholly positive results, and these results pique the interest of researchers in multiple disciplines and cultures, correlation studies will likely give way to longitudinal observation studies with the potential for an increased focus on intervention research, and methods for facilitating higher levels of self-compassion. A clearer understanding of how compound moderators affect self-compassion levels is crucial as a foundation for developing efficient and effective interventions, and for evaluating programs designed to increase self-compassion in the future.

In comparing results of the current study to other studies of self-compassion, the initial focus was on selecting studies of comparable populations, primarily based upon
age and gender. A complementary comparison can be made to research previously conducted with similar objectives. Table 5.2 provides a summary of studies designed to explore self-compassion and either exercise or body image. Studies were included in the table if they were conducted with a healthy population and reported mean self-compassion levels as measured using the SCS.

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Place</th>
<th>N</th>
<th>% Female</th>
<th>Participants</th>
<th>M_age</th>
<th>Mean SC (sd)</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Study</td>
<td>U.S.</td>
<td>1122</td>
<td>100%</td>
<td>ResearchMatch Database</td>
<td>48</td>
<td>3.19 (.75)</td>
<td>.91</td>
</tr>
<tr>
<td>(Magnus et al., 2010)</td>
<td>CN</td>
<td>252</td>
<td>100%</td>
<td>Exercisers &amp; Kines/Psych students</td>
<td>22</td>
<td>3.03 (.67)</td>
<td>.88</td>
</tr>
<tr>
<td>(Gard et al., 2012)</td>
<td>U.S.</td>
<td>76</td>
<td>74%</td>
<td>College students &amp; yoga-immersion program attendees</td>
<td>21</td>
<td>3.00 (.67)</td>
<td>N/A</td>
</tr>
<tr>
<td>(Schoenefeld &amp; Webb, 2013)</td>
<td>U.S.</td>
<td>322</td>
<td>100%</td>
<td>Undergrads</td>
<td>19</td>
<td>3.00 (.63)</td>
<td>.92</td>
</tr>
<tr>
<td>(Wasylkiw et al., 2012)</td>
<td>CN</td>
<td>142</td>
<td>100%</td>
<td>Undergrads</td>
<td>19</td>
<td>2.92 (.63)</td>
<td>.93</td>
</tr>
<tr>
<td>(Mosewich, Crocker, Kowalski, &amp; Delongis, 2013)</td>
<td>CN</td>
<td>60</td>
<td>100%</td>
<td>College varsity athletes</td>
<td>20</td>
<td>2.86 (.53)</td>
<td>.84</td>
</tr>
</tbody>
</table>

*Note. CN = Canada, Kines = Kinesiology, M_age = Mean Age*

Table 5.2. Self-Compassion Studies including Exercise and Body Image measures

Mean self-compassion of 3.19 in the current study is higher than the mean scores for studies with similar objectives as noted in Table 5.2. Mean age and education level are the most identifiable differences between the current study and each other study noted, and of the variables measured in these studies, are the most obvious contributors to
the difference in mean self-compassion. Cronbach’s alpha shows that internal consistency reliability in the current study is comparable to that of the other studies and demonstrates that the SCS has good reliability for use in further studies of middle-aged women.

Despite a focus on exercise or body image, of the five studies presented in Table 5.2, only one study reported BMI. Average BMI for participants in the Schoenefeld and Webb (2013) study was 23.55 (SD = 5.11), significantly lower than BMI in the current study (M = 28.32, SD = 7.28). While BMI was negatively correlated with self-compassion in the current study, the correlation was negligible in Schoenefeld and Webb’s study. It is surprising that studies with a focus on body image or exercise would not collect or report an indicator of body size or weight when research shows such a strong negative correlation between BMI and both exercise level and body satisfaction (Ålgars et al., 2009; Trost et al., 2002). While the focus of self-compassion research thus far has been psychological and not physical, as interests begin to extend further into the arena of health and well-being, as well as body image, assessing and reporting a standard indicator of body size seems prudent.

A key point to detail regarding Table 5.2 is that it includes a recent randomized controlled trial conducted by Mosewich et al. (2013) with college athletes. The authors compared self-compassion levels between control and intervention groups at three time points – pre-, 1-week post-, and 1-month post-intervention, and found significantly higher levels of self-compassion and lower levels of rumination and self-criticism at both post-intervention measurement points for the intervention group. The intervention was
conducted over seven days, and included an initial information and activity session, and a series of self-compassion modules completed over the course of the week. Aside from Neff and Germer’s pilot study of the Mindful Self-Compassion Program, this study with athletes presents one of the first self-compassion interventions to be considered for further development as an ongoing program. If this line of research continues to show promise as a potential tool to be utilized within sport psychology, it may raise awareness for the potential to use self-compassion as an intervention tool within exercise psychology as well.

**Body Image**

One of the objectives of this study was to compare several measures of body image to better understand how each assessed a different aspect of the construct of body image and to determine if body image comprised a significant portion of the variance in each of these observed variables. This was done using a confirmatory factor analysis in the measurement model of the SEM analysis and those results are discussed in the Correlation and SEM Measurement Model discussion section of this chapter (see page 153).

In order to provide a context for understanding results of body image measurement in this population of middle-aged women, Table 5.3 presents a comparison of results of the current study to other studies. The MBSRQ has been used for more than 15 years in a variety of settings (Menzel et al., 2011).
<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Place</th>
<th>N</th>
<th>Age</th>
<th>AE</th>
<th>AO</th>
<th>HFE</th>
<th>HFO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td><strong>Current Study</strong></td>
<td>U.S.</td>
<td>1122</td>
<td>48 (7.5)</td>
<td>2.95 (.96)</td>
<td>3.25 (.71)</td>
<td>3.42 (.78)</td>
<td>3.37 (.73)</td>
</tr>
<tr>
<td>(T. A. Brown et al., 1990)</td>
<td>U.S.</td>
<td>1070</td>
<td>45 (2.9)</td>
<td>3.36 (.87)</td>
<td>3.91 (.60)</td>
<td>3.67 (.88)</td>
<td>3.47 (.77)</td>
</tr>
<tr>
<td>(Cash, Morrow, Hrabsosky, &amp; Perry, 2004)</td>
<td>U.S.</td>
<td>1608</td>
<td>21 (2.9)</td>
<td>3.51 (.72)</td>
<td>3.52 (.65)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>(Rusticus &amp; Hubley, 2006)*</td>
<td>U.S.</td>
<td>840</td>
<td>40 (19.1)</td>
<td>3.35 (.83)</td>
<td>3.48 (.62)</td>
<td>3.79 (.76)</td>
<td>3.46 (.71)</td>
</tr>
<tr>
<td>(Untas, Koleck, Rasce, &amp; Borteyrou, 2009)</td>
<td>France</td>
<td>583</td>
<td>33 (13.4)</td>
<td>3.08 (.78)</td>
<td>3.65 (.59)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Note: AE = Appearance Evaluation, AO = Appearance Orientation, HFE = Health/Fitness Evaluation, HFO = Health/Fitness Orientation, SD = standard deviation, N/A = subscale not used.
* For this study, HFE = Health Evaluation only, HFO = Fitness Orientation only.
* Published paper did not include mean age, only that stratified sampling was done based upon census bureau report. M & SD were recalculated from (U.S. Bureau of the Census, 1984).

Table 5.3. Body Image Studies Using the MBSRQ

The studies selected for inclusion in Table 5.3 were selected based upon sample size, gender (100% women) and age group. The oldest MBSRQ subscale data reflect the norms published by Cash (2000) in the User’s Manual which accompanies the scale when purchased for use in research studies. These data are from the original national sample recruited in 1985 and used to validate the questionnaire (T. A. Brown et al., 1990). Data from the 2004 (Cash et al.) study is provided as it is more recent, with the caveat that it does not provide comparative data for a similar age group. The last study included was conducted in France and reflects data used to validate the French version of the MBSRQ.

Means of each of the four MBSRQ subscales in the current study are lower than those reported in the each of the four other studies. That said, several points should be made clear. The only data available for health/fitness evaluation and orientation is in one
case almost 20 years old, and in the second case incomplete (T. A. Brown et al., 1990; Rusticus & Hubley, 2006). While these scales were of primary interest in the current study, they are used less frequently than other MBSRQ subscales and comparable studies were not identified. The most relevant comparison to be made for the appearance orientation subscale is against the Rusticus and Hubley (2006) data. The mean for their study was only 7% higher than the mean appearance orientation score in the current study.

Finally, appearance evaluation had the lowest subscale score ($M = 2.95$) in the current study, 14% lower than the mean in the Rusticus and Hubley study. While these authors did not report BMI, a second study using a sample of 46% of the original female participants reported BMI of 25.5 ($SD = 5.2$) (Sabiston, Rusticus, et al., 2010). The authors in the second study included women from the first study who were at least 35 years old, without a diagnosis of breast cancer or body scars. Average age was higher than the original study ($M_{age} = 55$), and the appearance evaluation mean slightly lower ($M = 3.25$).

This second sample was demographically similar to the current study with one notable exception – BMI in that study was significantly lower than the current study (25.5 vs 28.3). In the current study, filtering out women with a BMI greater than 35 yielded a remaining 927 women with an average BMI = 25.7, and an appearance evaluation score of 3.12, just 4% lower than that for the subsample in the second study. Body mass index is noted in the literature as a clear moderator of body image (Ålgars et
al., 2009). In the current study it predicted body image. Again, despite its impact, BMI or an alternate measure of body size is often unreported in studies measuring body image.

Body image was also measured in the current study using the Body Appreciation Scale, developed and tested for validity and reliability in 2005 (Avalos et al.). This scale has the unique property of measuring body image from a positive perspective as opposed to a negative or neutral perspective. It has achieved good reliability in multiple populations and has enjoyed increasing usage over the past nine years (Cash & Smolak, 2011; Menzel et al., 2011; Tiggemann & McCourt, 2013). Table 5.3 presents a comparison of body appreciation scores in the current study to other recent studies.

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Place</th>
<th>N</th>
<th>Age M (SD)</th>
<th>BMI M (SD)</th>
<th>BAS M (SD)</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Study</td>
<td>U.S.</td>
<td>1122</td>
<td>48 (7.5)</td>
<td>28.3 (7.3)</td>
<td>3.35 (.77)</td>
<td>.92</td>
</tr>
<tr>
<td>(Tracy L. Tylka, 2013)</td>
<td>U.S.</td>
<td>527</td>
<td>20 (3.47)</td>
<td>N/A</td>
<td>3.49 (.79)</td>
<td>.94</td>
</tr>
<tr>
<td>(Tiggemann &amp; McCourt, 2013)</td>
<td>AUS</td>
<td>158</td>
<td>40 (13.3)</td>
<td>26.5 (4.5)</td>
<td>3.32 (.61)</td>
<td>.90</td>
</tr>
<tr>
<td>(Halliwell, 2013)</td>
<td>UK</td>
<td>130</td>
<td>20 (2.6)</td>
<td>22.0 (3.0)</td>
<td>3.20 (.68)</td>
<td>.92</td>
</tr>
<tr>
<td>(Winter &amp; Satinsky, 2014)</td>
<td>U.S.</td>
<td>289</td>
<td>31 (8.6)</td>
<td>29.9 (9.4)</td>
<td>3.64 (.68)</td>
<td>.93</td>
</tr>
</tbody>
</table>

Note: BAS = Body Appreciation Scale, SD = standard deviation, N/A = Not reported, AUS = Australia.

Table 5.4. Body Image Studies Reporting BAS Scores

Contrary to the MBSRQ studies noted in Table 5.4, all but one study using the BAS collected and reported BMI. The only study with participants reporting a higher BMI than the current study was also the study reporting the highest BAS score (M = 3.64). This is interesting because as noted earlier, BMI is often negatively correlated
with positive body image, but among the studies of body appreciation included in Table 5.4, that is not the case.

Two things should be mentioned in regard to this departure from the literature. First, Winter and Satinsky’s (2014) study explored the relationship between body appreciation and sexual behavior in a sample where 49% of the women who participated identified their sexual orientation as bisexual, lesbian or other. The literature is inconclusive as to whether sexual orientation moderates body image (Frederick et al., 2012; Morrison & McCutcheon, 2011). Due to the recency of the concept of body appreciation, there is no information available regarding the potential relationship between body appreciation and sexual orientation. The high degree of body appreciation reported by the women in Winter and Satinsky’s study may be more related to the level of self-confidence they must have possessed in order to volunteer for a study about their sexuality, rather than their specific sexual orientation.

Second, while there is a documented negative relationship between BMI and body image, that relationship is based upon measurement of body image with questionnaires primarily designed to evaluate negative or neutral body image. Body appreciation is not equivalent to the lack of body dissatisfaction, or even to body satisfaction (Tiggemann & McCourt, 2013). The difference between these constructs is perhaps similar to the theoretical schism that spawned positive psychology. A focus on preventing and treating known pathologies is not the same as promoting positive potential (Seligman & Csikszentmihalyi, 2000).
Now that body appreciation has been conceptualized and there is a valid and reliable measurement tool, new research will need to be conducted to determine how much of what we know about body image, its correlates and predictors applies to body appreciation as well. Tiggeman and McCourt (2013) explored relationships among body appreciation, body dissatisfaction-satisfaction, and age in 158 middle-aged women and found that while body appreciation and body dissatisfaction-satisfaction were positively correlated, that correlation weakened with age. The authors also found that body appreciation increased with age, as compared to other indicators of body image which appear fairly stable throughout adulthood (Grogan, 2011). Further, new research has begun to explore potential advantages of promoting body appreciation as opposed to reducing body dissatisfaction (Halliwell, 2013).

A final point to be made regarding body appreciation is its conceptual overlap with elements of self-compassion. Both are aligned with positive psychology, both promote acceptance of the current self, and both appear to hold potential for helping women look past social comparison and care for themselves in mind, body and spirit (Neff, 2011; T. L. Tylka, 2011). This overlap has been the focus of several recent studies (Berry et al., 2010; Wasylkiw et al., 2012; Wood-Barcalow et al., 2010). As noted in the literature review presented in chapter 3, self-compassion is well aligned with the theoretical basis posited in SDT. While body appreciation has not been studied under the SDT framework, it relates well to SDT’s theoretical underpinnings as it suggests one’s body has inherent value and its care should be a matter of autonomous motivation, not externally motivated objectives.
Exercise Motivation

Exercise motivation was measured using the BREQ-2. The Behavioral Regulations in Exercise Questionnaire (BREQ) is also available in its original format without the four items that measure amotivation. In addition, some researchers choose to add additional validated items to the BREQ to reflect another type of motivation called integrated motivation (on the continuum between identified and intrinsic forms of motivation). The BREQ and the BREQ-2 do not include integrated motivation as a separate measureable type of motivation as it is difficult to distinguish integrated from identified and intrinsic forms of motivation (Teixeira, Carraça, et al., 2012). Table 5.5 summarizes results of comparative studies that measured exercise motivation using the BREQ.

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Place</th>
<th>N</th>
<th>Age</th>
<th>Amot M (SD)</th>
<th>Ext M (SD)</th>
<th>Introj M (SD)</th>
<th>Ident M (SD)</th>
<th>Intrin M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Study</td>
<td>U.S.</td>
<td>1122</td>
<td>48</td>
<td>.33 (.72)</td>
<td>.50 (.68)</td>
<td>1.60 (1.13)</td>
<td>2.68 (1.07)</td>
<td>2.10 (1.30)</td>
</tr>
<tr>
<td>(Magnus et al., 2010)</td>
<td>CN.</td>
<td>252</td>
<td>22</td>
<td>* .74 (.78)</td>
<td>2.14 (1.04)</td>
<td>3.48 (.53)</td>
<td>3.22 (.64)</td>
<td></td>
</tr>
<tr>
<td>(Duncan, Hall, Wilson, &amp; Jenny, 2010)</td>
<td>CN</td>
<td>594</td>
<td>24</td>
<td>.13 (.31)</td>
<td>.82 (.84)</td>
<td>1.97 (1.08)</td>
<td>3.22 (.68)</td>
<td>3.06 (.75)</td>
</tr>
<tr>
<td>(Edmunds, Ntoumanis, &amp; Duda, 2008)</td>
<td>UK</td>
<td>56</td>
<td>21</td>
<td>.41 (.64)</td>
<td>.58 (.73)</td>
<td>1.53 (.81)</td>
<td>2.97 (.66)</td>
<td>3.06 (.70)</td>
</tr>
</tbody>
</table>

Note: Amot = amotivation, Ext = Extrinsic motivation, Introj = introjected motivation, Ident = identified motivation, Intrin = intrinsic motivation, SD = standard deviation, CN = Canada, UK = United Kingdom.

*The original BREQ was used without a measure of amotivation.

Table 5.5. Physical Activity/Exercise Studies Measuring Exercise Motivation Types
As noted in Table 5.5, mean scores for exercise motivation in the current study appear to be similar to those of the three other studies presented. The primary differences are in identified and intrinsic motivation, which are substantially below the average scores for the other three studies. This means that this population of middle-aged women was less intrinsically motivated to exercise than the other groups of women, and that they don’t identify themselves as “exercisers” to the same degree as the other groups. While women in the current study felt that it was “sometimes” true that they exercised because they enjoyed it or it was fun, women in the other three studies felt it was “sometimes” or “very” true that they exercised for such reasons. It is not surprising that women in the current study reported lower levels of identified and intrinsic motivation than women in the other studies presented in Table 5.5, as those studies were conducted with women who either identified as regular exercisers (Magnus et al. and Duncan et al.), or had signed up to participate in a 10-week exercise class (Edmunds, et al.).

**Physical Activity/Exercise Level**

As noted in chapter 4, PA/Ex level as measured by the Paffenbarger Physical Activity Questionnaire (PAQ) in PA/Ex Kcals expended per week was positively and leptokurtically skewed in this sample of middle-aged women. The 80% trimmed mean showed that the lower 10% of the sample was clustered between 0 and 134 Kcals expended, while the upper 10% was dispersed flatly between 4,400 Kcals and the maximum of the range at 14,831 Kcals. But perhaps more interesting is that the averages for both the full sample and the trimmed sample (1,908 and 1,556, respectively) translate
to exercise levels well above recommendations for 150 minutes of moderate physical activity per week (Centers for Disease Control and Prevention, 2012b).

The 150-minute exercise recommendation for healthy adults cannot be translated to an absolute number of Kcals, but rather is converted to a range of caloric expenditure for two primary reasons. First, moderate exercise is defined based upon activities known to be equivalent to MET levels between 3.0 and 5.9 (Ainsworth et al., 2011). A MET is the equivalent of expending 1 Kcal per kilogram of body weight per hour of activity; engaging in activities at the high end versus the low end of this continuum will produce very different amounts of energy expenditure. Because body size affects the effort required to move, and hence calorie expenditure in any given activity, converting minutes of activity to Kcals expended also requires taking weight into account.

To compare PA/Ex Kcals expended weekly by women in the current study to the 150-minute standard recommendation for weekly exercise, criterion values were set and used to convert 150 minutes of exercise to Kcals. Average METs were set to 4.45 (midpoint of the range), average weight of a woman participant in the study was used as the criterion for body weight, and the recommendation for 150 minutes of exercise per week was used as the criterion for time. Using these criterion values, 829 Kcals per week was the calculated average amount of recommended energy expenditure in PA/Ex for this sample of middle-aged women.

The women included in the 80% trimmed sample exercised an average of 1,556 Kcals per week, almost twice the recommended amount. From another perspective, 29% of the women in this study engaged in less than the recommended range of activity (559 –
1,099 Kcals per week for their average weight), 17% were in the recommended range, and 45% expended more than the recommended amount, but less than the upper 9% tail. Almost half the women in this study exceeded recommended amounts of exercise based upon self-reported PA/Ex.

This sample of middle-aged women is highly active when compared to data reported in the 2011 Behavioral Risk Factor Surveillance System (BRFSS) (Harris et al., 2013). Per the BRFSS, on the average only 50% of women aged 35-64 met the 150 minute per week guideline, compared to 71% in the study sample. One demographic factor that may help explain this tendency toward PA/Ex is the education level of the women in this sample. The 2011 BRFSS statistics indicated 60% of those with a college degree met the guideline for 150 minutes per week of PA/Ex, 20% higher than the baseline average for all individuals taking the survey. In this sample, 80% of women had a degree. Still, that would only explain about half of the increase in PA/Ex levels over the BRFSS data.

The remaining difference is most likely due to the convenience sample used in the study design. The recruitment information shared with potential participants indicated the study would assess women’s thoughts and attitudes toward physical activity and exercise. Women who were interested in exercise would have been more likely to respond favorably to the topic and to participate in the study. While the recruitment email stressed that women did not have to exercise to participate, some research indicates that middle-aged women who do not exercise, or exercise very little, may feel guilt for not doing something they know is recommended for their health and well-being (Segar et
al., 2012). Such women may also feel frustrated with the promotion of “exercise as medicine,” and be less inclined to take the time to completed a survey focused on that topic (Hendry et al., 2010).

While it does appear that the population of middle-aged women who participated in the current study were more active than the average group of middle-aged American women, and engaged in more PA/Ex than the standard recommended level for health benefits, these data should be interpreted with caution. Significant concerns have been raised regarding the overall reliability and validity of self-reported PA/Ex levels (Strath et al., 2013). Generally, physical activity questionnaires are the primary data collection method used in survey research of medium to large samples due to time, cost and human labor. The American Heart Association’s recently published guide to assessment of physical activity provides a table of the most commonly used physical activity questionnaires (Strath et al., 2013). The authors list 24 questionnaires they consider “commonly used” and note that PA/Ex questionnaires typically show good validity for vigorous intensity activity, but are less accurate for measurement of light and moderate intensity activities (Strath et al., 2013).

Similarly, in a review of the limitations of physical activity questionnaires, Shephard (2003) found more variability in validity and reliability of self-reported light and moderate habitual daily activity, than structured vigorous exercise. Further, the more days between the PA/Ex activity and the recall of that activity, the less reliable the information reported. Neither of these reviews specifically discussed the validity or reliability of the Paffenbarger PAQ used in the current study. Both noted that regardless
of the specific instrument utilized, the usefulness of self-reported PA/Ex data is limited. Such data can be relied upon to generalize about a group’s exercise habits, and to categorize or rank-order participants’ general habits, but should not be taken to indicate absolute volume or intensity of total exercise or caloric expenditure (Shephard, 2003).

**Correlation and SEM Measurement Model**

Because this study was designed to evaluate several measures of the latent variables, correlations were expected among those measures. Table 5.6 presents correlations among measures of exercise motivation and PA/Ex level.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Exercise Motivation:</td>
<td></td>
</tr>
<tr>
<td>1 Amotivation</td>
<td></td>
</tr>
<tr>
<td>2 External</td>
<td>0.28</td>
</tr>
<tr>
<td>3 Introjected</td>
<td>-0.15</td>
</tr>
<tr>
<td>4 Identified</td>
<td>-0.56</td>
</tr>
<tr>
<td>5 Intrinsic</td>
<td>-0.50</td>
</tr>
<tr>
<td>6 PA/Ex level (Kcals/wk)</td>
<td>-0.32</td>
</tr>
</tbody>
</table>

*p = .35. All other correlations significant at *p < .001.*

Table 5.6. Correlations Among Exercise Motivation Measures & PA/Ex Levels

As anticipated, amotivation and extrinsic motivation were significantly negatively correlated with PA/Ex level and identified and intrinsic motivation were significantly positively correlated with PA/Ex level. Introjected motivation was significantly correlated with other measures of motivation, but to a much lesser degree than the other four types of motivation. Its highest correlation was with identified motivation which is
expected as correlations among types of exercise motivation tend to be highest with the closest motivation type on the continuum (Ryan & Deci, 2000).

Introjected motivation is also the only motivation type not significantly correlated with exercise level. Because the women in this study were mature and highly educated, perhaps they were less susceptible to allowing negativity to dictate their behavior patterns in relation to exercise. In a review of PA/Ex and SDT, Teixeira et al. (2012) looked at 37 samples and found that 65% of the time, no association was noted between introjected motivation and PA/Ex levels. The authors also noted that because introjected motivation is unstable as a basis for facilitating long-term PA/Ex habits, this lack of association was not surprising.

As noted in Table 5.5, women in the current study experienced lower levels of introjected motivation for exercise than the women in other studies presented. Their introjected mean score indicated they felt it was somewhere between “not true” and “sometimes true” that they exercised for reasons related to guilt or to avoid negative repercussions. The measurement model and confirmatory factor analysis indicated introjected motivation did not significantly load on the latent variable of motivation for exercise, and introjected motivation was not carried forward into the structural model.

In an SDT-based weight-loss intervention study with 239 overweight women, one measure of introjected motivation also failed to load on the latent variable and was removed from further analysis (Silva, Markland, et al., 2010). The authors noted that the Portuguese women ($M_{age} = 38$) in this study experienced introjected motivation in a way more closely associated with identified and intrinsic motivation, contrary to results of
other similar studies. They surmised that culture and personality caused this population of women to integrate and internalize feelings of subjugation to “higher powers,” and thus introjected motivation was perceived as more self-determined by these women (Ingledew & Markland, 2008; Silva, Markland, et al., 2010). Contrarily, it is possible that women in the current study experienced feelings of introjection in an atypical fashion due to unknown personality or cultural factors.

Another potential explanation for introjected motivation’s lack of effect in the current study is the possibility that for this population of middle-aged women introjected motivation may be measuring another latent variable aside from exercise motivation. In SEM, when a factor loading is low, and measurement error variance is high, as was the case with introjected motivation, it indicates that the observed variable may be measuring something other than the intended latent variable (Albright & Park, 2009). While introjected motivation as measured on the BREQ-2 has been previously validated and shown to be reliable, that does not preclude the possibility that for some given unique population (e.g., the women in the current study) it may fail to measure its intended target (Rusticus & Hubley, 2006).

There is no way to conclusively identify what that other latent variable might be, but for illustration purposes, the following scenario is presented. Perhaps the three items that comprise introjected motivation on the BREQ-2 were interpreted by the middle-aged women in the current study as more indicative of “time for exercise” than actual exercise. The three introjected motivation items indicate feelings of guilt, shame and failure in relation to not exercising. It is possible that when this group of women were surveyed,
they read these items and responded with guilt, shame and failure in relation to their inability to prioritize themselves and schedule time to exercise, not in relation to the act of not exercising itself. In this scenario, a different latent variable would be measured instead of motivation for exercise, such as “time management.” This alternate latent variable would not achieve a factor loading comparable to the other observed variables (e.g., identified motivation, etc.) measuring the intended latent variable, motivation for exercise.

Again, while there is no way to conclusively identify why introjected motivation failed to effectively measure motivation for exercise in this group of middle-aged women, it is clear that scores for these items were not relevant to the exercise model proposed in this study. This points to a potential area of further research in this specific population, as motivation for exercise is so closely correlated with exercise behavior (Trost et al., 2002). Segar’s body of research regarding the reframing of exercise away from the “exercise is medicine” paradigm suggests that middle-aged women may not be motivated to exercise through introjected channels. Perhaps a line of research investigating the dynamics of exercise motivation in this population could provide a better understanding of the role introjected motivation might play.

Table 5.7 presents correlations among the multiple measures of body image and self-compassion. Each measure of body image is scaled such that a higher score indicates a greater level of the specific aspect, and a lower score indicates less of that aspect of body image.
*All correlations significant at $p < .001$ except appearance orientation with appearance evaluation and self-compassion, at $p = .27$, and $p = .02$, respectively.

Table 5.7. Correlations Among Body Image Measures & Self-Compassion

Table 5.7 indicates a high degree of correlation among measures of body image and between each measure of body image and self-compassion, with one notable exception. Appearance orientation is not as highly correlated with any of the other measures of body image, or with self-compassion. While it is not uncommon for the subscales of the MBSRQ to be uncorrelated or only moderately correlated, the correlation pattern for appearance orientation in the current study is atypical. The initial MBSRQ validation study indicated a small but significant correlation between appearance evaluation and orientation, and insignificant correlations between health/fitness evaluations and appearance orientation (T. A. Brown et al., 1990). Findings for the middle-aged women in the current study are reversed. The correlation between appearance evaluation and appearance orientation is insignificant, and there is a modest significant correlation between appearance orientation and health/fitness evaluation.

The measurement model and confirmatory factor analysis indicated appearance orientation did not significantly load on the latent variable of body image, and appearance orientation.
orientation was not carried forward into the structural model. As was noted previously when examining the failure of introjected motivation to load on motivation for exercise, it is likely that in this sample of middle-aged women, appearance orientation is measuring something other than the latent variable body image as operationalized in this study. The other four observed variables for body image, appearance evaluation, body appreciation, health/fitness evaluation and health/fitness orientation, taken together, provided a strong and significant basis for measuring the body image latent variable.

When the French version of the MBSRQ was evaluated for reliability and validity, the authors’ test of discriminant validity indicated a significant correlation between the appearance orientation subscale and a measure of social desirability (Untas et al., 2009). This suggests one possible alternate latent variable being measured by appearance orientation in the current study. Again, as noted in the discussion regarding introjected motivation for exercise, there is no way to conclusively determine what latent variable is being measured by appearance orientation in the current study. But results of the confirmatory factor analysis do indicate that it is not the same latent variable that is being measured by the other four observed variables used to measure body image in this study. The correlations detailed in Table 5.7 taken together with the comparative means shown in Tables 5.3 and 5.4 seem to characterize this group of middle-aged women as more oriented towards health and fitness than appearance, and more appreciative of body functionality and uniqueness than concerned with evaluations of appearance.
In the previous discussion sections the lens was focused on the specifics of self-compassion, body image, motivation for exercise and PA/Ex level, and the effects of key correlations among them in this group of middle-aged women. One point that has not yet been mentioned is the lack of associations among age, BMI, and PA/Ex level. The initial hypothesis that age and BMI would be among the significant predictors of PA/Ex level was not supported. Because this study was based on a convenience sample, these results cannot be extrapolated to imply that BMI and age are not predictive of PA/Ex levels in the general population of middle-aged women. But it does mean that women aren’t necessarily less active and larger as they age. This then returns us to the discussion of why some middle-aged women are more active and fit, regardless of age.

While BMI and age did not predict PA/Ex level, they were both significantly correlated with self-compassion in the final structural model. This relationship was not initially hypothesized, but it is supported by the self-compassion literature as discussed previously in this chapter. These results imply that women with a higher BMI are less self-compassionate than women with a lower BMI and that women become more self-compassionate with age. Because this study is not longitudinal, these results are equivocal and not conclusive, but do indicate strong enough relationships to warrant further research to replicate results and confirm findings.

The SEM analysis further indicated that self-compassion positively predicts body image. A higher level of self-compassion was associated with higher levels of body image, meaning less body dissatisfaction and more body appreciation. Halliwell (2013) notes that mindfulness has been used as an element of therapeutic interventions to
promote body appreciation through increasing acceptance of one’s own body and general promotion of psychological well-being. While Halliwell was not specifically referring to self-compassion, mindfulness is a key component of self-compassion and is prominent in Neff’s Mindful Self-Compassion program (Neff & Germer, 2013). In the current study self-compassion proved to be a significant positive predictor of body image, and was strongly correlated with body appreciation ($r = .65$, $p < .001$) and appearance evaluation ($r = .50$, $p < .001$).

Key in arriving at a good fit for the structural model was the addition of error covariances between three sets of variables – self-compassion and appearance evaluation, self-compassion and body appreciation, and self-compassion and health/fitness orientation. These error covariances indicate self-compassion and the three measures of body image share measurement error, which in SEM means they have common variance. This common variance can be related to measurement methods, latent variables they have in common outside the exercise arena, or a higher order latent variable that they both predict (i.e., self-worth). It is beyond the scope of this study to specify the source of the common variance, but because this common variance was key to establishing the final model, it points to a basis for further research.

Because the exercise literature already includes well-established evidence that exercise motivation predicts PA/Ex level, this study was designed to contribute to the literature by exploring variables that predict exercise motivation. The most unexpected finding in this study came in the prediction of that motivation. After completing several analyses and running multiple structural models, the existence of a negative suppression
effect was confirmed between body image and self-compassion in predicting motivation for exercise. The end result of negative suppression is that self-compassion appears to be a negative predictor of exercise motivation, meaning, as self-compassion increases, exercise level decreases through self-compassion’s effect on exercise motivation.

Suppression effects are primarily considered undesirable in statistical analysis results because they are misunderstood and challenging to understand and explain (Maassen & Bakker, 2001). That said, to discard research that demonstrates suppression effects is to overlook findings that may contribute greatly to the understanding of complex relationships in psychosocial disciplines (Paulhus, Robins, Trzesniewski, & Tracy, 2004). In the current study, the suppression effect implies that there is more in common between self-compassion and body image than between self-compassion and motivation for exercise. This relationship among the variables, depicted in Figure 5.2, results in the mathematical anomaly of sign change between correlational relationship and self-compassion’s exercise motivation prediction coefficient. To further appreciate this interaction requires focusing on the constructs of body image and self-compassion, and identifying factors that may be common to both outside the context of exercise.
There are numerous factors held in common between self-compassion and body image. While exercise science literature indicates poor body image is correlated with lower levels of PA/Ex, that is certainly not the only effect of poor body image, and most definitely not the worst (Trost et al., 2002). Poor body image is associated with a plethora of psychosocial pathologies including eating disorders, body dysmorphic disorders, social phobias and mood disorders (Cash, 2004). It can also negatively affect interpersonal relationships, sexual function, and overall quality of life (Tiggemann, 2011). As Naomi Wolfe wrote in her pivotal book *The Beauty Myth,*
…women confided in me the agonizingly personal struggles they had undergone... admitted to knowing, from the time they could first consciously think, that the ideal was someone tall, thin, white and blond, a face without pores, asymmetry, or flaws, someone wholly ‘perfect,’ and someone whom they felt, in one way or another, they were not. (2002, p. 1)

Wolfe continued by outlining the toll body image and the quest for beauty has taken in all arenas of women’s lives – work, love, politics, economics, and even religion (Wolf, 2002). Granted her work was first published in 1991, and the quote above is taken from the 2002 edition more than a decade ago, but how much has society evolved since then in terms of its investment in women’s appearance? Naomi Wolf, among others, says it hasn’t evolved at all, it’s gotten worse (Armstrong, 2013; 2011). But what has changed, is that there is a subset of middle-aged women, well-educated and financially secure, who don’t buy into the beauty myth and are continuously learning how to love themselves just as they are, and care for themselves in ways they deem necessary (Wolf, 2011). This subset of women that Naomi Wolf describes seems to possess greater than average levels of self-compassion and body appreciation.

If one subset of women has found a way to care about themselves and appreciate their bodies, studying these women can provide insight into strategies practitioners and interventionists may use to help middle-aged women develop a better body image. Self-compassion is a construct that has potential to inform the development of these strategies. According to reviews of self-compassion research, self-compassion may be a cure-all for
psychosocial conditions in much the same way exercise has been presented as a cure-all for pathologies of the body (i.e., “exercise is medicine” movement). Self-compassion is correlated with lower levels and poor body image is correlated with higher levels of unhealthy psychological and behavioral conditions including depression, anxiety, stress, eating disorders, and social anxiety (Barnard & Curry, 2011; MacBeth & Gumley, 2012).

Further, in research that directly addressed body dissatisfaction, self-compassion predicted lower levels of body preoccupation, body shame, social physique anxiety and eating disorder symptomology (Ferreira et al., 2013; Mosewich et al., 2011; Wasylkiw et al., 2012). As mentioned earlier in this discussion, the first use of self-compassion as an effective interventional coping mechanism to reduce self-criticism and rumination in women athletes was described one year before the completion of the current study (Mosewich et al., 2013). Self-compassion has demonstrated significant potential for use as a coping mechanism to decrease negative affect related to body image distress and to facilitate body appreciation and associated positive outcomes (Berry et al., 2010).

In sum, while self-compassion is indeed correlated with self-regulated forms of motivation for exercise, the links it has to body image are greater. The commonality between self-compassion and body image increases the positive effect of body image on exercise motivation, and causes self-compassion to appear as a negative predictor of exercise motivation. Taken out of context, this can be misinterpreted to imply that self-compassion has a negative effect on exercise motivation. In reality, it plays an essential role in buffering body dissatisfaction, and holds potential for encouraging body appreciation, which might ultimately lead to more autonomous motivation for exercise.
Statistical analyses are only tools for understanding, and it is more important to consider the interrelationships among self-compassion, body image and motivation for exercise than it is to differentiate between the mathematical operators in the SEM prediction equation (Paulhus et al., 2004).

**Limitations**

Some limitations of this study have already been mentioned. Self-reported PA/Ex levels are subject to reliability and validity concerns. Similarly, height and weight were self-reported and may include bias. All data collected via psychosocial questionnaires are measured with some degree of error and/or bias. Despite error and bias potentially included in the data, they are still comparable to the results of other studies that have been collected and reported under the same conditions. Further, because all data were collected anonymously and kept confidential, bias has been minimized.

This study is also limited by its design. Results of correlational, cross-sectional studies are not intended to assess cause and effect, or to determine directionality of relationships. The results indicate associations and correlations and point to directions for further research to elucidate potential causes and effects that are suggested. In addition, the use of a convenience sample limits the ability to generalize results of this study to the larger population of middle-aged women.

**Conclusions and Future Directions**

This study began with the initial hypothesis that self-compassion could be used to facilitate higher levels of PA/Ex among middle-aged women. It ends with the
understanding that the way in which self-compassion can facilitate lifelong PA/Ex in this population of women is to help them understand and appreciate their bodies beyond the one-dimensionality of physical appearance. The findings of this study indicate that self-compassion has a role in helping middle-aged women substitute the media’s socially-constructed images of ideal femininity with realistic and empowering images of their own. Through self-compassion, these women may learn to develop new images of themselves as individuals inhabiting distinctive bodies, inherently worthy of self-care and the time required to engage in PA/Ex to optimize immediate and long-term quality of life.

But self-compassion is not alone in re-creating the relationship between middle-aged women and physical activity. Much has been learned from the study of exercise behavior using Self-Determination Theory’s (SDT) model of the motivation continuum. For instance, self-directed PA/Ex helps individuals meet basic human psychological needs for autonomy, competence and relatedness when driven by intrinsic forms of motivation (Teixeira, 2011). Such behavior is rewarding and is repeated for its own sake. Research shows that exercise behaviors that are intrinsically driven increase habit strength and the likelihood for lifelong PA/Ex (B. Gardner & Lally, 2013).

Unfortunately, SDT indicates an exercise behavior model contrary to the pathologically-driven “exercise is medicine” paradigm. A new paradigm based in positive psychology that includes striving for optimal quality of life is required if middle-aged women are to see exercise in a new light (Segar et al., 2011). Segar’s research agenda suggests that PA/Ex be reframed as a behavior that provides not only immediate relief for what ails you (stress, poor sleep, low self-image), but holds potential for a better
quality of life in the future (more energy, clear mind, positive attitude) (Segar et al., 2008; Segar et al., 2012).

The current study suggests a potential avenue for beginning this paradigm shift in the population of middle-aged women. Here is one possible path this journey might take. The journey begins by helping these women understand, appreciate and increase their self-compassion. Self-compassion encourages body appreciation and feelings of self-worth. Higher levels of self-compassion may provide a coping mechanism for suffering because of poor body image, and a reduction in feelings of unworthiness that prevent some middle-aged women from taking time to care for themselves and address their own needs. Improved body image and an increased sense of self-worth may help middle-aged women meet the basic psychological needs for autonomy and relatedness. Improved body image can shift motivation for exercise from external regulation to autonomous forms of behavior regulation.

Increased autonomous motivation for exercise predicts that these women will engage in more PA/Ex. Further, the likelihood of sustaining higher levels of physical activity increases because positive habits based on self-directed, intrinsically-motivated behavior create feelings of competence (Deci & Ryan, 2002b). The basic need for competence is met, not only because these women become proficient in the act of exercising (which they may), but also because they become good at taking care of themselves. They gain a sense of control over activities that can relieve stress, improve sleep, clear their minds and generate self-worth. This sense of personal agency is the most powerful kind of competence there is (Deci & Ryan, 2002b).
While self-compassion is highly correlated with the construct of body image and with key observed variables that measure it, specifically appearance evaluation and body appreciation, there is still room to strengthen this relationship. Self-compassion is correlated to a lesser degree with two other aspects of body image (i.e., health/fitness evaluation and orientation). Perhaps the less robust correlations reflect the current “exercise is medicine” paradigm, which does not promote intrinsic forms of exercise motivation and is out of sync with elements of SDT and self-compassion.

A paradigm shift toward reframing exercise as conceptualized in this discussion might facilitate women’s interests in caring for themselves physically, and organically increase health/fitness orientation and evaluation aspects of their body image. This could eventually reinforce the already strong link between self-compassion and the appearance evaluation and body appreciation aspects of body image. In the current study, self-compassion and improved body image together predicted increasing levels of intrinsically-motivated PA/Ex behavior. Given the powerful relationship between self-determined motivation and engagement in long-term behavior patterns, the proposed end result is increased physical activity among middle-aged women.

Based upon the self-compassion research that has been conducted to date and the findings presented in this study several conclusions can be drawn. Perhaps the most critical, is that to one degree or another, almost all women appear to be “at risk” of body image disturbance at some point in their lives. Because the negative repercussions of body image dissatisfaction can extend into so many facets of women’s lives and be so
potentially debilitating, it is critical for research to continue focusing on ways to combat negative body image and encourage body appreciation.

One of those negative effects of body image dissatisfaction is decreased motivation to exercise and consequently, lower levels of PA/Ex among individuals with poor body image. At the same time, exercise scientists are struggling to identify new methods of promoting PA/Ex to a population of middle-aged women that continues to be underactive. Perhaps an intervention targeted to reduce body image dissatisfaction, while increasing awareness of immediate benefits of exercise could address both issues simultaneously. While a physically active lifestyle can provide almost endless benefits and positive outcomes, the current paradigm that promotes “exercise as medicine” appears ineffective, and is incongruent with one of the most prevalent theoretical bases explaining lifelong exercise behavior, that is, Self-Determination Theory.

Self-compassion appears to protect both middle-aged and young women from the hazards of body dissatisfaction by providing a positive coping mechanism. Self-compassion’s utility as a coping mechanism to reduce suffering appears to act through several channels, including acts of self-kindness, positive cognitive restructuring, meditation and mindfulness (Allen & Leary, 2010; Berry et al., 2010; Neff, Kirkpatrick, & Rude, 2007). Further, it appears to be a teachable skill (Mosewich et al., 2013; Neff & Germer, 2013). Self-compassion is well-suited to application of SDT principles, as is the reframing of exercise along more intrinsically motivated avenues. A shift in the exercise messaging paradigm to feature immediate daily benefits of exercise may help middle-aged women see exercise in a new light. If these women can see their way through to
including PA/Ex as part of something they want to do in their lives, instead of something they have to do, and can begin to view their bodies as a friend instead of an enemy, physically active lifestyles may become more common.

Based upon these conclusions several recommendations can be made for future research:

- Further investigate the relationship between self-compassion and body image to identify common factors to be targeted through intervention programs
- Further investigate the relationship between body image and autonomous forms of exercise motivation using multiple measures of body image
- Repeat the current study in different groups of middle-aged women to replicate results, and further analyze and understand the suppressor effect
- Conduct research that analyzes the relationship between self-compassion and body appreciation, with the objective of developing methods to increase appreciation for functional aspects of the body in relation to PA/Ex
- Investigate the role self-compassion and body image can play in reframing PA/Ex to allow for self-determined forms of behavior regulation.
Bibliography


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Duncan, L. R., Hall, C. R., Wilson, P. M., & Jenny, O. (2010). Exercise motivation: A cross-sectional analysis examining its relationships with frequency, intensity, and


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Appendix A: Self-Determination Theory Motivation Continuum

The Motivation Continuum, An Example:

Possible motivations for regular exercise

<table>
<thead>
<tr>
<th>Amotivation</th>
<th>External Regulation</th>
<th>Introjected Regulation</th>
<th>Identified Regulation</th>
<th>Integrated Regulation</th>
<th>Intrinsic Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I’m not interested. Why bother</td>
<td>My doctor says I am risking my health by not being active</td>
<td>If I don’t exercise I’ll feel fat and guilty</td>
<td>Exercise helps me to feel healthy, and I like feeling healthy</td>
<td>I exercise. It is an established part of my life and reflects who I am</td>
<td>I exercise because I love it! It makes me feel good and it is fun!</td>
</tr>
</tbody>
</table>

Increasing Self-Determination

Figure A.1. An Example of SDT's Motivation Continuum with Exercise Behavior
Appendix B: Summary of Studies Investigating Self-Compassion and Exercise, Physical Activity or Body Image

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Title/Journal</th>
<th>Type of study</th>
<th>Sample</th>
<th>Key Findings</th>
</tr>
</thead>
</table>
| Berry, Kowalski, Ferguson, & McHugh, 2010 | An empirical phenomenology of young adult women exercisers' body self-compassion. *Qualitative Research in Sport and Exercise* | Qualitative Interview to determine the essential components of SC related to the body | 5 women aged 23-29 | 3 essential structures to body SC:  
- Appreciating one’s unique body  
- Taking ownership of one’s body  
- Engaging in less social comparison |
| Ferreira, C., Pinto-Gouveia, J., & Duarte, C, 2013 | Self-compassion in the face of shame and body image dissatisfaction: Implications for eating disorders. *Eating Behaviors* | Cross-sectional study exploring role of SC in coping with shame & body dissatisfaction in eating disorder patients vs general population | 102 female eating disorder patients, 123 general population females | ↑ shame and body image dissatisfaction predicted ↑ drive for thinness via ↓ SC |
| Gard et al., 2012 | Effects of a yoga-based intervention for young adults on quality of life and perceived stress: The potential mediating roles of mindfulness and self-compassion. *Journal of Positive Psychology* | Intervention with convenience TMT group & matched control group; pre & post surveys. TMT = 4-month residential Yoga program Control = Nothing | 101 subjects (TMT=33, Control=48) 22 avg age 73% women | Mindfulness & SC mediated QOL ↑ Only SC mediated ↓ in perceived stress |

Continued

Abbreviations: SC = self-compassion, avg = average, TMT = treatment, wk = weeks, min= minutes, QOL = quality of life

Table B.1. Self-compassion Studies Involving Exercise, Physical Activity or Body Image Published through February 2013.
<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Title/Journal</th>
<th>Type of study</th>
<th>Sample</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnus, Kowalski, &amp; McHugh, 2010</td>
<td>The role of self-compassion in women's self-determined motives to exercise and exercise-related outcomes. <em>Self and Identity</em></td>
<td>Cross-sectional study to assess correlations between SC &amp; motivation for exercise, goal orientation, social physique anxiety and obligatory exercise behavior. Convenience sample</td>
<td>252 women recruited from campus fitness center; Avg age = 22</td>
<td>SC explained unique variance in - Introjected motivation - Social physique anxiety - Ego goal orientation - Obligatory exercise</td>
</tr>
<tr>
<td>Nedeljkovic, Ausfeld-Hafer, &amp; Wirtz, 2012</td>
<td>Effects of Taiji practice on mindfulness and self-compassion in healthy participants-a randomized controlled trial. <em>Mindfulness</em></td>
<td>RCT w/ 3-month intervention TMT = Taiji practice 2x/wk Control = wait list</td>
<td>59 subjects recruited via university email etc. Avg age = 35 66% female</td>
<td>Significant increase in SC between baseline &amp; post test</td>
</tr>
<tr>
<td>Wasylkiw, MacKinnon, &amp; MacLellan, 2012</td>
<td>Exploring the link between self-compassion and body image in university women. <em>Body Image</em></td>
<td>2 cross-sectional/correlational studies: 1. SC &amp; body image 2. SC &amp; eating behavior; SC &amp; depression</td>
<td>1. 142 undergrads; on-line recruit 2. 189 undergrads; recruited from psych class Subjects received course credit</td>
<td>SC associated w/ ↓body concerns High SC predicted ↓ eating guilt SC partially mediated relation between body preoccupation &amp; symptoms of depression</td>
</tr>
</tbody>
</table>

Abbreviations: SC = self-compassion, avg = average, TMT = treatment, wk = weeks, min = minutes, QOL = quality of life
Appendix C: Paffenbarger Physical Activity Questionnaire Scoring Worksheet

Energy expenditure associated with stair-climbing (Question #2)

\[
\text{___ flights of stairs climbed/day} \times 7 \text{ days/week} = \text{___ flights of stairs climbed/wk}
\]

\[
\text{_____ flights of stairs climbed/wk } \times 4 \text{ kcal/flight} = \text{____________ kcal energy expended/week stair-climbing}
\]

Energy expenditure associated with walking (Question #3)

\[
\text{______ blocks walked/day} \times 7 \text{ days/week} = \text{______ blocks walked/week}
\]

\[
\text{______ blocks walked/week } \times 8 \text{ kcal/block} = \text{____________ kcal energy expended/week walking}
\]

Energy expenditure associated with moderate intensity activities (Question #4)

\[
\text{___ Total minutes moderate sport/recreational activities/week } \times 7.5 \text{ kcal/minute} = \text{____________ kcal expended/week in light sport/recreational activities}
\]

Energy expenditure associated with vigorous intensity activities (Question #5)

\[
\text{___ Total minutes vigorous sport/recreational activities/week } \times 10 \text{ kcal/minute} = \text{____________ kcal expended/week vigorous sport/recreational activities}
\]

Total sport, leisure, and recreational energy expenditure per week

\[
\text{______ kcal/wk stair-climbing}
\]

\[
+ \text{______ kcal/wk walking}
\]

\[
+ \text{______ kcal/wk moderate sport/recreational}
\]

\[
+ \text{______ kcal/wk vigorous sport/recreational}
\]

\[
= \text{____________ Total kcal/wk expended}
\]
# Appendix D: IRB Forms

## INITIAL REVIEW OF HUMAN SUBJECTS RESEARCH
The Ohio State University Institutional Review Boards

Office of Responsible Research Practices (ORRP)
300 Research Administration Building, 1960 Kinnear Road, Columbus, OH 43210
Phone: (614) 688-8457 Fax: (614) 688-0356 [http://orrp.osu.edu](http://orrp.osu.edu)

<table>
<thead>
<tr>
<th>DATE RECEIVED</th>
<th>PROTOCOL NUMBER</th>
</tr>
</thead>
</table>

## 1. PROJECT TITLE
Exercise & Physical Activity in Middle Aged Women: The Role of Self-Compassion

## 2. INSTITUTIONAL REVIEW BOARD
Select the Board to review this research:
Final Board assignment is determined by ORRP.
- Behavioral and Social Sciences
- Biomedical Sciences
- Cancer

## 3. PRINCIPAL INVESTIGATOR (or Advisor) - see Qualifications for service as a PI
<table>
<thead>
<tr>
<th>Name (Last, First, MD)</th>
<th>Backworth, Janet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree(s)</td>
<td>B.A., University of Alabama in Birmingham, Sociology/Psychology University of Georgia: M.S.W., Clinical Social Work M.A., Community Health Education Ph.D., Exercise Psychology</td>
</tr>
<tr>
<td>University Academic Title</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>College (TU)</td>
<td>Education and Human Ecology</td>
</tr>
<tr>
<td>Department Name (TU)</td>
<td>Human Sciences</td>
</tr>
<tr>
<td>Department # (TU)</td>
<td>1256</td>
</tr>
<tr>
<td>Campus Mailing Address</td>
<td>505 W 17th Ave</td>
</tr>
<tr>
<td>University ID Number</td>
<td>60697824</td>
</tr>
<tr>
<td>E-mail</td>
<td><a href="mailto:Backworth@osu.edu">Backworth@osu.edu</a></td>
</tr>
<tr>
<td>Phone</td>
<td>(614) 688-3432</td>
</tr>
<tr>
<td>Fax</td>
<td>(614) 292-0757</td>
</tr>
<tr>
<td>Emergency phone</td>
<td>(614) 282-5100</td>
</tr>
</tbody>
</table>

## 4. CO-INVESTIGATOR(S)
Are there any Ohio State University co-investigators on this protocol?
- Yes → Complete Appendix A1
- No

Signatures of co-investigator(s) are required on Appendix A1.

## 5. KEY PERSONNEL
Are there any Ohio State University key personnel on this protocol?
- Yes → Complete Appendix A1
- No

Key personnel are defined as individuals who participate in the design, conduct, or reporting of human subjects research. At a minimum, include individuals who recruit participants, obtain consent, or who collect study data.

## 6. EXTERNAL CO-INVESTIGATOR(S) & KEY PERSONNEL
Are any external (non-Ohio State University) investigators or key personnel engaged in the Ohio State research?
- Yes
- No → Go to Question #7
"Engaged" individuals are those who intervene or interact with participants in the context of the research or who will obtain individually identifiable private information for research funded, supervised, or coordinated by Ohio State University. See ORBP Engagement Guidance or contact ORRP for more information.

If Yes → Who will provide approval for these external personnel?

- [ ] Ohio State University IRB → Provide a copy of the approval(s)
- [ ] Non-Ohio State University IRB → Provide a copy of the approval(s)

5. ADDITIONAL CONTACT(S)

If further information about this application is needed, specify the contact person(s) if other than the PI (e.g., study or regulatory coordinator, research assistant, etc.).

Name (Last, First, M/D): Thall, Michelle, S.  
E-mail: Thall.2@osu.edu  
Phone: (614) 944-1396  
Fax: (614) 688-3432

All Ohio State University individuals listed on this protocol will have access to information about IRB actions and the completion status of each individual’s administrative and training requirements (CITI COI disclosure). Personal financial information provided in COI disclosures is not included.

8. EDUCATION

Educational requirements (initial and continuing) must be satisfied prior to submitting the application for IRB review. See Human Subjects Protection Training or contact ORRP for more information.

Have all Ohio State University investigators and key personnel completed the required web-based course (CITI) in the protection of human research subjects?

- [ ] Yes
- [x] No

9. FINANCIAL CONFLICT OF INTEREST

All Ohio State University investigators and key personnel must have a current COI disclosure (updated as necessary for the proposed research) before IRB review. Examples of financial interests that must be disclosed include (but are not limited to) consulting fees or honoraria; stocks, stock options or other ownership interests; and patents, copyrights and royalties from such rights. For more information, see Office of Research Compliance COI Overview and eCOI.

a. Have all Ohio State University investigators and key personnel completed the required COI disclosure?

- [ ] Yes
- [x] No

b. Does any Ohio State University investigator (including principal or co-investigator), key personnel, or their immediate family members have a financial interest (including salary or other payments for services, equity interests, or intellectual property rights) that would reasonably appear to be affected by the research, or a financial interest in any entity whose financial interest would reasonably appear to be affected by the research?

- [ ] Yes
- [x] No

10. FUNDING OR OTHER SUPPORT

If the research is federally funded and involves a subcontract to or from another entity, an IRB Authorization Agreement may be required. Contact ORRP for more information.

a. Is the research funded or has funding been requested?

- [x] Yes
- [ ] No

If Yes → Specify sponsor:

Provide a copy of the grant application or funding proposal. The university is required to verify that all funding proposals and grants (new or renewals) have been reviewed by the IRB before funds are awarded.
b. Is any support other than monetary (e.g., drugs, equipment, etc.) being provided for the study? □ Yes □ No
   If Yes → Specify support and provider.

11. OTHER INSTITUTIONAL APPROVALS
Check all that apply and provide applicable documentation. See websites listed below for information on obtaining approvals. IRB review cannot be conducted until required institutional approvals or exemptions are obtained, except as noted.

☐ None
☐ Clinical Research Center (CRC) Scientific Advisory Committee (SAC) – Approval required for research sponsored by the CRC. Final IRB approval will be held pending receipt of SAC approval.
☐ Institutional Biosafety Committee (IBC) – Approval required for research involving biohazards (recombinant DNA, infectious or select agents, human, gene transfer, or xenotransplantation).
☐ Comprehensive Cancer Center (CCC) Clinical Scientific Review Committee (CSRC) – Approval or exemption required for cancer-related research.
☐ Maternal-Fetal Welfare Committee – Approval required for some research involving pregnant women and fetuses.
☐ Human Subject Radiation Committee (HSRC) – Approval required for research involving radiologic procedures for research purposes (e.g., non-clinical care X-rays, DEXA or CT scans, nuclear medicine procedures, etc.).

12. LOCATION OF THE RESEARCH
Research to be conducted at locations other than approved performance sites will minimally require a letter of support and may require another IRB’s approval if personnel are engaged. See OHRP Engagement Guidance for more information.

a. List the specific sites at which the Ohio State research will be conducted (include both domestic and international locations):

<table>
<thead>
<tr>
<th>Location Name (or description)</th>
<th>Address (street, city and state or country)</th>
<th>Location of participant’s choice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. Are all the sites listed above on the Ohio State list of approved research performance sites? □ Yes □ No
   If No → ☐ Domestic sites → Provide a letter of support, as applicable
   ☐ International sites → Complete Appendix V

c. Is the Ohio State PI the lead investigator or is The Ohio State University the lead site for collaborative research? □ Yes □ No → Go to Question #13
   ☐ Not collaborative research → Go to Question #13

i. Describe the communication between sites that might be relevant to the protection of participants, such as unanticipated problems, interim results, and protocol modifications.
ii. Describe IRB oversight arrangements for each collaborative site (i.e., who will provide IRB review and approval). Provide copies of the non-Ohio State approvals, as applicable. Contact ORR if requesting that Ohio State University serve as the IRB of record.

13. EXPEDITED REVIEW

Are you requesting Expedited Review?  
☑ Yes ➔ Complete Appendix E  
☐ No

14. SUMMARY OF THE RESEARCH

Summarize the proposed research using non-technical language that can be readily understood by someone outside the discipline. Explain briefly the research design, procedures to be used, risks and anticipated benefits, and the importance of the knowledge that may reasonably be expected to result. Use complete sentences (limit 300 words).

The proposed research is an anonymous, on-line survey designed to assess interactions between several psychosocial variables (self-compassion, body appreciation, and motivation for exercise), age, body mass index, and levels of physical activity and exercise in middle-aged women. The sample will be nationally recruited on-line with assistance from the Center for Clinical and Translational Science (CCTS). The survey will be created using Qualtrics Research Suite and will include several psychosocial measurement tools and a demographic questionnaire. Recruited participants will be able to access the survey via any internet connection. Participant risk is minimal; participants may choose to discontinue the survey at any time. Each participant who completes the survey will have the opportunity to enroll in a drawing to win one of four $25 gift cards, as well as to register to receive information regarding results of the study. Data will be analyzed using Qualtrics Research Suite, Excel, SPSS and LISREL (structural equation modeling software).

Expected benefits include a growing knowledge base regarding exercise correlates and increased understanding of the relationships between psychosocial variables that may affect levels of exercise participation in this population of middle-aged women. As physical inactivity is considered a significant worldwide health concern and women are consistently less physically active than men, new avenues to investigate exercise initiation and adherence are indicated.

15. SCIENTIFIC BACKGROUND & LITERATURE REVIEW

Summarize existing knowledge and previous work that support the expectation of obtaining useful results without undue risk to human subjects. Use complete sentences (limit 300 words).

Engaging in adequate levels of physical activity and exercise (PAEx) is considered key to maintaining health (WHO, 2012). The Centers for Disease Control and Prevention (2012) reported that Americans fail to engage in adequate levels of PAEx. PAEx levels decline as we age, and women are less active than men. Only 18% of adult women meet Health and Human Services physical activity guidelines, with further declines in physical activity levels after age 45 (Artero et al., 2013). Exercise science scholars continue to explore new methods to motivate sedentary individuals to engage in PAEx and to maintain PAEx throughout their lifetime.

Recent research suggests that the focus on long-term health benefits of exercise is an ineffective frame for motivating individuals to begin and maintain adequate levels of PAEx (e.g., Searle, Eccles & Richardson, 2011). Some studies indicate a focus on immediate benefits (improved quality of life, decreased stress, increased vitality, etc.) may facilitate PAEx behavior among middle-aged women (Huberty et al., 2003). Searle, Lepore & Hoke (2006). Self-compassion, a new psychological construct encompassing self-knowledge, mindfulness and common humanity is positively correlated with psychological well-being and quality of life and negatively correlated with depression, stress and procrastination (Brown & Ryan, 2010). Since 2010, seven studies exploring the relationship between self-compassion, body image and exercise have been published. While subjects were primarily high school and college-aged women, key findings include a significant positive correlation between self-compassion and motivation for exercise, and significant negative correlations between self-compassion and social physique anxiety and body concern (Magnus, Kowalski, & McHugh, 2010). Moreover, Kowalski, Sabiston, Gedwick, Tracy, 2011; Wansley, Jackson, MacKinnon, & MacKinnon, 2012). Assessing the relationship between self-compassion, body image, exercise motivation and PAEx in middle-aged women will add to the body of research exploring self-compassion interventions to facilitate health-related behavior and overall quality of life.
16. RESEARCH OBJECTIVES

List the specific scientific or scholarly aims of the research study.

(1) To assess the magnitude and direction of relationships among several personal variables (self-compassion, body image, motivation for exercise, age & body mass index) and their correlation with physical activity/exercise (PA/Ex) level in middle-aged women.
(2) To assess the capacity of several measurement tools to evaluate body image in this population of middle-aged women.
(3) To determine the optimal motivational types for predicting overall exercise motivation in this population of middle-aged women.

17. RESEARCH METHODS & ACTIVITIES

a. Identify and describe all interventions and interactions that are to be performed solely for the research study. Distinguish research (i.e., experimental) activities from non-research activities. Provide description (e.g., spreadsheet or forms) of data being collected. Do not include case report forms for multi-site industry-sponsored or cooperative group studies.

This research study is designed as a cross-sectional survey and requires only on-line interaction at one time point. Participants will complete the survey, which serves as the data collection point. After completing the survey, if they choose to, participants will be directed to another website where they can either enroll in a drawing to win one of four gift cards, or register to receive information regarding results when available. This study is non-experimental in nature.

b. Check all research activities that apply:

- Anesthesia (general or local) or sedation
- Audio, video, digital, or image recordings
- Biological samples (e.g., DNA, infectious agents, select agents, toxins)
- Biological sampling (other than blood)
- Blood drawing
- Coordinating Center
- Data, not publicly available
- Data, publicly available
- Data repositories → Complete Appendix C
- (future unspecified use, including research databases)
- Deception → Complete Appendix D & Appendix MI
- Devices → Complete Appendix F
- Diet, exercise, or sleep modifications
- Drugs or biology → Complete Appendix E
- Emergency research
- Focus groups
- Food supplements
- Gene transfer
- Genetic testing → Complete Appendix C
- Internet or e-mail data collection
- Magnetic Resonance Imaging (MRI)
- Materials that may be considered sensitive, offensive, threatening, or degrading
- Non-invasive medical procedures (e.g., EKG, Dopplers)
- Observation of participants (including field notes)
- Oral history (does not include medical history)
- Placebo
- Pregnancy testing
- Program Protocol (Umbrella Protocol)
- Radiation (e.g., CT or DEXA scans, X-rays, nuclear medicine procedures) → Complete Appendix V
- Randomization
- Record review (which may include PHID)
- Stem cell research
- Storage of biological materials → Complete Appendix H
- (future unspecified use, including repositories)
- Surgical procedures (including biopsies)
- Surveys, questionnaires, or interviews (one-on-one)
- Surveys, questionnaires, or interviews (group)
- Other

Specify:

18. DURATION

Estimate the time required from each participant, including individual interactions, total time commitment, and long-term follow-up, if any.

Completion of the on-line survey should take 15-30 minutes. There is no long-term follow-up.
19. NUMBER OF PARTICIPANTS

The number of participants is defined as the number of individuals who agree to participate (i.e., those who provide consent or whose records are accessed, etc.) even if all do not prove eligible or complete the study. The total number of research participants may be increased only with prior IRB approval.

a. Provide the total number of participants (or number of participant records, specimens, etc.) for whom you are seeking Ohio State University IRB approval. 10,192

b. Explain how this number was derived (e.g., statistical rationale, attrition rate, etc.).

The primary recruitment method to be utilized for this study is online via the ResearchMatch database. Based upon preliminary feasibility screening, and estimated number of subjects meeting inclusion criteria, the maximum number of subjects who could elect to complete the study is 10,192. Based upon a range of subjects fitting all required criteria, and anticipated response rate between 10% and 40%, the predicted number of participants who will complete the survey ranges from 637 to 3,587.

c. Is this a multi-site study? ☑ Yes Indicate the total number of participants to be enrolled across all sites: __________

 soften

20. PARTICIPANT POPULATION

a. Specify the age(s) of the individuals who may participate in the research:

Age(s): 35-66 years of age

b. Specify the participant population(s). Check all that apply:

☑ Adults

☐ Children (< 18 years) → Complete Appendix J

☐ Adults with decisional impairment → Complete Appendix W

☐ Non-English speaking → Complete Appendix J

☐ Student research pools (e.g., psychology, linguistics) Specify: __________________________

☐ Pregnant women/fetuses → Complete Appendix K

Do not complete Appendix K unless pregnant women will be intentionally recruited and/or studied.

☐ Neonates (uncertain viability/moribund) → Complete Appendix K

☐ Prisoners → Complete Appendix L

☐ Unknown (e.g., secondary use of data/specimens; non-targeted surveys, program protocols)

Specify: __________________________

c. Describe the characteristics of the proposed participants, and explain how the nature of the research requires/justifies their inclusion.

Proposed participants will be 35-66 year old women, who are U.S. citizens and able to read and understand English. The purpose of the study is to assess the relationship of several psychosocial factors and exercise level in middle-aged women, with the ultimate goal of informing future research to help this low-active group of women increase lifetime physical activity.

d. Will any participants be excluded based on age, gender, race/ethnicity, pregnancy status, language, education, or financial status? ☑ Yes ☐ No

If Yes → Explain the criteria and reason(s) for each exclusion. Consider the study’s scientific or scholarly aims and risks.

Pregnant and first year postpartum women are excluded from this study due to effect on ability to exercise, because exercise level is a primary outcome of interest, and confounding effects of pregnancy on body image.

e. Are any of the participants likely to be vulnerable to coercion or undue influence? Consider students, employees, terminally ill persons, or others who may have limited autonomy? ☑ Yes ☐ No

If Yes → Describe additional safeguards to protect participants’ rights and welfare. Consider strategies to ensure voluntary participation.
21. PARTICIPANT IDENTIFICATION, RECRUITMENT, & SELECTION

a. Provide evidence that you will be able to recruit the necessary number of participants to complete the study.

We are working in conjunction with CCTS to identify and recruit subjects. ResearchMatch will provide sample participants based upon initial estimates of eligible subjects and estimated response rates. In addition, CCTS has developed flyers, which will be posted in campus buildings in an effort to recruit additional participants, and the study will be posted on StudySearch. Also, friends, colleagues, and acquaintances of the primary investigator, co-investigator, and key personnel are potential participants. If these initial recruitment methods do not provide a sufficient number of subjects, additional recruitment will be conducted via on-line women’s organizations and social media (Facebook, etc.).

b. Describe how potential participants will be identified (e.g., advertising, individuals known to investigator, record review, etc.). Explain how investigators will gain access to this population, as applicable.

CCTS personnel will issue notices to eligible participants through ResearchMatch, as well as post the study on StudySearch. The primary investigator, co-investigator, and key personnel may contact potential participants known to them, and provide them with the co-investigator’s email address for further information regarding the study. Recruitment flyers posted in campus buildings will also include the co-investigator’s email address for further information. Individuals contacting the co-investigator by email will be instructed to include “SC Exercise Study” in the subject line for ease of identification. The co-investigator will then email any interested individuals with the link to the survey website.

c. List the names of investigator(s) and/or key personnel who will recruit participants.

Dr. Janet Buckworth
Dr. Diane Habash
Dr. Maryanna Kiat
Rose Halter
Bair Grossenbacher
Michelle Thall

d. Describe the process that will be used to determine participant eligibility.

The ResearchMatch database is structured to allow on-line selection of eligible participants based on age and gender. Additional inclusion and exclusion criteria will be noted in the ResearchMatch ad sent to potential participants who meet the initial criteria. The survey will ask participants to check male or female and indicate age. If participants identify as male or outside the range of 35 – 60 years of age, they will be thanked and re-directed out of the survey.

e. Describe the recruitment process, including the setting in which recruitment will take place. Provide copies of proposed recruitment materials (e.g., ads, flyers, website postings, recruitment letters, and/or handwritten notes).

Recruitment will take place on-line for ResearchMatch. The ad is attached. Flyers will be posted in campus buildings; a sample is attached.

f. Explain how the process respects potential participants’ privacy.

All surveys are completed on-line, at the participant’s convenience. They may choose to exit the survey and discontinue participation at any time. All data gathered will be anonymous and kept confidential. If participants choose to enroll in the drawing or register to receive survey results, they will be re-directed to a separate website to provide their email contact information in order to protect their privacy.

22. INCENTIVES TO PARTICIPATE

Will participants receive compensation or other incentives (e.g., free sunscreen, cash payments, gift certificates, et al.) to participate in the research study? Compensations plans should be pre-authorized (not contingent upon study completion) and should consider participant withdrawal, as applicable.

If Yes: Describe the incentive, including the amount and timing of all payments.
Participants who complete the survey can choose to enroll in a drawing to win one of four $25 gift cards. The drawing will occur within one month of the data of the last registered participant. Winning participants will be contacted by email to determine the most convenient method to claim their prize. Prizes will be distributed within one month of this contact.

23. ALTERNATIVES TO STUDY PARTICIPATION

Other than choosing not to participate, list any specific alternatives, including available procedures or treatments that may be advantageous to the subject.

N/A

24. INFORMED CONSENT PROCESS

Indicate the consent process(es) and document(s) to be used in the study. Check all that apply. Provide copies of documents and/or complete relevant appendices, as needed. See Consent for Research for templates. IRPP policies Informed Consent Process and the Elements of Informed Consent, Documentation of the Informed Consent Process, and Assent and Parental Permission or consent ORPP for more information.

☐ Assent – Form
☐ Assent – Verbal Script
☒ Informed Consent – Form
☐ Informed Consent – Verbal Script → Complete Appendix M2
☐ Informed Consent – Addendum

☐ Parental Permission – Form
☐ Parental Permission – Verbal Script → Complete Appendix M2
☐ Translated Consent/Assent – Form(s) → Complete Appendix M3
☐ Waiver or Alteration of Consent Process → Complete Appendix M1
☐ Waiver of Consent Documentation → Complete Appendix M2

b. List the names of investigator(s) and/or key personnel who will obtain consent from participants or their legally authorized representatives.

N/A

c. Who will provide consent or permission (i.e., participant, legally authorized representative, parent and/or guardian)?

☐ N/A

The participants will provide their own consent to participate in the research.

d. Describe the consent process. Explain when and where consent will be obtained and how subjects and/or their legally authorized representatives will be provided sufficient opportunity (e.g., waiting period, if any) to consider participation.

The informed consent will be located on the first page of the online survey. The individual reading the consent will be provided with information about the study purpose and involvement, as well as contact information for the PI. Only once they have consented, will they be able to proceed to the remainder of the survey. Participants can stop completing the survey at any time. If they do not return to the survey and complete it within one week, their responses will be discarded. In addition, if they complete the survey, they can still elect to have their answers discarded at the very end of the survey. Completion of the survey and submission to the investigators implies consent.

e. Explain how the possibility of coercion or undue influence will be minimized in the consent process.

☐ N/A

The participants will choose the time and place most convenient for them to complete the survey. No research team member will be present when the participant completes the survey instrument. Additionally, they can choose to discontinue taking the survey at any time. These factors minimize the risk of coercion.
26. PRIVACY OF PARTICIPANTS

a. Describe the provisions to protect the privacy interests of the participants. Consider the circumstances and nature of information to be obtained, taking into account factors (e.g., age, gender, ethnicity, education level, etc.) that may influence participants' expectations of privacy.

The survey will be online and anonymous. The only risk to privacy would be internet security issues. These issues will be minimized by using an OSU approved survey host through the College of Education and Human Ecology. The information that the subjects provide will not be linked to them, and all information will remain anonymous. Additionally, IP addresses from which the participant completed the survey will not be stored. Participants will be warned of this possible, minimal risk.

b. Does the research require access to personally identifiable private information?
   - Yes
   - No

If Yes → Describe the personally identifiable private information involved in the research. List the information source(s) (e.g., educational records, surveys, medical records, etc.).

26. CONFIDENTIALITY OF DATA

a. Explain how information is handled, including storage, security measures (as necessary), and who will have access to the information. Include both electronic and hard copy records. Methods for handling and storing data (including the use of personal computers and portable storage devices) must comply with university policies. Restricted data, including protected health information, must be encrypted if stored or used on portable devices, if removed from a secure university location, or if electronically transmitted. For more information, see Policy on Institutional Data and Research Data Policies.

All data and information recorded will be stored electronically. All collected data will be confidential and safely secured in a server located at The Ohio State University, accessible only to investigators and IRB approved key personnel involved in the study. Participants will be informed of the procedures that will be taken to ensure confidentiality prior to participation in the study.

b. Explain if any personal or sensitive information that could be potentially damaging to participants (e.g., relating to illegal behaviors, alcohol or drug use, sexual attitudes, mental health, etc.) will be collected.
   - N/A

c. Will you be obtaining an NIH Certificate of Confidentiality?
   - Yes → Provide a copy before you begin the research
   - No

See HRPP policy Privacy and Confidentiality for more information.

d. Explain any circumstances (ethical or legal) where it would be necessary to break confidentiality.
   - N/A

e. Indicate what will happen to identifiable data at the end of the study. Primary research data should be retained for a minimum of five years after final project closeout. For more information, see the university’s Research Data Policy. Other research-related records should be retained for a period of at least three years after the research has been discontinued (i.e., no further data collection, long term follow-up, re-contact, or analysis of identifiable/coded data).
   - Identifiable data were not collected
Identifiers will be permanently removed from the data and destroyed (resulting in de-identified data)
- Identifiable or coded/linked data will be retained and stored securely (as appropriate)
- Identifiable data will be retained and may be made public with participant consent (e.g., ethnographic research)

27. HIPAA RESEARCH AUTHORIZATION
Will individually identifiable Protected Health Information (PHI) subject to the HIPAA Privacy Rule requirements be accessed, used, or disclosed in the research study?
- ☑ No
- ☐ Yes → Check all that apply:
  - Written Authorization → Provide a copy of the Authorization Form
  - Partial Waiver (recruitment purposes only) → Complete Appendix N
  - Full Waiver (entire research study) → Complete Appendix N
  - Alteration (written documentation) → Complete Appendix N

28. REASONABLY ANTICIPATED BENEFITS
a. List the potential benefits that participants may expect as a result of this research study. State if there are no direct benefits to individual participants. *Compensation is not to be considered a benefit.*

There are no direct benefits to individual participants.

b. List the potential benefits that society and/or others may expect as a result of this research study.

This research study aims to provide a better understanding of how body image, self-compassion and motivation for exercise intersect and contribute to actual exercise levels in middle-aged women. With this increased knowledge, new strategies can be used to develop future PAEx interventions tailored to this population.

29. RISKS, HARMs, & DISCOMFORTS
a. Describe all reasonably expected risks, harms, and/or discomforts that may apply to the research. Discuss severity and likelihood of occurrence. As applicable, include potential risks to an embryo or fetus if a woman is or may become pregnant. Consider the range of risks, including physical, psychological, social, legal, and economic.

There will be no physical or social risks to participating in this research as participants will be only be asked to complete the survey anonymously online. They will complete this survey individually which will mean no one will be able to see their answers. Therefore no social harms are anticipated. Additionally, no information about illegal behaviors will be collected, no legal harms are anticipated. No economic harms are anticipated as the total amount of time the participants will give up as part of the research is minimal. There is a possibility of temporary psychological discomfort from answering questions about their weight, body image and other attitudes toward the self.

b. Describe how risks, harms, and/or discomforts will be minimized. *If testing will be performed to identify individuals who may be at increased risk (e.g., pregnant women, individuals with HIV/AIDS, depressive disorders, etc.), address timing and method of testing; include how positive test results will be handled.*

The possible psychological discomfort is minimized by the anonymous nature of the survey and the ability of the respondent to end the survey at any point.

30. MONITORING

Does the research involve greater than minimal risk (i.e., are the harms or discomforts described in Question 29 beyond what is ordinarily encountered in daily life or during the performance of routine physical or psychological tests)?
- ☑ Yes
- ☐ No

If Yes → Describe the plan to oversee and monitor data collected to ensure participant safety and data integrity. Include the following:
The information that will be evaluated (e.g., incidence and severity of actual harms compared to that expected);
Who will perform the monitoring (e.g., investigator, sponsor, or independent monitoring committee);
Timing of monitoring (e.g., at specific points in time, after a specific number of participants have been enrolled); and
Decisions to be made as a result of the monitoring process (e.g., provisions to stop the study early for unanticipated problems).

31. ASSESSMENT OF RISKS & BENEFITS
Discuss how risks to participants are reasonable when compared to the anticipated benefits to participants (if any) and the importance of the knowledge that may reasonably be expected to result.

The minor psychological risk is reasonable given that middle-aged women are one of the least active segments of a population that is already low-active, and that results of the study may yield information that is helpful in better understanding drivers of activity in this population. Further, if self compassion is correlated with lower negative body image and higher levels of physical activity, this would provide a basis for using self-compassion coping strategies, as part of a future intervention aimed at increasing PA/Ex levels in middle-aged women.

32. PARTICIPANT COSTS & REIMBURSEMENTS
a. List any potential costs participants (or their insurance) will incur as a result of study participation (e.g., parking, study drugs, diagnostic tests, etc.).
All participants will complete the survey online at their convenience. There is no monetary cost to participation, other than the participant’s time.

b. List any costs to participants that will be covered by the research study.
There is no compensation provided for the participant’s time.

33. APPLICATION CONTENTS
Indicate the documents being submitted for this research project. Check all appropriate boxes.
☑ Initial Review of Human Subjects Research Application
☑ Appendix A1: Ohio State University Co-Investigators & Key Personnel (questions 4 & 5)
☐ Appendix A2: External (non-OH State) Co-Investigators & Key Personnel (question 6)
☐ Appendix B: Expedited Review – Initial Review (question 13)
☐ Appendix C: Data Repositories (question 17b)
☐ Appendix D: Deception (question 17b)
☐ Appendix E: Devices (question 17b)
☐ Appendix F: Drugs or Biologics (question 17b)
☐ Appendix G: Genetic Testing (question 17b)
☐ Appendix H: Storage of Biological Materials (question 17b)
☐ Appendix I: Children (question 26b)
☐ Appendix J: Non-English Speaking Participants (questions 26a and 24a)
☐ Appendix K: Pregnant Women/Fetuses/Neonates (question 29b)
☐ Appendix L: Prisons (question 29b)
☐ Appendix M1: Waiver or Alteration of Consent Process (questions 17b & 24a)
☑ Appendix M2: Waiver of Consent Documentation (question 24a)
The Ohio State University Institutional Review Board - INITIAL REVIEW OF HUMAN SUBJECTS RESEARCH

☐ Appendix N: Waiver or Alteration of HIPAA Research Authorization (question 27)
☐ Appendix U: Research in International Settings (question 12)
☐ Appendix V: Radiation (question 17b)
☐ Appendix W: Adults with Decisional Impairment (question 20b)
☒ Consent form(s), Assent Form(s), Permission Form(s), and Verbal Script(s), including translated documents (question 24a)
☒ HIPAA Research Authorization Form(s) (question 27)
☐ Data Collection Form(s) for Investigator-Initiated Studies (question 17a)
☐ Data Collection Form(s) involving protected health information (Appendix N)
☒ Recruitment Materials (e.g., ads, flyers, telephone or other oral script, radio/TV scripts, internet solicitations) (question 21d)
☐ Script(s) or Information Sheet(s), including Debriefing Materials (question 24)
☒ Instruments (e.g., questionnaires or surveys to be completed by participants) (question 17b)
☐ Other Committee Approvals/Letters of Support (questions 11 & 12)
☒ Research Protocol
☐ Complete Grant Application or Funding Proposal, as applicable
☐ Drug Manufacturer’s Approved Labeling/Investigator’s Drug Brochure (Appendix F)
☐ Device Manufacturer’s Approved Labeling (Appendix E)
☐ Other supporting documentation and/or materials

For Multi-Site Clinical Trials supported by DHHS, the submission will also include:
☐ DHHS-approved Sample Informed Consent Document (if one exists)
☐ DHHS-approved Protocol (if one exists)

34. ASSURANCE

PRINCIPAL INVESTIGATOR (or Advisor)

I agree to follow all applicable federal regulations, guidance, state and local laws, and university policies related to the protection of human subjects in research, as well as professional practice standards and generally accepted good research practices for investigators, including, but not limited to, the responsibilities described in IRB policy Responsibilities of Principal Investigators, Co-Investigators, and Key Personnel.

I verify that the information provided in this Initial Review of Human Subjects Research application is accurate and complete. I will initiate this research only after having received notification of final IRB approval.

Signature of Principal Investigator (or Advisor)

Date

Printed Name of Principal Investigator (or Advisor)

DEPARTMENT CHAIR (or Signatory Official)

As Department Chair (or Signatory Official) for the Principal Investigator, I acknowledge that this research is in keeping with the standards set by our unit and that it has met all Departmental/College requirements for review.

If the PI or any co-investigator is also the Department Chair, the signature of the Dean or other appropriate Signatory Official, such as the Associate Dean for Research, must be obtained.

Signature of Department Chair

Date

Printed name of Department Chair

Form Date: 04/13/15
Version 1.3

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APPENDIX M2
Waiver of Consent Documentation

Complete this form to request a waiver of consent documentation for the proposed research. DHHS regulations permit waivers of documentation of the consent process if the research meets certain conditions. DHHS and FDA regulations differ regarding when an IRB may waive the requirement to document the informed consent process.

Do not complete this form to request a waiver or alteration of the consent process, use Appendix M1.

For additional guidance, see IRB policy Documentation of the Informed Consent Process and the IRB Reviewers Reference Sheets – Appendix 2.

PI Name: Buckworth, Janet

1. Is the research subject to FDA regulations (e.g., involves use of a food, drug, biologic, device)?
   - Yes
   - No [X]

If Yes, only section (2) may be used to request waiver of consent documentation.
If No, either section (2) or (3) may be used to request waiver of consent documentation.

Documentation of consent cannot be waived under the conditions of the last section below if the research involves a product regulated by FDA or if the results of the research may be submitted to FDA as part of a marketing application.

2. Both answers below (2a and 2b) must be No for a waiver of consent documentation:
   a. Does the research present greater than minimal risk? [X] No
   b. Does the research involve procedures for which written consent is normally required outside the research context? [X] No

If No, explain how the research meets both (2a and 2b) of the conditions above.

   A. The research will be conducted as a one-time, online, survey and consists of providing demographic information and responses to questions about attitudes and beliefs. Survey responses will not be linked to participant names or email addresses. Participants can stop completing the survey at any time and not submit their responses.
   B. Completing online surveys of this nature outside of the research environment does not normally require written consent.

3. Both answers below (3a and 3b) must be Yes for a waiver of consent documentation:
   a. Would the only record linking the participant and the research be the consent document? [X] No
   b. Would the principal risk to the participant be potential harm resulting from a breach in confidentiality? [X] No

   Note: The participant should be asked whether he/she wants documentation linking the participants with the research; the participant's wishes will govern.

   If Yes, explain how the research meets both (3a and 3b) of the conditions above.
# APPENDIX A1
Ohio State University Co-Investigators & Key Personnel

Complete this form to list Ohio State University co-investigators and key personnel on the research study. Signatures are required of all Ohio State University co-investigators. Use Appendix A2 to list external (non-Ohio State) co-investigators and key personnel. Researchers should only be listed in one category (e.g., PI, co-investigator, or key personnel).

Key personnel are defined as individuals who participate in the design, conduct, or reporting of human subjects research. At a minimum, include individuals who recruit participants, obtain consent, or who collect study data. All Ohio State University individuals listed on this protocol will have access to information about IRB actions and the completion status of each individual's administrative and training requirements (CHRI, COI disclosure). Note: Personal financial information provided in COI disclosures is not included.

**PI Name:** Buckworth, Janet

## OHIO STATE UNIVERSITY CO-INVESTIGATORS

As co-investigator, I agree to follow all applicable federal regulations, guidance, state and local laws, and university policies related to the protection of human subjects in research, as well as professional practice standards and generally accepted good research practices for investigators, including, but not limited to, the responsibilities described in HRPP policy Responsibilities of Principal Investigators, Co-Investigators and Key Personnel.

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<thead>
<tr>
<th>Name (Last, First, M/D/Y)</th>
<th>Degree(s)</th>
<th>College (T/U):</th>
<th>Phone</th>
<th>E-mail:</th>
<th>University ID #:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hall, Michele S.</td>
<td>MS</td>
<td>Education &amp; Human Ecology</td>
<td>(614) 844-1506</td>
<td><a href="mailto:Hallm.5@osu.edu">Hallm.5@osu.edu</a></td>
<td>200042705</td>
</tr>
</tbody>
</table>

Signature of co-investigator

Date

Printed name of co-investigator

<table>
<thead>
<tr>
<th>Name (Last, First, M/D/Y)</th>
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<th>College (T/U):</th>
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<th>University ID #:</th>
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Signature of co-investigator

Date

Printed name of co-investigator

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<tr>
<th>Name (Last, First, M/D/Y)</th>
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</table>

Signature of co-investigator

Date

Printed name of co-investigator

Form date: 05/04/12

Version 2.1
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<tr>
<th>Name (Last, First, MD)</th>
<th>Department Name</th>
<th>Email</th>
<th>Research role/activities performed for study (e.g., data collection)</th>
<th>University Title</th>
<th>University ID #</th>
<th>Phone</th>
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<tr>
<td>Habash, Diana</td>
<td>Health Sci &amp; Med Diet</td>
<td><a href="mailto:Diana.habash@osumc.edu">Diana.habash@osumc.edu</a></td>
<td>Recruitment assistance</td>
<td>Clinical Associate Professor</td>
<td>88085354</td>
<td>614-292-6689</td>
</tr>
<tr>
<td>Khatt, Maryanna</td>
<td>BRS</td>
<td><a href="mailto:Khatt.8@osum.edu">Khatt.8@osum.edu</a></td>
<td>Research assistance</td>
<td>Associate Professor</td>
<td>98075836</td>
<td>614-292-0065</td>
</tr>
<tr>
<td>Hallen, Rose</td>
<td>CCTS</td>
<td><a href="mailto:hallen.1@osum.edu">hallen.1@osum.edu</a></td>
<td>Recruitment assistance</td>
<td>Clinical Irish Recruitment Program Director</td>
<td>96115377</td>
<td>614-292-1498</td>
</tr>
<tr>
<td>Gonzenhauser, Blair</td>
<td>CCTS</td>
<td><a href="mailto:gonzenhauser.2@osum.edu">gonzenhauser.2@osum.edu</a></td>
<td>Recruitment assistance</td>
<td>Program Coordinator</td>
<td>20003081</td>
<td>614-292-4376</td>
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APPENDIX B
Expedited Review – Initial Review

Complete this form to request expedited review of the proposed research. If the research meets the conditions for expedited review, the review of the protocol will be carried out by the IRB chairperson or by one or more experienced reviewers designated by the chairperson from among members of the IRB.

See 45 CFR 46 and 21 CFR 56 for more information.

PI Name: Buckworth, Janet

Conditions required for expedited IRB review:

1) The Federal Regulations establish two main criteria for an expedited review:
   a) The research may not involve more than "minimal risk." "Minimal risk" means that "the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests." (45 CFR 46.102(d) and 21 CFR 56.102(d)).
   b) The entire research project must be consistent with one or more of the federally defined categories.

2) The categories in this list apply regardless of the age of the participant, except as noted.

3) The expedited review procedure may not be used where identification of the participants and/or their responses would reasonably place them at risk of criminal or civil liability or of being damaged to the participant's financial standing, employability, insurability, reputation, or be stigmatizing, unless reasonable and appropriate protections will be implemented so that risks related to invasion of privacy and breach of confidentiality are no greater than minimal.

4) The expedited review procedure may not be used for classified research involving human subjects.

5) Investigators and IRBs are reminded that the standard requirements for informed consent (or its waiver, alteration, or exception) apply regardless of the type of review (i.e., expedited or convened) utilized by the IRB.

Indicate all categories that describe the research project.

- [ ] (1) Clinical studies of drugs and medical devices only when condition (a) or (b) is met.
  a) Research on drugs for which an investigational new drug application (21 CFR 312) is not required. (Note: Research on marketed drugs that significantly increases the risks or decreases the acceptability of the risks associated with the use of the product is not eligible for expedited review.)
  b) Research on medical devices for which (1) an investigational device exemption application (21 CFR 812) is not required; or (2) the medical device is cleared/approved for marketing and the medical device is being used in accordance with its cleared/approved labeling.

- [ ] (2) Collection of blood samples by finger stick, heel stick, ear stick, or venipuncture as follows:
  a) from healthy, nonpregnant adults who weigh at least 110 pounds. For these participants, the amount drawn may not exceed 330 ml in an 8 week period and collection may not occur more frequently than 2 times per week.
  b) from other adults and children (defined as "persons who have not attained the legal age for consent to treatments or procedures involved in the research, under the applicable law of the jurisdiction in which the research will be conducted." 45 CFR 46.402(a)), considering the age, weight, and health of the participants, the collection procedure, the amount of blood to be collected, and the frequency with which it will be collected. For these participants, the amount drawn may not exceed the lesser of 30 ml or 5 ml per kg in an 8 week period and collection may not occur more frequently than 2 times per week.

- [ ] (3) Prospective collection of biological specimens for research purposes by non-invasive means.
  Examples: (a) hair and nail clippings in a non-intrusive manner; (b) deciduous teeth at time of exfoliation or if
routine patient care indicates a need for extraction; (c) permanent teeth if routine patient care indicates a need for extraction; (d) secreted and external secretions (including sweat); (e) unstimulated saliva collected either in an unstimulated fashion or stimulated by chewing gumbase or wax or by applying a dilute citric solution to the tongue; (f) placenta removed at delivery; (g) anesthetic fluid obtained at the time of rupture of the membrane prior to or during labor; (h) supragingival and subgingival dental plaque and calculus, provided the collection procedure is not more invasive than routine prophylactic scaling of the teeth and the process is accomplished in accordance with accepted prophylactic techniques; (i) mucosal and skin cells collected by buccal scraping or swab, skin swab, or mouth washings; (j) spumen collected after saline mist nebulization.

☐ (4) Collection of data through noninvasive procedures (not involving general anesthesia or radiation) routinely employed in clinical practice, excluding procedures involving x-rays or microwaves. Where medical devices are employed, they must be cleared/approved for marketing. (Studies intended to evaluate the safety and effectiveness of the medical device are not generally eligible for expedited review, including studies of cleared medical devices for new indications.)

Examples: (a) physical sensors that are applied either to the surface of the body or at a distance and do not involve input of significant amounts of energy into the participant or an invasion of the participant's privacy; (b) weighing or testing sensory acuity; (c) magnetic resonance imaging; (d) electrocardiography, electroencephalography, thermography, detection of naturally occurring radioactivity, electroteleradiography, ultrasound, diagnostic infrared imaging, doppler blood flow, and echocardiography; (e) moderate exercise, muscular strength testing, body composition assessment, and flexibility testing whose appropriate given the age, weight, and health of the individual.

☐ (5) Research involving materials (data, documents, records, or specimens) that have been collected or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis). (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects 45 CFR 46.101(b)(4). This listing refers only to research that is not exempt.)

☐ (6) Collection of data from voice, video, digital or image recordings made for research purposes.

☐ (7) Research made on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects 45 CFR 46.101 (b)(2) and (b)(5). This listing refers only to research that is not exempt.)
Appendix E: Consent Script and Questionnaire

Consent to Participate in Research: Exercise & Physical Activity in Women
Researchers: Janet Buckworth & Michelle Thall

This document contains important information about this study and what to expect if you decide to participate.

Your participation is voluntary.
Please consider the information carefully. If you decide to participate, you will be asked to click the consent button below to continue to the survey.

The purpose of this study is to examine thoughts, beliefs and attitudes that women 35-60 years old have about physical activity and about themselves. We want to use this information to create better health-related physical activity programs for women.

Participation in this study will only involve completion of this anonymous on-line survey, which should take 15-30 minutes. Please try to answer all questions, but you may skip any that you do not wish to answer. Once you have completed the survey, clicking on the Submit button at the end of the questionnaire will send your answers over the Internet to a secure server. If you click the Discard button, your responses will not be recorded. There will be no follow-up survey.

Benefits and Risks: There will be no direct benefit to you for participating in this survey. The results of this study may provide information to create more effective physical activity programs for women in the future. The only anticipated risk to taking this survey may be emotional discomfort in considering your responses to certain topics.

Confidentiality and Privacy: This survey is anonymous. We will not ask you to provide any personal information that could be used to identify you. Please do not include any personal information, such as your name or email, in your responses. Please be aware that Internet communications can be insecure. We cannot guarantee your privacy and confidentiality while the data are transmitted to us over the Internet. However, once we receive the completed surveys, any information that is obtained in connection with this study and that can be identified with you will remain confidential except as required by law (such as knowledge that a felony has been or is being committed). The results from your participation will be anonymous. A summary of the research results from all participants will be published but no mention will be made of individual results.
Incentives: When you complete this survey, you will have the opportunity to enroll in a drawing to win one of four $25 gift cards. Your odds of winning a gift card are 1 in 523, based on the most likely number of participants, but those odds will vary based upon the number of individuals who complete the survey and choose to enroll in the drawing. If you choose to enroll in the drawing, your name and contact information will be collected through a separate website and will not be linked to the responses you provide in this survey.

Voluntary Participation: Your participation is voluntary. You may discontinue the survey at any time without penalty or loss of benefits to which you are otherwise entitled. An Institutional Review Board responsible for human subjects research at The Ohio State University reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

Questions: If you have any questions about this study, or feel you have been harmed by participating in the study, you can contact, Dr. Janet Buckworth at 614-292-0757 or at Buckworth.1@osu.edu (Address: A44 PAES Bldg, 305 W. 17th Ave., Columbus, OH 43210-1224). For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

Consent for participation: Submittal of the survey will be considered as your consent to participate in this study. Click on “I consent to participate in this research” to begin the survey. Please save a copy of this page for your reference.

Thank you for agreeing to participate in this survey!

We are studying thoughts, beliefs, and attitudes that women 35-60 years old have about physical activity and about themselves. We want to use this information to create better health-related physical activity programs for women.

- Your answers are anonymous.
- All information you provide will be kept confidential.
- There are no right or wrong answers. Just choose the answers that are most accurate for you.
- Please answer all items.
- You can choose to discontinue the survey at any time.
Background Information

1. Age: __________________

2. Gender: ______ Male
            ______ Female

3. Please indicate highest education level:
   ____ Some High School   ____ High School Diploma
   ____ Some College       ____ College Degree
   ____ Graduate Degree    ____ Professional Degree

4. Marital Status: ______ Single (Never married)    ______
                    Married/partnered
                    ______ Separated    ______ Divorced    ______
                    Widowed

5. Please use the following guidelines and indicate which best describes your current status:

   ____ Pre-menopausal: No signs or symptoms of perimenopause as listed below
   ____ Perimenopausal: The transition to menopause with many or all of the following:
                          • Lengthening or shortening of the usual menstrual cycle
                          • Irregular bleeding or spotting
                          • Fluctuation in length or amount of usual bleeding
                          • Skipped periods
                          • Hot flashes
                          • Sleep problems/night sweats
• Vaginal dryness
  _____ Menopausal: No menstrual period for the last 12 months

6. Ethnic Background:

  ________ Hispanic or Latino
  ________ Not Hispanic or Latino

7. Race: (please select one category)

  ________ White
  ________ Black or African American
  ________ American Indian or Alaskan Native
  ________ Native Hawaiian or other Pacific Islander
  ________ Asian
  ________ Multi-Racial
  ________ Other
HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

<table>
<thead>
<tr>
<th>Almost never (1)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Almost always</th>
</tr>
</thead>
</table>

1. I’m disapproving and judgmental about my own flaws and inadequacies.
2. When I’m feeling down I tend to obsess and fixate on everything that’s wrong.
3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.
4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.
5. I try to be loving towards myself when I’m feeling emotional pain.
6. When I fail at something important to me I become consumed by feelings of inadequacy.
7. When I’m down and out, I remind myself that there are lots of other people in the world feeling like I am.
8. When times are really difficult, I tend to be tough on myself.
9. When something upsets me I try to keep my emotions in balance.
10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
11. I’m intolerant and impatient towards those aspects of my personality I don’t like.
12. When I’m going through a very hard time, I give myself the caring and tenderness I need.
13. When I’m feeling down, I tend to feel like most other people are probably happier than I am.
14. When something painful happens I try to take a balanced view of the situation.

15. I try to see my failings as part of the human condition.

16. When I see aspects of myself that I don't like, I get down on myself.

17. When I fail at something important to me I try to keep things in perspective.

18. When I'm really struggling, I tend to feel like other people must be having an easier time of it.

19. I'm kind to myself when I'm experiencing suffering.

20. When something upsets me I get carried away with my feelings.

21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.

22. When I'm feeling down I try to approach my feelings with curiosity and openness.

23. I'm tolerant of my own flaws and inadequacies.

24. When something painful happens I tend to blow the incident out of proportion.

25. When I fail at something that's important to me, I tend to feel alone in my failure.

26. I try to be understanding and patient towards those aspects of my personality I don't like.
Body Appreciation Scale

Please indicate whether the statement is true about you:

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>_____</td>
<td>1</td>
<td></td>
<td></td>
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<td>2</td>
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<td>_____</td>
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<td>13</td>
<td>_____</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 1 I respect my body
- 2 I feel good about my body
- 3 On the whole, I am satisfied with my body
- 4 Despite its flaws, I accept my body for what it is
- 5 I feel that my body has at least some good qualities
- 6 I take a positive attitude toward my body
- 7 I am attentive to my body’s needs
- 8 My self-worth is independent of my body shape or weight
- 9 I do not focus a lot of energy being concerned with my body shape or weight
- 10 My feelings toward my body are positive, for the most part
- 11 I engage in healthy behaviors to take care of my body
- 12 I do not allow unrealistically thin images of women presented in the media to affect my attitudes toward my body
- 13 Despite its imperfections, I still like my body
Physical Activity Questionnaire (Modified Paffenbarger)

The following questions ask you about your physical activity. Please answer as accurately as possible. Provide a specific number or check your answers in the spaces provided.

1. Was there anything about the past week that made exercising especially different for you in terms of extended illness, injury, or vacation?
   - Yes.
   - No.

2. Stair-Climbing:
   First, we are interested in the number of flights of stairs you climbed on average each day in this week. We only want to know the number of flights you climb going up - not down.
   *When answering this question, One flight of stairs = 10 steps if you know the number of steps.

3. Brisk walking:
   We want to know how much time you spent this past week briskly walking for exercise or transportation. We are interested in bouts of walking that were at least 10 continuous minutes in duration. This would include walking outside, at an indoor facility, or on a treadmill.

   a. How many days this week did you walk briskly for the purpose of exercise or transportation for at least 10 continuous minutes outside, at an indoor facility, or on a treadmill?

   b. On these days in which you walked briskly at least 10 continuous minutes, on average, how many minutes per day did you walk briskly?
4. Sports, fitness, or recreational activities:

*Note: All walking should only be included in Question 3.
*Note: Do not include “occupational” activity as these are not considered to be sport, fitness, or recreational activity.
*Note: Household activities such as cleaning, laundry, yard work and gardening are not to be included here as they are not considered to be a sport, fitness, or recreational activity.

**Moderate-intensity activity** means you are working hard enough to raise your heart rate and break a sweat. One way to tell is that **you will be able to talk, but not sing the words to your favorite song**. Here are some examples of activities that require moderate effort:
- Doing water aerobics
- Riding a bike on level ground or with few hills
- Playing doubles tennis

- **Were there any moderate-intensity sports, fitness, or recreational activities in which you participated during the past week?** We are interested only in time that you were physically active while performing the activity.

<table>
<thead>
<tr>
<th>Moderate-Intensity Sport, Fitness, or Recreation</th>
<th>Days per Week</th>
<th>Average Time per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>minutes</td>
</tr>
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<td></td>
<td></td>
<td>minutes</td>
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<td>minutes</td>
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<tr>
<td></td>
<td></td>
<td>minutes</td>
</tr>
</tbody>
</table>

213
**Vigorous-intensity activity** means you are breathing hard and fast, and your heart rate has gone up quite a bit. If you're working at this level, you won't be able to say more than a few words without pausing for a breath. Here are some examples of activities that require vigorous effort:

- Jogging or running
- Swimming laps
- Riding a bike fast or on hills
- Playing singles tennis
- Playing basketball

- **Were there any vigorous-intensity sports, fitness, or recreational activities in which you participated during the past week?** We are interested only in time that you were physically active while performing the activity.

<table>
<thead>
<tr>
<th>Vigorous-Intensity Sport, Fitness, or Recreation</th>
<th>Days per Week</th>
<th>Average Time per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td></td>
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<tr>
<td>d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Would you say that during the past week (the week used for questions 2-4) you were:
- ☐ less active than usual
- ☐ more active than usual
- ☐ about as active than usual
EXERCISE REGULATIONS QUESTIONNAIRE (BREQ-2)

**WHY DO YOU ENGAGE IN EXERCISE?**

We are interested in the reasons underlying peoples' decisions to engage, or not engage in physical exercise. Using the scale below, please indicate to what extent each of the following items is true for you. Please note that there are no right or wrong answers and no trick questions. We simply want to know how you personally feel about exercise.

<table>
<thead>
<tr>
<th></th>
<th>Not True For Me</th>
<th>Sometimes True For Me</th>
<th>Very True For Me</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I exercise because other people say I should</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>I feel guilty when I don’t exercise</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>I value the benefits of exercise</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>I exercise because it’s fun</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>I don’t see why I should have to exercise</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>I take part in exercise because my friends/family/partner say I should</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>I feel ashamed when I miss an exercise session</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>It’s important to me to exercise regularly</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>I can’t see why I should bother exercising</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>I enjoy my exercise sessions</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>I exercise because others will not be pleased with me if I don’t</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>I don’t see the point in exercising</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>I feel like a failure when I haven’t exercised in a while</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>I think it is important to make the effort to exercise regularly</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>I find exercise a pleasurable activity</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>I feel under pressure from my friends/family to exercise</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>I get restless if I don’t exercise regularly</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>I get pleasure and satisfaction from participating in exercise</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>I think exercising is a waste of time</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
The following pages contain a series of statements about how people might think, feel, or behave. You are asked to indicate the extent to which each statement pertains to you personally. Read each statement carefully and indicate your answer by entering it to the left of the number of the statement.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Definitely</td>
<td>Mostly</td>
<td>Neither</td>
<td>Mostly</td>
<td>Definitely</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>Disagree</td>
<td>Agree Nor</td>
<td>Agree</td>
<td>Agree</td>
</tr>
</tbody>
</table>

2. I am careful to buy clothes that will make me look my best.
3. I would pass most physical-fitness tests.
4. It is important that I have superior physical strength.
5. My body is sexually appealing.
6. I am not involved in a regular exercise program.
7. I am in control of my health.
8. I know a lot about things that affect my physical health.
9. I have deliberately developed a healthy lifestyle.
10. I constantly worry about being or becoming fat.
11. I like my looks just the way they are.
12. I check my appearance in a mirror whenever I can.
13. Before going out, I usually spend a lot of time getting ready.
14. My physical endurance is good.
15. Participating in sports is unimportant to me.
16. I do not actively do things to keep physically fit.
17. My health is a matter of unexpected ups and downs.
18. Good health is one of the most important things in my life.
19. I don't do anything that I know might threaten my health.
20. I am very conscious of even small changes in my weight.
21. Most people would consider me good-looking.
22. It is important that I always look good.
23. I use very few grooming products.
24. I easily learn physical skills.
25. Being physically fit is not a strong priority in my life.
26. I do things to increase my physical strength.
27. I am seldom physically ill.
28. I take my health for granted.
29. I often read books and magazines that pertain to health.
30. I like the way I look without my clothes on.
31. I am self-conscious if my grooming isn't right.
32. I usually wear whatever is handy without caring how it looks.
33. I do poorly in physical sports or games.
34. I seldom think about my athletic skills.
35. I work to improve my physical stamina.
36. From day to day, I never know how my body will feel.
37. If I am sick, I don't pay much attention to my symptoms.
38. I make no special effort to eat a balanced and nutritious diet.
39. I like the way my clothes fit me.
40. I don't care what people think about my appearance.
41. I take special care with my hair grooming.
42. I dislike my physique.
43. I don't care to improve my abilities in physical activities.
44. I try to be physically active.
45. I often feel vulnerable to sickness.
46. I pay close attention to my body for any signs of illness.
47. If I'm coming down with a cold or flu, I just ignore it and go on as usual.
48. I am physically unattractive.
49. I never think about my appearance.
50. I am always trying to improve my physical appearance.
51. I am very well coordinated.
52. I know a lot about physical fitness.
53. I play a sport regularly throughout the year.
54. I am a physically healthy person.
55. I am very aware of small changes in my physical health.
56. At the first sign of illness, I seek medical advice.
57. I am on a weight-loss diet.

For the remainder next 3 items use the response scale given with the item, and enter your answer in the space beside the item.

58. I have tried to lose weight by fasting or going on crash diets.
   1. Never
   2. Rarely
   3. Sometimes
   4. Often
   5. Very Often

59. I think I am:
   1. Very Underweight
   2. Somewhat Underweight
   3. Normal Weight
   4. Somewhat Overweight
   5. Very Overweight

60. From looking at me, most other people would think I am:
   1. Very Underweight
   2. Somewhat Underweight
   3. Normal Weight
   4. Somewhat Overweight
   5. Very Overweight
61-69. Use this 1 to 5 scale to indicate how dissatisfied or satisfied you are with each of the following areas or aspects of your body:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very Dissatisfied</td>
<td>Mostly Dissatisfied</td>
<td>Neither Satisfied Nor Dissatisfied</td>
<td>Mostly Satisfied</td>
<td>Very Satisfied</td>
</tr>
</tbody>
</table>

_____ 61. Face (facial features, complexion)
_____ 62. Hair (color, thickness, texture)
_____ 63. Lower torso (buttocks, hips, thighs, legs)
_____ 64. Mid torso (waist, stomach)
_____ 65. Upper torso (chest or breasts, shoulders, arms)
_____ 66. Muscle tone
_____ 67. Weight
_____ 68. Height
_____ 69. Overall appearance

You are almost done completing this survey. Please answer these final questions about yourself.

1. Currently, which of the following statements best describes you?
   _____ I am not trying to change or maintain my weight
   _____ I am trying to lose weight
   _____ I am trying to gain weight
I am trying to maintain my present weight

2. Height in inches (without shoes): ___________________

3. Weight in pounds: ______________________

4. Please answer any or all of the following questions in your own words:
   - What is your favorite form of physical activity or exercise? _______________________________
   - If you could offer a fellow woman a word of advice about how to get and stay physically active it would be______________________________
   - What is the most important thing you need to be physically active? ______________________

5. How did you find out about this survey?
   - ResearchMatch
   - StudySearch
   - Flyer
   - Friend
   - Word of mouth
   - On-line women's organization
   - Social Media (Facebook, etc.)
   - Don't remember
   - Other

6. What state do you live in:
   - I prefer not to answer this question
   - Alabama
   - Alaska
______ Arizona
______ Arkansas
______ California
______ Colorado
______ Connecticut
______ Delaware
______ District of Columbia
______ Florida
______ Georgia
______ Hawaii
______ Idaho
______ Illinois
______ Indiana
______ Iowa
______ Kansas
______ Kentucky
______ Louisiana
______ Maine
______ Maryland
______ Massachusetts
______ Michigan
______ Minnesota
______ Mississippi
______ Missouri
______ Montana
______ Nebraska
______ Nevada
______ New Hampshire
______ New Jersey
______ New Mexico

221
_____ New York
_____ North Carolina
_____ North Dakota
_____ Ohio
_____ Oklahoma
_____ Oregon
_____ Pennsylvania
_____ Rhode Island
_____ South Carolina
_____ South Dakota
_____ Tennessee
_____ Texas
_____ Utah
_____ Vermont
_____ Virginia
_____ Washington
_____ West Virginia
_____ Wisconsin
_____ Wyoming

THANK YOU!!

[Please click here to submit your survey]

At this point, a dialog box will pop up:

Would you like to enroll in a drawing for a chance to win one of four $25 gift cards?
Would you like to receive study results?
If you are interested in either, please click here[XXXX]

Subjects will be re-directed to a URL of a separate Qualtrics survey site where they will see the following:

Thank you again, for participating in our survey! Please complete the following for a chance to win a gift card or to get results:

Email Address:
Re-type Email Address:

Please check all that apply:

[ ] I would like to enroll in the drawing for a chance to win one of four $25 gift cards.
[ ] I would like to receive study results.
[ ] No thanks.
Appendix F: Calculation of Likely Number of Respondents to Recruitment

<table>
<thead>
<tr>
<th>Exercise &amp; Physical Activity in Middle-Aged Women: The Role of Self-Compassion</th>
<th>Anticipated Number of Participants Recruited via ResearchMatch Database (as of 8/22/13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM-Screened Total*</td>
<td>12,740</td>
</tr>
<tr>
<td>% meeting Addf criteria**</td>
<td>100%</td>
</tr>
<tr>
<td>Total Potential Participants***</td>
<td>12,740</td>
</tr>
<tr>
<td>80%</td>
<td>10,192</td>
</tr>
<tr>
<td>90%</td>
<td>7,644</td>
</tr>
<tr>
<td>40%</td>
<td>5,096</td>
</tr>
<tr>
<td>Predicted Response Rates</td>
<td>35%</td>
</tr>
<tr>
<td>30%</td>
<td>3,822</td>
</tr>
<tr>
<td>25%</td>
<td>3,185</td>
</tr>
<tr>
<td>20%</td>
<td>2,543</td>
</tr>
<tr>
<td>15%</td>
<td>1,911</td>
</tr>
<tr>
<td>10%</td>
<td>1,274</td>
</tr>
<tr>
<td>5%</td>
<td>637</td>
</tr>
<tr>
<td>3%</td>
<td>319</td>
</tr>
</tbody>
</table>

**NOTES:**
- Projected Max/Min
- Projected most likely range of participants

RM-Screened Total* = ResearchMatch allows screening for some of study criteria: Female, aged 35-60
% meeting Addf criteria** = Predicted percent of subjects who are not: Pregnant or 1st year postpartum, or unable to exercise for medical reasons
Total Potential Participants*** = Predicted number of subjects meeting all study criteria
Appendix G: Gift Card Drawing Methods & Email Text

Exercise & Physical Activity in Middle-Aged Women: The Role of Self-Compassion
Gift Card Drawing Methodology

The Qualtrics survey system used to collect data assigned each woman who enrolled in the gift card drawing a random response ID code (example: R_dS72P9TvWjefgPO). Random ID codes for the 1,178 entrants were downloaded to an excel spreadsheet in rows 3 – 1,180. A random number generator was then used to select 4 numbers between 3 and 1,180; a screenshot of the random selection numbers is shown below. The gift card winners were identified by the email addresses associated with the response ID codes on the row numbers randomly selected.
Non-Winners:
Thank you for participating in my research study: Exercise & Physical Activity in Middle-Aged Women: The Role of Self-Compassion! The survey is now closed, but thanks to you, I collected data from over 1,300 women in 48 states and the District of Columbia. The greatest number of surveys were completed by women living in Ohio, Iowa, Tennessee and New York. The gift card drawing has been conducted and the winners of four $25 VISA cards have been separately notified (please see the attached file for information on how the drawing was conducted)! I am sorry you were not one of them, but please know that your time in completing this survey is integral to continuing research that focuses on women’s thoughts, emotions and motivations in regard to exercise and self-care. If you enrolled to receive information regarding study results, I will email again after data has been analyzed and reviewed.

Thank you again for your time and consideration in helping with my research project!

Winners:
Thank you for participating in my research study: Exercise & Physical Activity in Middle-Aged Women: The Role of Self-Compassion! The survey is now closed, but thanks to you, I collected
data from over 1,300 women in 48 states and the District of Columbia. The greatest number of surveys were completed by women living in Ohio, Iowa, Tennessee and New York.

The gift card drawing has been conducted and I am thrilled to tell you that you were selected as one of the four winners of a $25 VISA gift card! Please email back to let me know that you have received this email and include a mailing address where you would like me to send your gift card.

The time you took to complete this survey is integral to continuing research that focuses on women’s thoughts, emotions and motivations in regard to exercise and self-care. If you enrolled to receive information regarding study results, I will email again after data has been analyzed and reviewed.

Thank you again for your time and consideration in helping with my research project!
Appendix H: Visual of Missing Value Patterns