THE ASSOCIATION BETWEEN PHYSICAL SELF-DISREPANCY AND PHYSICAL ACTIVITY: THE MEDIATING ROLE OF MOTIVATION

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DEDICATION

I dedicate this dissertation to my husband, Andrew Davis, who has offered unwavering support and encouragement during the past six years of my doctoral journey. He has cheered me on when I was discouraged, but most importantly was always confident in my ability to get this done. Thanks Drew for your support and counsel.

I also want to offer thanks to my parents, Cecilia and Jesus, who instilled in me hard work and perseverance. My parents have been my number one cheerleaders from the very beginning. Thanks mom and dad for always believing in me and for encouraging me to strive for my dream.

ABSTRACT

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Research has shown a negative relationship between perceived body size discrepancies and exercise participation. The aim of this study was to test the mediating role of exercise behavioral regulations in the relationships between physical self-discrepancies and physical activity participation. ***Methods.*** A sample of 147 college students completed measures of physical self-discrepancies and behavioral regulations, and wore accelerometers to collect physical activity data over a two-week period. Data were analyzed using multilevel logistic regression. ***Results.*** Analyses showed greater agreement between actual and ideal physical self-perceptions was related to physical activity as mediated by intrinsic motivational regulations. Furthermore, ideal and ought discrepancy scores were highly correlated, but the patterns of results observed in this study varied. ***Conclusion.*** Among college students it appears that ideal physical self-discrepancies exert a negative influence on physical activity by decreasing feelings that exercise is inherently enjoyable. To increase physical activity behavior interventions should strive to enhance physical satisfaction and the importance of autonomous (intrinsic) regulations in fostering physical activities.

KEY WORDS: Self-discrepancy, Self-determination, Physical activity, Accelerometer, Physical-self, Mediation

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CHAPTER I

Introduction

One could easily conclude that America is preoccupied with weight and physical appearance. A content analysis suggests that mass media, such as movies, magazines, the Internet, and television shows showcase that "thin is normative and attractive" for the female body (Harrison & Hefner, 2006). In particular, the media's *ideal* body for women has become increasingly and unrealistically thin over the years (Sypeck, Gray, & Ahrens, 2004). A more recent content analysis of advertisements in two types of magazines suggests that both fitness/health and beauty/fashion magazines feature models with unattainable ideals (Wasylkiw, Emms, Meuse & Poirier, 2009). Over the last 20 years, the body size of models on magazine covers has significantly decreased, simultaneously with the media displaying the entire body of models. For males, the prescribed standard for attractiveness promoted through mainstream media is muscular and toned bodies (Cafri & Thompson, 2004). Over the last 25 decades, men on the centerfolds of magazines have shed 12 pounds of fat while putting on approximately 27 pounds of muscle (Leitt, Pope, & Gray, 2001). Therefore, men hope to achieve muscularity, and women hope for a thin, toned appearance. The cultural standards of beauty for both genders are unrealistic for the majority of the population to achieve, and further removed from the general population as obesity rates have increased (Flegal, Carroll, Ogden, & Curtin, 2010).

Approximately 78 million adults in the United States are considered obese (Johnson, Hayes, Brown, Hoo, & Ethier, 2014), with about 36% of women and 32% of men (Flegal, et al., 2010). Among college students, about 22% of students are overweight

with about 12% obese (American College Health Association, 2012). From the beginning of college to the end of senior year, females gain on average 1.7 pounds, and males gain about 4.2 pounds (Racette, Deusinger, Strube, Highstein & Deusinger, 2008). Increasing body weight and obesity are associated with the incidence of multiple co-morbidities, such as type II diabetes, cardiovascular disease, several forms of cancer, and chronic back pain (Guh, et al., 2009).

The increasing obesity rates across gender displace the average American body further away from the already unattainable ideal. Essentially, female and male beauty ideals have become thinner and more muscular while women and men are getting heavier. The gap between the ideal image and their actual body size has widened over the years. Discrepancies between actual body and ideal body have been identified as central to body dissatisfaction (Halliwell & Dittmar, 2006). These body-related self-discrepancies in turn, could, have emotional (Heron & Smyth, 2013), psychological (Dittmar, 2009; McDaniel & Grice, 2008), and behavioral consequences (Anton, Perri, & Riley, 2000; Brunet, Sabiston, Castonguay, Ferguson, Bessette, 2012; Markland, 2009; Markland & Ingledew, 2007; Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006). Of particular interest to the proposed study is the relationship between physical-related self-discrepancy and physical activity in college-aged population. It is essential to examine college students in terms of body image because health habits and behavior patterns established during this period may persist into adulthood (Sparling & Snow, 2002) and younger individuals feel more inclined to compare themselves to society's standards of beauty (Kozar & Damhorst, 2009).

Due in part to concerns with rising obesity rates in the general population, and the chronic illnesses obesity can give rise to, there has been an increase in promoting physical activity over the last several years. The media promotes exercise as the optimal means to achieve the ideal physique (Lindeman, 1999). In addition to the aforementioned medical diseases, regular physical activity is also associated with the prevention of mental health illness (Hogan, Catalino, Mata, Fredrickson, 2015). The Centers for Disease Control and Prevention recommends 30 minutes of moderate to vigorous physical activity, at least five days a week for adults to gain the benefits from physical activity (CDC, 2009). Despite the benefits of regular physical activity and implicit media pressure, most Americans fail to meet these guidelines to maintain proper health (Sisson & Katzmarzyk, 2008). Only 47% of college students meet these recommendations for physical activity (American College Health Association, 2012). The present study focused on the discrepancy between the perceptions of individual's actual physical selves and their ideal selves and how this discrepancy is associated with physical activity. In addition, the present study examined the extent to which behavioral regulation, a continuum reflecting the extent to which external contingencies have become internalized and integrated into the person's sense of self, mediates the relationship between physical discrepancy and physical activity.

Self-Discrepancy

Prior to reviewing the literature on self-discrepancy, it is crucial to clarify the theoretical framework from which I am working. An individual's self-concept is multifaceted and complex. An individual develops various attributes that define the self through patterns of interacting with significant others and other environmental

contingencies (Shavelson, Hubner, & Stanton, 1976). Higgins' Self-Discrepancy Theory (i.e., SDT[1]) suggests that conflict arises when individuals compare one self-state to another and discover a discrepancy between the two. According to SDT, there are three basic domains of the self: (i) who you are (i.e., actual self), (ii) who you would like to be (i.e., ideal self), and (iii) who you should be (i.e., ought self). The actual self is a self-state representation of the attributes and qualities that the individual believes he or she possesses. The ideal and ought domains are guided by self-directive standards or self-guides, meaning they represent attributes one does not possess but may strive to obtain. The ideal self describes the characteristics or qualities one wishes or desires to possess. The ought self, defined by feelings of duty and responsibility, is guided by a person's moral standards and feelings that one should or is obligated to possess these attributes. In addition to the three domains of the self, SDT also proposes that these selves can be conceptualized not just from one's own perspective but also from the perspectives of others (e.g., friend, parent, or significant others). Essentially, there are six self-states described by SDT: actual/own, actual/other, ideal/own, ideal/other, ought/own, and ought/other. Within the body image literature, researchers typically focus on individuals' own perspectives, while acknowledging that the ideal/own could potentially reflect an internalization of society's standards of attractiveness (Vartanian, 2012).

Discrepancies arise when there is a difference between how a person actually views him or herself and their view of how they would ideally like or ought to be. In combination, there are various possible types of self-discrepancies based on the combinations between the self-concept and self-guides, as well as, from different

[1] The acronym SDT will be reserved for Self-Discrepancy Theory. When Self-Determination Theory is introduced later, it will be spelled out to minimize confusion between theories.

standpoints (e.g., ideal/own vs. ought/other). However, an especially important set of self-discrepancies within the body image literature is the set that reflects a discrepancy between an individual's self-concept and self-guide, the ideal discrepancy. This refers to the mismatch between how a person actually views him or herself and who they ideally would like to be. The proposed study will focus on the following two types of discrepancies: actual/own: ideal/own and actual/own: ought/own. An actual: ideal discrepancy from the own standpoint occurs when the individual perceives their actual state as discrepant from their ideal state (e.g. "I am fat, but I would like to be skinny"). An actual: ought discrepancy transpires when one perceives their actual state as discrepant from who they should be (e.g. " I am overweight, but I should be skinny"). For the sake of clarity and brevity, from this point forward the description of the self-discrepancy will omit the term "actual" and the perspective will be the own standpoint unless otherwise specified.

One of the primary aims of Higgins' model is to understand how incompatible beliefs about one's self are associated with emotional discomfort (Higgins, 1987). Individuals that possess an ideal discrepancy are vulnerable to dejection-related emotions. Two emotions that are specifically associated with an ideal discrepancy are disappointment and dissatisfaction. Ought discrepancy also represents a negative outcome and is associated with a vulnerability towards agitation-related affect, such as anxiety and guilt. Higgins (1987) asserts self-discrepancies serve an important self-regulatory function. Discrepancy leaves an individual vulnerable to feelings of disappointment and dissatisfaction. When these self-discrepancies are activated,

discomfort ensues, and the individual will be motivated to match the actual self to personally relevant self-guides in order to diminish the negative affect.

Empirical Support for the Self-Discrepancy Theory. The empirical support for SDT has been mixed. There is substantial evidence that self-discrepancies produce emotional distress, but the emotional distinctiveness of each type of discrepancy remains a contentious point. Higgins and his colleagues have conducted several studies that support the basic tenets of SDT, suggesting that ideal discrepancy was related to depressed affect whereas ought discrepancy was associated with anxious affect (Higgins, 1987; Higgins, Bond, Klein, & Strauman, 1986; Higgins, Klein, & Strauman, 1985; Heron & Smyth, 2013). Some researchers, however, have not found evidence supporting the emotional distinctiveness associated with the various discrepancies (McDaniel & Grice, 2008; Ozgul, Heubeck, Ward & Wilkinson, 2003; Tangney, Niedenthal, Covert & Barlow, 1998), while other findings represent mixed support for the theory (Scott & O'Hara, 1993). Ozgul and colleagues (2003) theorize that individuals might not make a sharp distinction between their ideal and ought selves making discrepancy-affect relations ambiguous.

Higgins (1987) suggests that the distinctiveness between discrepancies and affect is dependent on several factors: magnitude and accessibility of the discrepancy, contextual relevance, and the importance of the discrepancy to the individual (Tangney et al., 1998). All of these factors may account for the conflicting findings regarding the emotional distinctiveness of certain discrepancies (Boldero, Moretti, Bell, & Francis, 2005). Furthermore, Boldero and colleagues (2005) comment that the factors outlined by Higgins (1987) regarding the importance of distinctiveness and accessibility of

discrepancies could by impacted by the method utilized to measure self-discrepancies, which will be further discussed in the sections about the assessment of self-discrepancy. From a methodological standpoint, the vast majority of research studies have examined the predictions of SDT from a between-person rather than within-person perspective. Furthermore, less research attention has been placed on the actual-ought discrepancy. Those that have tested self-discrepancy using within-person designs have utilized laboratory-based priming measures in which specific discrepancy types were primed, and the resulting negative affect was measured (Strauman & Higgins, 1988). Some researchers have utilized Ecological Momentary Assessment to measure body discrepancies and negative affect in their natural setting over the course of a week (Heron & Smyth, 2013). Heron and Smyth (2013) had women complete surveys five times a day about body image discrepancies and depressed and anxious affect. The findings suggested that momentary within-person ideal discrepancy was associated with concomitant depressed affect but not momentary anxious affect. This pattern was reversed for momentary within-person ought discrepancy. The findings of this study are not only significant because they support the predictions of SDT, but it suggests that discrepancies can be assessed in a more naturalistic setting and ought discrepancies have unique contributions.

Assessment of Self-Discrepancy. Over the years, various different measures have been utilized to assess self-discrepancies. Originally, self-discrepancies were assessed through Higgins' Selves Questionnaire, which measured ideal and ought discrepancies in one's general self-concept (Higgins, et al., 1985). The Selves Questionnaire is based on an idiographic approach, meaning that respondents

spontaneously generate attributes for each self-state from specific perspectives. The number of matches or mismatches among the attributes listed for each self-domain is computed to arrive at a discrepancy score. For example, a respondent might generate "fat" to describe their current self, but generate the attribute "slim" for ideal self, meaning this would be a mismatch. The discrepancy score indicates the extent to which an individual's ideal or ought selves differ from the actual self. The Selves Questionnaire was developed to assess general self-discrepancies, but it has been used in body image research by identifying any attributes that relate to physical appearance (i.e. Strauman, Vookles, Berenstein, Chaiken, & Higgins, 1991). Some researchers argue that this idiographic method is very time-consuming, and there are concerns about the quality and distinctiveness of attributes generated by participants (Tangney et al., 1998). In addition, because the measure was not designed to measure body image discrepancies, it does not directly ask participants to reflect on their physical appearance. Some researchers have circumvented this issue by modifying the Selves Questionnaire instructions, and asking participants to list attributes that describe their physical appearance in each of the domains (Vartanian, 2012).

An alternative method of assessing self-discrepancies is utilizing a nomothetic method, using a fixed item pool that ask participants to evaluate how their actual self matches their ideal self with respect to physical appearance. There are various nomothetic measures developed to assess body-related discrepancies using different techniques. For example, the Body-Image Ideals Questionnaire (BIQ) was developed to assess one's perceived discrepancy between personal ideals on multiple physical attributes (Cash & Szymanski, 1995). Participants rate ten body-related attributes based on their personal

ideal and the extent to which their actual body resembles that ideal. Another nomothetic measure used to assess self-discrepancies is through figure rating scales. Typical figure rating scales consist of a variety of body silhouettes presented sequentially from which the participant is asked to identify the figure that most closely resembles their current body size and the figure that most embodies their ideal body (e.g. the Stunkard Figure Rating Scale and the Contour Drawing Rating Scale). Other versions of figure rating scales have been developed, such as using photographs of real bodies instead of drawn figures (Swami, Salem, Furnham, & Tovée, 2008), or randomization of figure presentation (Duncan, Dodd, & Al-Nakeeb 2005).

Regardless of the type of measure, self-discrepancies are typically calculated as the difference between the construct representing one's actual and ideal (or ought) body. Other researchers have simply taken the difference between the individual's actual physical weight/body size and ideal weight/body size as an index of self-discrepancy. Utilizing difference scores to measure self-discrepancy has been noted to have potential conceptual and methodological problems. It can reduce reliability, introduce ambiguity, and confound self and ideal ratings (see Cafri, van den Berg, & Brannick, 2010). Critics suggest alternate scoring procedures within a data-analytic framework that involves either a regression model of respondent's response or sophisticated analytical strategies such as polynomial regression.

In general, researchers have debated the best way to empirically measure self-discrepancy. Some researchers argue in favor of nomothetic measures, whereas others support idiographic measures. Certain idiographic and nomothetic measures have demonstrated moderate correlations between instruments and high intercorrelations

between scores within instruments (Ozgul et. al., 2003). Another line of research suggests a lack of correspondence between ideographic and nomothetic self-discrepancy measures (Halliwell & Dittmar, 2006; McDaniel & Grice, 2008), and there is no clearly superior methodology (Boldero et al., 2005; Halliwell & Dittmar, 2006; McDaniel & Grice, 2008). Halliwell and Dittmar (2006) concluded that statistically significant self-discrepancy effects were primarily endorsed with nomothetic measures, whereas McDaniel's and Grice's (2008) findings suggest nomothetic self-discrepancies were better at predicting psychological well-being. Possible explanations for the mixed findings can be explained by the variability in the measurement techniques, number of constructs, and analytic procedures. Overall, there are various ways of assessing body related discrepancies, with each measure yielding slightly different outcomes.

An issue that has received little attention in the literature is the conceptualization of body-related attributes. The majority of the research on self-discrepancy and body image focuses on global self-assessments or specific discrepancies pertaining to physical appearance (i.e. body related weight, size, shape, and attractiveness). For example, idiographic measures tend to have subjects spontaneously list any attributes associated with their self-states, a more global approach. Then each subject is assigned a score denoting the number of constructs listed that concern appearance or body shape among the self-guides, such as "beautiful", "attractive", and "thin" (i.e. Strauman, et al., 1991). Nomothetic measures of body image discrepancy are typically fixed items based on weight or some other physical characteristic (i.e. height, skin complexion, facial features, muscle tone and definition etc.). While both lines of inquiry are informative, they fail to consider other potentially important physical self-perceptions such as strength, fitness,

and confidence in physical ability. For example, an individual's actual and ideal body might be discrepant in regards to body shape and weight but might match in regards to strength and confidence in physical ability, which could provide a different picture regarding the relationship between self-discrepancy and exercise behaviors. Therefore, too narrow of a focus on bodily-related characteristics might not adequately capture all physical discrepancies.

A different way of conceptualizing these body-related and appearance-related attributes, and the approach I propose using in this study, is through using a broader concept, such as the physical domain. The physical self is defined as the descriptive and evaluative self-perceptions of his/her physical appearance and physical abilities (Marsh, 1997). Utilizing the concept of the physical self extends the construct to include physical abilities along with physical appearance. The physical domain is arguably the strongest predictor of the self-system (Fox & Corbin, 1989) and of health behaviors, such as physical activity (Fox & Corbin, 1989; Crocker, Sabiston, Kowalski, McDonough, & Kowalski, 2006). Taken together, utilizing the physical self to assess self-discrepancies related to perceptions of physical appearance and physical abilities may provide more knowledge on the specific links between the self-system and health-related behavioral outcomes.

Physical Self-Discrepancy

The physical self-concept is one of the distinct domains of the global self-concept (Marsh & Shavelson, 1985). The physical self-concept is defined as an individual's descriptive and evaluative self-perceptions of his/her physical appearance and, extending beyond appearance, his or her physical abilities (Marsh, 1997). The physical self was

originally defined by four self-perceptions: sports competence, attractive body, physical strength, and physical condition (Fox & Corbin, 1989). Marsh & Redmayne (1994) supported the facets proposed by Fox and Corbin (1989) but also suggested that flexibility and balance are a significant aspect of the physical self-concept. The physical self has been shown to be an important contributor to overarching global perceptions of self-worth in hierarchical models of self-esteem and associated with well-being (Fox, 200).

Findings from multiple studies across various populations have consistently found that the physical self is a predictor of health-related behaviors and emotions (Crocker, et al., 2006; Moreno-Murcia, Hellín, González-Cutre, & Martínez-Galindo, 2011). Certain subdomains of physical self-perception are predictors of physical activity and other health-related behaviors (Crocker, et al., 2006; Moreno-Murcia, et al., 2011). Among young adults, perceived sports competence was positively correlated with current physical activity. Body attractiveness, however, was positively correlated with physical activity in men and negatively in women (Moreno-Murcia, et al., 2011). Over a three-year period, students in 9^{th}-11^{th} grades were followed to investigate the changes in and the relationships among body mass index, physical self-perceptions, physical activity, and other health-related activities (Crocker, et al., 2006). Findings demonstrated moderate covariance and stability in all variables. An analysis of bidirectional effects indicated that self-perceptions impacted specific behaviors more so than the impact of the behavior on self-perceptions. Page and Fox argue that physical self-concept is a better predictor of behaviors than using specific body characteristics such as height and weight (as cited in Crocker et al., 2006, p. 186).

Gender differences in Physical Self-Discrepancy. The majority of studies examining self-discrepancy in the context of physical-related attributes have focused on female participants. As a starting point, female college students perceive the cultural norm for women's bodies to be extremely thin, and this standard is related to personal body ideals (Bessenoff & Snow, 2006). Considering this finding, it is not surprising that college females tend to express greater dissatisfaction with their appearance, since the cultural standards might be perceived as unattainable (Gillen & Lefkowitz, 2006). Although over the course of college, females became more satisfied with areas of their body and their appearance, their appearance evaluations tend to remain less positive on average than males. Researchers studying college-aged women consistently show that participants who perceive a greater discrepancy between their ideal and actual physical appearance were generally more dissatisfied with their bodies (Fallon & Rozin, 1985; Halliwell & Dittmar, 2006; Jung, Lennon, Rudd, 2001; Strauman, et al., 1991).

Many researchers have operationalized the difference between actual and ideal physical appearance as an index of body dissatisfaction in and of themselves. Vartanian (2012) argues that from the perspective of self-discrepancy, describing these self-discrepancies as 'body dissatisfaction' skips a step in the theory. Perceived discrepancies result in and lead to particular emotional responses. Research suggests that the greater a discrepancy is perceived between ideal and actual physical appearance in women has been associated with more body dissatisfaction (Koza & Damhorst, 2009). This discrepancy between women's actual physical appearance and their ideal physical self has been identified as central to body dissatisfaction, which, in turn, leads to negative affect (Halliwell & Dittmar, 2006). Discrepancies between how women see themselves

and how they would like to be are related to negative psychological outcomes, such as depression, anxiety, self-esteem, and body dissatisfaction (McDaniel & Grice, 2008; Heron & Smyth, 2013). Many of these studies have focused specifically on women's body size, weight, or attractiveness, without much attention to how other aspects of the physical self (i.e., sports competence, physical strength, and/or physical condition).

In recent years, the scientific literature and public media has more extensively covered male body image. In 1997, a *Psychology Today's* Body Image survey with 4,000 responses (14% men) indicated that 41% of men felt dissatisfied with their body and a significant proportion of dissatisfied men wanted to *add* body mass. (Garner, 1997). Garner (1997) argued that although men as a group are more satisfied with their appearance, the number of men who are distressed about their body weight and size appears to be growing. Among college men, about 91% desired a more muscular body (Jacobi &Cash, 1994). A muscular appearance is related to the degree of muscularity but also the absence of fat that hides the muscle (Cafri & Thompson, 2004; Olivardia, Pope, Borowiecki, & Cohane, 2004). College men tend to select an ideal body that is more muscular and leaner than their own body by 25 pounds of muscle and 8 pounds less of body fat (Olivardia, et al., 2004). Based on this number, it can be argued that men are experiencing a discrepancy between who they perceive themselves to be and who they would like to be in regards to their physical appearance.

Research tends to suggest that there are many notable similarities of self-discrepancies for men and women (Halliwell & Dittmar, 2006; Stevens, Lovejoy, & Pittman). For example, among college students, ideal discrepancy predicted depressive symptoms for both males and females (Stevens, et al., 2014). Another study examined an

association between ideal appearance-related discrepancies with affect and body dissatisfaction across gender (Halliwell & Dittmar, 2006). Between males and females, there were minor gender differences, which might indicate that men and women experience ideal discrepancy at similar levels, along with negative affect and body dissatisfaction.

Most of the research on physical-related self-discrepancies among men has been conducted with mixed-gender samples, but few have carried out gender comparisons; therefore, it is difficult to gain a better understanding of systematic gender differences. Some of the differences and similarities found between men and women depend on the measures used. For example, men tend to report less body image discrepancy than do women on questionnaires (Halliwell & Dittmar, 2006). However, when utilizing figure-rating scales, males and female differ in terms of body size discrepancy (Markland & Ingledew, 2007). Males tended to have a positive discrepancy (i.e. wanting to increase in size), while females more likely to have a negative discrepancy (i.e. desiring to decrease size). However, the following study had a notable proportion of women that indicated a preference for a larger ideal body size and males who wanted a smaller body size. These findings suggest that body and appearance related attributes demonstrate some gender-specific associations.

Physical Self-Discrepancy related to Physical Activity. Physical self-discrepancies have been associated with behavioral consequences, ranging from eating behaviors (Harrison, Taylor, Marske, 2006; Halliwell & Dittmar, 2006; Sawdon, Cooper, Seabrook, 2007) to physical activity (Anton, et al., 2000; Brunet, et al., 2012; Markland, 2009; Markland & Ingledew, 2007; Neumark-Sztainer, et al., 2006). Both of these

behaviors can be viewed as means by which to reduce the dissonance between current perceived physical features and desired state. The proposed study, however, will focus on physical activity.

Research findings suggest that the more physical appearance discrepancies an individual experiences, the less likely they are to engage in physical activity (Anton et al., 2000; Brunet, et al., 2012; Kruger, Lee, Ainsworth, & Macera, 2008; Lamarche & Gammage, 2012; Markland, 2009; Markland & Ingledew, 2007). A nationwide sample (over half male) suggested that irrespective of actual weight, adults who reported being dissatisfied with their body size were less likely to engage in physical activity (Kruger et al., 2008). Similarly, larger discrepancies between actual and ideal body sizes among female college students was found to be associated with lower levels of leisure-time physical activity (Anton et al., 2000; Brunet et al., 2012; Markland, 2009), a finding that has also been evidenced with male samples (Markland & Ingledew, 2007). Some researchers have found that larger ideal discrepancies were related to less moderate-vigorous physical activity (Lamarche & Gammage, 2012). These findings regarding the relationship between physical discrepancy and physical activity is interesting, as one would expect physical activity to be a means through which to reduce the physical discrepancy.

Physical activity is a behavior that is associated with mental and medical health benefits, as well as, an optimal way to achieve the ideal physique (Hogan, et al., 2015; Lindeman, 1999). Individuals engage in physical activity for diverse reasons, and these vary by gender (Ingledew, Hardy, de Sousa, 1995; Ingledew & Sullivan, 2002). For example, body mass predicted exercising for weight management motives among men

whereas weight management motives among women were predicted by perceived body size discrepancy (Ingledew et al., 1995). Women are motived to exercise based on how they perceive their body, regardless of their actual body mass, whereas body fat is an important motivator for men. In a follow-up study, Ingledew and Sullivan (2002) examined the association between body-related discrepancies and exercise motives across both age and gender. Overall, they found that the effects of body mass and body image on exercise motives emerge during adolescence. Specifically, by late adolescence, females are likely to exercise for weight management reasons if they perceive themselves to be overweight and if they want to be slimmer, whereas males are likely to exercise for weight management purposes if they actually are overweight. Further, overweight females are less likely to exercise for affiliation, competition, and enjoyment, whereas males that perceive themselves to be overweight are less likely to exercise for challenge, social recognition, and stress management. Ingledew and Sullivan (2002) concluded that being overweight or the perception that one is overweight even if one is not, can minimize the inherent satisfaction of exercising. These findings suggest that concerns about the body represent intrapersonal factors that are likely to have motivational consequences. For example, among women aged 16-21 years, an increase in exercise was associated with increased body dissatisfaction and decreased self-esteem. Neumark-Sztainer and colleagues (2006) found that lower body satisfaction does not serve as a motivator for engaging in healthy weight management behaviors. They found that for both males and females lower body satisfaction was related to variety of unhealthy weight control behaviors (i.e., fasting, restrictive diet, laxatives, diuretics) and lower levels of physical activity.

These findings are incongruent with the proposition of SDT, which posits that increased behavior that reduces discrepancy should minimize negative affect. As mentioned earlier, Higgins (1987, 1989) claims that self-discrepancies serve an important self-regulatory function in maintaining matches or reducing mismatches in one's self-concept, as well as, helping individuals evaluate their progress in self-discrepancy management. Higgins' postulates that discrepancies lead to discomfort, and, as a result, individuals will become motivated to decrease the self-discrepancy, in order to diminish the negative affect; however, research suggests that the opposite tends to occur. It is paradoxical that physical discrepancies are associated with low levels of physical activity because engaging in physical activity is one way that could decrease the discrepancy. Further examining motivation within the context of discrepancy might shed light on this paradoxical relation.

Self-Determination Theory

Existing research suggests that when there is a significant discrepancy between current physical appearance-related features and the individual's desired state, paradoxically, physical activity is less likely to be utilized (and less enjoyed) in these situations. Much of the research on self-discrepancy theory assumes that humans have an innate tendency to reduce such discrepancies and move towards a coherent self-concept. However, SDT has not been able to explain the observed relationship between physical discrepancy and physical activity. Some researchers suggest that the relationship observed between larger physical self-discrepancy associated with less physical activity might reflect a decrease in motivation to exercise (Anton, et al., 2000), which cannot easily be supported by SDT tenets. A potential alternative theory to explain a potential

decrease in motivation as physical self-discrepancy increases is through the motivation theory of self-determination (Deci & Ryan, 2002), which has been applied to study participants motivation in the sport and exercise domain (see Deci & Ryan, 2002).

Self-determination theory (Ryan & Deci, 2000; Deci & Ryan, 2002) is a theory of motivation that adopts a growth-oriented perspective of the self. According to Deci and Ryan (2002), self-determination theory proposes that humans are inherently "active, growth-oriented organisms" with tendencies towards actualization, integration, and coherence (pg. 8). It conceptualizes the regulation of behavior as lying along a continuum of relative autonomy. Three necessary conditions are needed for these natural growth-orientated processes to occur: competence (i.e., feeling of optimally challenged and a sense of confidence), relatedness (i.e., feelings of belonging and caring for others), and autonomy (i.e., feeling as the source of one's own behavior). The interplay between organismic integrative tendencies and social-contextual factors can predict why certain people initiate and persist in behaviors, which could shed additional information as to why larger physical self-discrepancies tended to be associated with less physical activity.

Self-Determination and Physical Activity. Intrinsic and extrinsic motivation can be two important concepts in regards to engaging in physical activity (Ryan & Deci, 2000; Deci & Ryan, 2002). Intrinsic motivation refers to activity in which people engage spontaneously due to the inherent satisfaction of the behavior and not due to contingencies or external reinforcements. Extrinsic motivation refers to a less self-determined style, in that it is more focused toward engaging in behaviors or activity dependent on external reinforcements, separable from the activity itself. An important element of self-determined regulation is that it views self-determination or autonomy on a

continuum for extrinsic motivation, with four types of regulation. At the controlled or non-autonomous end of the continuum is external regulation, whereby actions are entirely motivated to obtain external rewards or avoid punishments. Introjected regulation refers to when a person has partially internalized a behavior but is not considered part of the integrated self. Identified regulation is a more self-determined form of extrinsic motivation, in which behaviors are performed because they are consciously valued and deemed personally relevant. Integrated regulation is the most autonomous form of extrinsically motivated behavior, in which behaviors are performed because they are in harmony with personally, endorsed values and principles. Besides intrinsic and extrinsic motivation exists amotivation, the least self-determined style of behavior regulation because they tend to act passively or not act at all.

The self-determination continuum suggests that not all deliberate actions taken by a person emerge from internal motivations. For example, amotivated, external and introjected styles of behavior regulation suggest that although the person initiated the action, they are not self-endorsed and lack inherent enjoyment and satisfaction. The identified, integrated, and intrinsic styles of behavior regulation are viewed as self-determined because they are informed by the needs and values of the self. Overall, the underlying motivation behind an action predicts different outcomes. Multiple studies across various life domains support that a more autonomous behavior, such as intrinsic and integrated styles of motivation, relates to outcomes that are more positive. For example, students thrive more with autonomy-supportive teachers and children have higher school achievement when they perceive their parents exhibit autonomy supportive behavior (for reviews see Deci & Ryan, 2002).

In regards to physical activity, the self-determination theory has been implemented in an array of studies with the consensus being that more self-determined motivation is positively related to exercise behavior relative to less autonomous behavior regulation (Teixteira, Carraça, Markland, Silva, & Ryan 2012). Ingledew and Sullivan's (2002) findings showed that being overweight or the perception that one is overweight can engender extrinsic motivation and undermine intrinsic motivations. However, they used simple exercise questions (i.e., frequency and length) to assess the relationship between physical discrepancy and exercise. Anton and colleagues (2000) further examined the relationship between physical discrepancy and physical activity and proposed behavior regulation to understand the negative relationship found between physical discrepancies and physical activity. Markland and Ingledew (2007) sought to examine this idea and assessed the impact of body image discrepancy on behavioral regulation for exercise. They found that the more women wanted to lose weight, and the more males wanted to increase in size, was associated with lower relative autonomy. Furthermore, a curvilinear relationship was found between physical activity and relative autonomy for men. Relative autonomy was at its maximum when there was zero discrepancy and as discrepancy increased in either direction (i.e. either increase or decrease their body size) relative autonomy decreased. Among females, the relationship between body size discrepancy showed a slight trend towards an r-shaped curvilinear trajectory. In other words, wanting to lose weight was associated with less autonomous motivation, whereas wanting to increase in weight was not harmful to autonomous motivation for exercise. However, they utilized a unitary index of autonomy to assess behavior regulations, which is problematic conceptually and statistically (Chemolli &

Gagne, 2014). In addition, Markland and Ingledew (2007) did not examine the relationship between body size discrepancy and autonomous motivation for exercise on exercise behavior, and the unique role each regulation (e.g., Intrinsic, Extrinsic, Introjected, Identified) has on physical activity.

Subsequently, Markland (2009) examined the mediating role of exercise behavior regulations between body image discrepancy and physical activity participation among females. The physical discrepancy was negatively related to physical activity. Furthermore, physical appearance discrepancy was negatively related to more autonomous behavior regulations (i.e., identified and intrinsic regulation) and positively connected to external regulation (i.e., amotivation and external regulation). Physical activity was positively related to intrinsic, identified, and introjected regulations. Amotivation was negatively related to physical activity. The negative effect physical discrepancy has on physical activity was explained more by autonomous regulations but not by less autonomous regulations or amotivation, meaning that identified and intrinsic regulations mediated the relation between physical discrepancy and physical activity. Markland (2009) explains these findings to mean that "body image discrepancy exerts a negative motivational influence on physical activity by undermining feelings that exercise is a valued and an enjoyable activity rather than by leading people to feel more externally or internally controlled in their behavior" (pg., 177).

There are some notable limitations to these studies. The conceptualization of body related discrepancy was limited to body size and weight. In addition, the findings focused exclusively on the ideal self-discrepancy and physical activity relationship, ignoring the ought self-discrepancy. A recent study attempted to address these limitations by creating

a physical self-discrepancy questionnaire to assess self-perceptions in relation to strength, attractiveness, thinness, physical abilities, and fitness based on the three domains of the self (i.e. actual, ideal, and ought; Brunet, et al., 2012). They found that motivational regulations partially mediated the relationship between physical self-discrepancies and physical activity behavior. Furthermore, physical activity levels were lower when ideal or ought self-perceptions were higher than actual self-perceptions. More specifically, the greater the agreement between the actual and self-states (i.e., ideal and ought) had direct and positive linear links to intrinsic motivation and physical activity. The degree of discrepancy between selves was positively related to introjected and external regulations. Therefore, in this study, young adult women's physical activity motivation and behavior is related to the difference between who they perceive they are and who they would like to be or should be. However, contrary to previous findings (Anton et al., 2000; Markland, 2009), Brunet and colleagues (2012) did not find a link between physical self-discrepancies to physical activity.

A limitation of much of the previous research is that it relies almost exclusively on retrospective self-report measures of physical activity. Although there are notable reasons for using self-report, this data might not necessarily be the most accurate reflection of the individual's physical activity. Self-report might reflect inaccuracies, unwillingness to record every physical activity, or an oversimplification of it (LaPorte, Montoye, Caspersen, 1985). Motion sensors, such as accelerometers, are an appealing way of assessing physical activity because they objectively measure both frequency and intensity, without interfering or influencing with physical activity (LaPort et al., 1985). Electronic accelerometers are useful for assessing physical activity because the monitors

can differentiate between physical and sedentary activities that have a strong relationship to oxygen uptake and heart rate (Patterson et al., 1993). Furthermore, most of these studies examining the possibility of motivational regulations explaining the association between physical self-discrepancies and physical activity exclude males. As previously mentioned, self-discrepancies regarding physical appearance is not only seen in women but males as well. Recent research suggest that males also experience some discrepancies in regards to their actual body and the body they desire, which has been associated with negative outcomes (Halliwell & Dittmar, 2006; Neumark-Sztainer, et al., 2006).

The Present Study

The present study aimed to integrate SDT and self-determination theory to assess the association between physical self-discrepancies and physical activity, as mediated by motivational regulations in both males and females. The study assessed self-discrepancies in regards to the physical-self instead of body image measures, which tends to focus exclusively on physical appearance and not on ability or competence. The physical-self taps concepts regarding the appearance of the body and the ability of the body, which might be more suited when assessing the link between self-discrepancy and physical activity. Crocker and colleagues (2006) argue that the physical self-concept is a better predictor of behaviors than using specific body characteristics such as height and weight (i.e., Page & Fox, 1997).

In addition, the present study used objective measures to assess physical activity to circumvent some of the problems with self-report measures. All the previous studies reviewed used self-report measures of physical activity, which are associated with

recall bias or oversimplification of physical activity (LaPort, et al., 1985). Using a more objective and accurate measure of physical activity can further define the relationship between self-discrepancy and physical activity and the association of motivation regulation with the various intensity of physical activity.

Previous studies have focused mostly on the association between ideal discrepancy and physical activity behavior. The current study plans to add to the literature by including the ought physical self-perception and its association with physical activity. Brunet and colleagues (2012) found that ideal and ought scores were highly correlated, but the pattern of results differed on these measures when included in path models. The ideal discrepancy was not related to external regulation, but ought discrepancy was. An additional contribution the present study makes is that it assesses both between- and within-subject relations. One previous study using ecological momentary assessment has evaluated within-subject relations between body image discrepancy and negative affect within individuals in everyday life (Heron & Smyth, 2013). However, to my knowledge, the study I am proposing is the first that will assess the association between physical self and between- and within-participant levels of physical activity.

Hypotheses

H1: With respect to gender, it is hypothesized that women would report larger physical self-discrepancy than men due to the greater social emphasis on women's appearance.

H2: Agreement between actual and ideal (or ought) self-perceptions will have positive associations with self-determined regulations and physical activity behaviors and negative ones with non-self-determined regulations.

H3: The associations between actual and ideal (or ought) self-perception agreement and physical activity will be mediated by motivational regulations. The effects will be mediated by more autonomous regulations (identified and intrinsic) but not by less autonomous regulations (introjected and external) or by amotivation.

CHAPTER II

Methods

Participants and Procedures

The current study is part of a larger-scale project, which aims to examine the relation between physical activity and alcohol use among college students. Data was collected from students enrolled at Sam Houston State University (SHSU). The exclusion criteria for participation in the study were driven by the parent project: (1) engagement in Intercollegiate Athletics during the current academic year, (2) physical disability or medical reasons for refraining from physical activity. These exclusion criteria were adopted to ensure participant safety and to minimize discomfort. In addition, the exclusion criteria increased generalizability to a "normal" population of individuals involved in regular physical activity.

Participants for the current study consisted of 147 undergraduate students enrolled in a mid-sized regional Southern University over the course of 18 months. Of the 147 participants, the majority identified as female (66.7%) and averaged just over 20 years of age (M = 20.61, SD = 3.49). Ethnicity closely resembled the overall student population demographics of the institution, with the majority identifying as Caucasian (60.3 %), followed by African American or Black (22%), Asian (1.3%), Native Hawaiian or Pacific Islander (0.7%), and "Other" (12.0%). Additionally, 28% of participants identified as Hispanic. The majority of the participants fell within the "Normal Weight" category (40.7%), with other participants being categorized as "Overweight" (27.3%), "Obese" (20.0%), and "Underweight" (12%) based on BMI standards. Participants reported an average of 27.42 minutes of moderate-vigorous physical activity (SD = 22.52) per day.

The study consists of two parts; the first part of the study involved a one-hour session where an assessment packet is completed in addition to collecting physical measurements. Participants also received training on the use of objective assessment materials, including an accelerometer to measure daily physical activity. The second part of the study involved completing daily measures of a variety of constructs for fourteen days over the course of 2 weeks. This study aimed to use the physical activity data along with physical self-discrepancy measures from the same project.

Measures

Demographic questionnaire. Participants completed a demographics questionnaire in which they were asked to report a range of background information including, but not limited to, age, gender, ethnicity, religious affiliation, and relationship status.

Motivational Regulation. The BREQ-2 was developed by Markland and Tobin (2004) to measure behavioral regulations for exercise. The BREQ-2 consists of 19-items to measure five constructs, based on Deci and Ryan's (1991) continuum conception of extrinsic and intrinsic motivation: amotivated (e.g., "I don't see the point in exercising"), external (e.g., "I exercise because other people say I should"), introjected (e.g., "I feel guilty when I don't exercise"), identified (e.g., "I value the benefits of exercise"), and intrinsic (e.g., I exercise because it's fun") regulation of exercise behavior. The response to each statement is scored on a five-point scale ranging from 0 (not true for me) to 4 (very true for me). In examining the original BREQ, the standardized factor loading revealed moderate to strong (M = .73, range = .46 - .94) relations between the four latent factors and BREQ items and structural equation modeling (SEM) suggest that the BREQ

measures was related to discrete aspects of exercise motives along a continuum (Wilson, Rodgers, & Fraser, 2002). The addition of amotivation subscale to the original BREQ produced a model that had good factorial validity with all standardized factor loadings being significant and moderate to strong (M = .76; range .53-.90; p's < .001) (Markland & Tobin, 2004). In the current study, the amotivation subscale (4 items; α = .72), external subscale (4 items; α = .83), introjected subscale (3 items; α = .76), intrinsic subscale (4 items; α = .90), and identified subscale (4 items; α = .76) had acceptable to good reliability.

Physical Activity. Acticals were used to accurately measure physical activity duration and intensity. The accelerometer used in this study was the Actical (Philips Respironics, Bend, OR), an omni-directional accelerometer that measures accelerations in multiple planes. Participants wore an Actical accelerometer on their wrist, secured with an elastic belt, for a minimum of 14 days, except when showering, bathing, or swimming. Raw physical activity counts were measured in 60-second epochs. Data from the accelerometers were downloaded to a computer and processed at the end of 14 days. This process involved: (a) identifying and removing periods of non-wear time, defined as zero-activity count greater than 60 minutes; (b) and classifying physical activity levels into activity count classifications based on Giffuni, McMurray, Schwartz, & Berry (2012) study: Sedentary (<100 counts/mins), Light (100 to 1725 counts/mins); Moderate (1726 to 4116 counts/mins); and Vigorous (4117+ counts/min). These thresholds exhibit good classification accuracy among normal-weight, overweight, or obese individuals (Giffuni, et al., 2012). Physical activity was calculated as the total number of minutes within a given intensity level for that day beginning at 6am and ending at 12am, and in order to be

included in the sum, activity bouts needed to be at least 10 minutes in duration. The Accelerometer has been validated in several studies as providing reliable and valid objective assessment of physical activity in a natural environment (Crouter, Dellavalle, Horton, Haas, Frongillo & Bassett, 2011**;** Hills, Mokhtar, Byrne, 2014).

Physical Self-Discrepancy Questionnaire. The physical self-discrepancy questionnaire was developed and used by Brunet and colleagues (2012) study. The questionnaire is 5-items that assess self-perceptions in relations to strength, attractiveness, thinness, physical ability, and fitness. Participants used a 7-point Likert scale, anchored by "not at all" and "very much," to rate the degree to which participants believe they possess each of the physical characteristic (actual), desires to possess (ideal), and are obligated to possess the attribute (ought). Brunet and colleagues (2012) created the physical self-discrepancy measure by using Fox and Corbin's (1989) subdomains of the physical-self. They found good construct validity of the measure using a confirmatory factor analysis, resulting in composite reliability correlations ranging from .66 to .78 for the scores. The scores for actual and ideal self were highly correlated with the Figure Rating scales (FRS; Stunkard, A., Sorenson, T., & Schlusinger, F., 1983) and with the respective subdomains of the physical self as assessed using the Physical Self-Description Questionnaire (PSDQ; Marsh, Richards, Johnson, Rocher, & Tremayne, 1994). In the current study, Cronbach's alpha for the 5-item actual ($\alpha = .75$), 5-item ideal ($\alpha = .74$), and 5-item ought subscale ($\alpha = .68$) ranged from adequate to questionable reliability.

Data Analysis

First, data were screened for patterns of missing data, outliers, and violations of the assumption of normality. Multilevel logistic regression models with days nested within people (Snijders & Bosker, 1999) were used to test hypothesis regarding within- and between- person associations between PA (aggregate for the various activity levels [e.g., light, moderate, vigorous]) and physical self-discrepancies. Daily moderate and vigorous activity levels were combined as a measure of exercise activity. The combined moderate/vigorous physical activity substantially deviated from normality, positively skewed (skewness = 2.48), and a log transformation was applied to normalize the distribution (see *Figure 1*). Statistical analysis was carried out on the log transformed physical activity data. Physical self-discrepancies were modeled by polynomial regression terms as recommended by Edwards (2002).

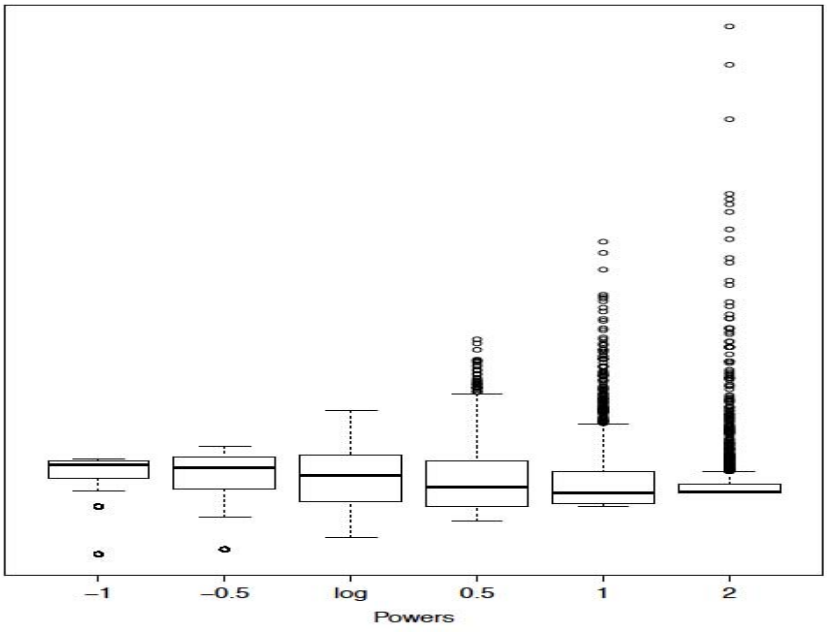

Figure 1. Boxplots for power transformations for combined moderate/vigorous PA. The log transformation appears to be the optimal normalizing transformation for physical activity, as it demonstrated the best spread and a symmetric distribution of all the data.

Finally, a meditation model depicted in Figure 2 was tested using a series of multilevel regression analyses. Motivational regulations were examined as mediators of the relation between self-discrepancy and physical activity.

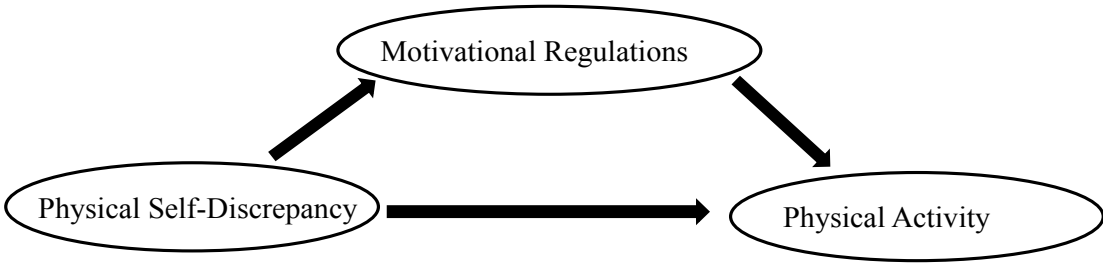

Figure 2. Hypothesized model with motivational regulation as mediator of the relationship between physical self-discrepancies and physical activity.

CHAPTER III

Results

The data comprises 1992 daily reports from 147 students on their physical activity, self-discrepancy, and motivations. Bivariate correlations among physical activity, physical self-discrepancies, and behavioral regulations are presented in Table 1 and descriptive statistics for the main study variables are presented in Table 2.

Table 1

Correlations among physical activity, physical self-discrepancies, and behavioral regulations

	1	2	3	4	5	6	7	8	9
1. Amotivation Regulation	–	–	–	–	–	–	–	–	–
2. External regulation	.24**	–	–	–	–	–	–	–	–
3. Introjected regulaiton	-.20*	.05	–	–	–	–	–	–	–
4. Identified regulation	-.39**	-.08	.64**	–	–	–	–	–	–
5. Intrinsic regulation	-.21*	-.26**	.42**	.68**	–	–	–	–	–
6. Ideal Discrepancy	.10	-.22**	-.15	.10	.34**	–	–	–	–
7. Ought Discrepancy	.06	-.21*	-.10	.14	.36**	.88**	–	–	–
8. Moderate/Vigorous Activity	-.00	.02	-.09	.10	.12	.14	.12	–	–
9. Log Moderate /Vigorous Activity	-.03	-.02	.00	.18*	.18*	.10	.08	.85**	–

*Note. *p <.05; **p <.01.*

Intrinsic regulation was significantly and positively correlated with introjected (r = .42) and identified (r = .68) regulations as well as with log moderate/vigorous PA (r = .18). Intrinsic regulation was significantly and negatively correlated with amotivation (r = -.21) and external (r = -.26) regulations. Identified regulation was negatively associated with amotivation (r = -.39) and positively related to introjected regulations (r = .64) and log moderate/vigorous physical PA (r = .18), both of which were statistically significant. External regulation was significantly and positively correlated with amotivation (r = .24). Overall, the log of moderate/vigorous activity was significantly positively related to higher forms of self-determination (e.g., identified and intrinsic).

Ideal discrepancy was significantly and positively correlated with intrinsic regulation (r =.34) and negatively correlated to external regulation (r = -.21). Ought discrepancy was significantly and negatively related to external (r = -.21) and introjected (r = -.10) regulations but positively correlated with intrinsic regulation (r = .36). A final significant correlation was a positive relation between ideal discrepancy and ought discrepancy (r = .88), suggesting that ideal and ought discrepancies were correlated to the point of possible collinearity. Summarizing the pattern of correlations, they suggest physical discrepancies (ought and ideal) were both positively correlated with intrinsic motivation and tend to be negatively related to external motivation. Neither ideal nor ought discrepancies were correlated with log moderate/vigorous activity.

Table 2

Descriptive statistics for physical activity, behavioral regulations, and physical self-discrepancies.

Variables	Males		Females	
	M	*SD*	*M*	*SD*
Amotivation	.27	.54	.28	.50
External regulation	.67	.75	.80	.90
Introjected regulation	2.09	1.27	2.19	1.14
Identified regulation	3.03	.80	2.81	.83
Intrinsic regulation	3.09	.85	2.74	1.06
Ideal Discrepancy	.43	.92	-.22*	1.27
Ought Discrepancy	.29	.94	-.18*	1.15
Moderate/Vigorous Activity	531.32	355.95	308.99***	271.70
Log Moderate/Vigorous Activity	18.41	5.04	13.96***	5.67

*Note. *p < .05; **p < .01; *** p < .001.*

Hypothesis 1

Independent sample t-tests showed that there were no significant differences between males and females in behavioral regulations (*p*s>.05). Intrinsic regulation approached significance ($p = 0.056$) with males slightly more intrinsically regulated than females. Males reported greater agreement between actual self and ideal self (t (144) = 3.14, p = .002.) than females, as well as ought self (t (143) = 2.43, p = .016). Furthermore, males engaged in more moderate/vigorous PA per day than females (t (139) = 4.56, p < .001).

Hypothesis 2

Multiple regression analyses were calculated to examine associations between physical self-discrepancies and motivational regulations (e.g., amotivation, external, introjected, identified, and intrinsic). Together, the physical self- discrepancies (ideal and ought) were significantly related to intrinsic regulations, $R^2 = .36$, F (2, 140) = 10.31, $p < .001$. However, none of these variables, ideal or ought discrepancies, were significant when considered alone. The regression equation predicting external regulation was significantly predicted by the physical self-discrepancies, $R^2 = .23$, F (2, 141) = 3.78, $p < .025$, but none of these variables (ideal or ought discrepancies) were significant when considered alone. The regression equation predicting amotivation (F (2, 141) = .95, $p < .391$, $R^2 = .12$), introjected (F (2, 142) = 2.03, $p < .136$, $R^2 = .17$), and identified regulations (F (2, 142) = 1.57, $p < .212$), $R^2 = .15$) were not significant.

The following set of analyses tested the ability of physical self-discrepancies to predict (log) moderate/vigorous PA. Results are reported in Table 3. Ideal discrepancy (b = 0.11, *SE* = 0.05, *pseudo z* = 2.22, $p = 0.26$) significantly predicted moderate/vigorous PA, with greater agreement between actual and ideal selves associated with more moderate/vigorous PA. However, ought discrepancy (b = -0.03, *SE* = 0.02, *pseudo z* = -1.46, $p = .14$) did not significantly predict moderate/vigorous PA.

Table 3

Multilevel Regression Analyses Moderate/Vigorous Physical Activity

Predictors	*b*	*SE*	*p*
Ideal Discrepancy	.11	.050	.02
Ought Discrepancy	-.03	.02	.144

Hypothesis 3

The previous set of analysis suggested that ought physical discrepancy was not statistically able to predict Log moderate/vigorous PA; therefore, the mediation model focused on the associations between ideal discrepancies to physical activity, mediated by motivational regulations. Amotivation, introjected, and identified regulations were not correlated with ideal physical discrepancies, and the former regulations along with extrinsic regulations were not correlated with physical activity. In the end, ideal discrepancy, intrinsic regulation, and log-transformed moderate/vigorous PA were included in the final mediation model. Results showed that ideal discrepancy was significantly related to intrinsic regulation $R^2 = .11$, F (1, 142) = 17.74, $p < .001$. Further, intrinsic regulation was significantly related to physical activity (b = 0.08, *SE* = 0.04, *pseudo z* = 8.56, $p = 0.02$). These relations in combination with the total effect for ideal discrepancy on physical activity decreasing from (b = 0.11, *SE* = 0.05, *pseudo z* = 2.22, $p = 0.03$) to (b = 0.02, *SE* = 0.04, *pseudo z* = 0.56, $p = 0.57$) when controlling for the mediator (i.e., intrinsic motivation) suggested that intrinsic regulation explained the relation between ideal self-discrepancy and PA using Baron and Kenny's (1986) criteria.

CHAPTER IV

Discussion

The aim of the study was to examine the relationship between perceptions of physical self-discrepancies and physical activity behavior, as mediated by exercise motivational regulations. It employed a theoretical framework incorporating self-discrepancy (Higgins, 1987) and self-determination (Deci & Ryan, 1985) as they relate to physical activity. This study extends current literature by expanding the conceptualization of body-related discrepancy to include a more global physical conception of self (i.e., strength, attractiveness, thinness, physical abilities, and fitness), instead of exclusively focusing on individual parts of the body. It also sought to expand the self-discrepancy literature by including ought discrepancy, although results showed ideal discrepancy to be more influential. In addition, it is, to my knowledge, the first study to examine the relationship between PA and self-discrepancies by using accelerometers to measure PA.

Based on previous studies (Anton et al., 2000; Markland, 2009; Brunet et al., 2012), I hypothesized that more autonomous regulation (i.e., identified and intrinsic) would at least partially explain an association between self-discrepancies and physical activity. Study results supported the overriding hypothesis in that intrinsic motivational regulations mediated the relationship between ideal physical discrepancy and physical activity. These results suggest that discrepancies between a perceived actual and ideal, or desired, physical self may undermine feelings that exercise is a valued and an enjoyable activity rather than engendering people to feel more externally or internally controlled in their behavior. This was not the case for identified regulations despite previous research supporting this relation (Markland, 2009; Burnet et al., 2012). In the current study,

although identified motivation was positively related to physical activity, it was not correlated with an ideal discrepancy

There are several possible explanations for the failure to find identified regulations mediating the relationship between physical activity and self-discrepancies. First, identified regulations more strongly predict exercise behavior in the short term, but intrinsic motivation is more important in sustaining it (Teixeira, et al., 2012). Prior research has shown that individuals in the maintenance exercise stage of change display significantly more intrinsic motivation whereas identified regulation played a more important role in the preparation and action stage (Thøgersen-Ntoumani & Ntoumanis, 2006). Second, physical activity intensities are associated with different behavioral regulations (Edmunds, Ntoumanis, Duda, 2006; Silva et al., 2010). For example, out of the exercise regulations, intrinsic motivation was the only motive that positively influenced moderate and vigorous exercise whereas lifestyle physical activity was not significantly predicted by any of the motivation regulation (Silva et al., 2010). The current study looked specifically into moderate-vigorous physical activity, potentially explaining why intrinsic regulation was a significant predictor over identified regulations. In future studies, it may be desirable to assess the exercise stages of change as a potential moderator of discrepancy-motivation-physical activity relations. Furthermore, future studies on motivation predictors need to examine different intensities of physical activity (i.e., moderate-vigorous, light, sedentary), as they may be guided by different regulatory mechanisms. The current findings suggest that encouraging individuals' ideal self-perception to be healthy and realistic may reduce the discrepancies between their actual

and self-guided states and therefore help promote more autonomous motivational regulations for moderate-vigorous physical activity.

Previous studies have primarily focused on the association between ideal discrepancy and physical activity and neglected the ought discrepancy. In the current study, ideal and ought discrepancy scores were highly correlated, and neither discrepancy was a strong enough factor to independently predict specific motivations. A possible explanation for this finding is the internalization or assimilation of individuals' ideal and ought selves. The ought discrepancy involves the condition in which one's current attributes do not match the state that the individual believes is his or her *duty* or *obligation* to attain, whereas the ideal discrepancy one's current attributes do not match the ideal state he or she *personally* wishes to attain (Higgins, 1987). It is possible that societal standards of physical attributes can over time be integrated as one's own beliefs and personal wishes. Bessenoff and Snow (2006) found that personal beauty ideals were highly related to cultural beauty standards among women, meaning that cultural standards may have an unconscious effect on the development of personal ideals. Similar to the current findings, other studies have also reported high correlations between ideal and ought self-perceptions (Ozgul et al., 2003; Tangney et al.; Burnet et al., 2012), which raises doubts about individuals' ability to make a sharp distinction between their ideal and ought selves.

Despite the strong correlation observed between these constructs in the current study, ideal and ought discrepancy varied in their association to physical activity. Specifically, ought self-discrepancy was not statistically associated with physical activity. A possible explanation is that students' ideal discrepancies are more accessible, and thus

related more strongly to physical activity. Higgins (1987) suggested that individuals can possess none or any combination of discrepancies, and furthermore, the discrepancies do not have an equivalent impact. Higgins theorized that the *availability* of a particular self-discrepancy is dependent on the magnitude of the discrepancy, and the *accessibility* is based on the recency and frequency a construct has been activated. Studies have reported that mass media repeatedly showcase the "unattainable ideal" bodies for females and males (Cafri & Thompson, 2004; Harrison & Hefner, 2006; Wasylkiw, et al., 2009). It is possible that due to the frequent portrayals of models (i.e., accessibility) with unattainable/unrealistic ideals (i.e., availability) makes the ideal discrepancy most salient among college students. Based on Higgins' (1987) contentions, since the ideal discrepancy appears to be the most salient discrepancy, participants should be more vulnerable to dejection-related emotions versus agitation-related emotions.

Another aim of the study was to examine gender differences regarding physical self-discrepancy. The finding that females reported a larger degree of discrepancy between actual and ideal (or ought) selves is consistent with previous findings that even across idiographic and nomothetic measures, females reported larger appearance-related discrepancies than males (Halliwell & Dittmar, 2006). However, the finding that males not only reported less disagreement between their actual and ideal (or ought) selves but that they reported greater agreement was not expected. Research findings suggest that men are increasingly dissatisfied with their bodies and appearance (Kruger et al., 2008; Markland & Ingledew, 2007; Olivardia et al., 2004). The greater agreement observed between men's actual and self-guided states (i.e., ideal and ought) may be related to differences in the way in which males and females conceptualize their bodies. Halliwell

and Dittmar (2003) found that men tended to evaluate and discuss the body as a single and complete entity, whereas women described their body through discussing many distinct parts, rather than, the body as a whole. The majority of research assessing physical/body related discrepancies focus on evaluating single entities, such as weight and fat. It is possible that when body-related discrepancies move away from solely assessing distinct parts of the body, such as in the current study, that men's global physical self might be more in agreement with self-guide states. However, the physical self-discrepancy questionnaire (Brunet et al., 2012) used in the current study was validated only with females; therefore, it is uncertain if this higher level of agreement observed between actual and ideal (or ought) selves might be due to an artifact of the specific measure used. Further research is needed to test the measure with males and different samples.

Initial analyses also showed interesting findings that males and females did not differ in terms of motivational regulations. Although there were mean differences in intrinsic motivation, the difference was not statistically significant. The finding runs contrary to studies that have shown differences between genders in levels of motivational regulations (Lauderdale, Yli-Piipari, Irwin, & Layne, 2015). These results are in line however with meta-analysis findings demonstrating that males and females share consistent levels of motivational styles (Guérin, Bales, Sweet, & Fortier, 2012). From the participation-motives perspective, these findings do not take away from the notion that certain reasons for exercise, such as appearance and weight, can be more salient for either gender. Finally, the results from this study are consistent with prior research in which males had higher PA levels compared with females (Lauderdale et al., 2015).

Health promotion campaigns typically market exercise more in terms of improved health-related outcome (Hogan et al., 2015) and as a mean to achieve the ideal physique (Lindeman, 1999) than in terms of its intrinsic value. These campaigns may enhance the perceived utility of exercise for weight-control and health reasons, but inadvertently minimize experiential rewards of exercise such as social interaction, expression of personal skills and abilities, or pure enjoyment. Based on the current findings, inherent satisfaction and enjoyment of exercise was highlighted as a critical mediator between physical self-discrepancy and physical activity behavior. Therefore, if having more intrinsic motivation is associated with greater physical activity behavior, individuals should be encouraged to participate in physical activity that engenders or maximizes experiential rewards of exercise such as playing sports, dancing, or hiking. In support of this view, Kilpatrick, Hebert, and Bartholomew (2005) found that among college students', sports participation was more closely linked to intrinsic motives (i.e., affiliation, enjoyment, and challenge), whereas health- and appearance-related motives were more highly linked to extrinsic regulations. From a public health and exercise promotion perspective, it is unfortunate that activities such as sports participation and related activities, rich in their intrinsic appeal, are not considered viable options for health-related motives or reducing self-discrepancies. Therefore, college students should explore reasons to be physically active that go beyond the most common motives such as improved body and shape, in order to achieve long-term maintenance and participate in physical activity that engenders intrinsic motivation (i.e. challenge and enjoyment). Furthermore, health professionals should be trained in distinguishing the signs of intrinsic

versus extrinsic motives in individuals and promote intrinsic motivation at every opportunity.

Limitations

The findings from this study should be considered in light of several limitations. First, the cross-sectional design of this study limits conclusions regarding the causal direction of associations. Although establishing mediation requires that researchers specify a temporal ordering of the independent, mediator, and dependent variables, respectively, researchers have stated that the ordering of the variables in cross-sectional studies may be justified on theoretical grounds (Mathieu & Taylor, 2006). In this study, self-discrepancy and self-determination theories were used to guide model testing (Deci & Ryan, 1985; Higgins, 1987). However, due to the cross-sectional nature of the present study, there is a possibility that the motivational regulations did not mediate the relationship between discrepancies and physical activity but that there was an alternative causal ordering of relationships among the variables (i.e., the motivational regulations were confounding variables). For example, motivational regulations could have a causal effect on both discrepancies and physical activity rather than a mediating effect. Longitudinal studies could help in providing additional justification for the sequence tested within this study. In addition, the strong correlation between ideal and ought discrepancies (.88) raises doubts about the utility of this instrument in being able to discriminate between the various self-domains and the discrepancies between them. However, based on research findings, it seems that individuals may not make a sharp distinction between their ideal and ought self. As previously mentioned, the physical self-discrepancy questionnaire was developed by Burnet and colleagues (2012) using

young adult women. Therefore, it is difficult to extrapolate the meaning of men's physical self-discrepancies.

Conclusion

The current study provides important insights into understanding how perceptions of physical self-discrepancies related to physical activity. To summarize, this study found that agreement between actual and ideal-self had a positive association with physical activity through intrinsic motivation, inherent interest and enjoyment of behavior. In terms of applied implications, findings suggest that either attempts to increase individual's actual self-perception or bridge the gap between actual or self-guides, would be beneficial. Most importantly, it would be beneficial to encourage college students to participate in physical activity that is rich in intrinsic appeal, such as sports or fitness classes, to increase long-term engagement. There is considerable scope for future research on the nature of the relationships between physical perception, motivation, and behavior. Future studies could benefit from including stages of change as moderator as this might impact the mediating role of motivation between physical self-discrepancy and physical activity. Similarly, studies that include markers of psychological well-being and mental health, such as self-efficacy and symptoms of anxiety and depression, would also be useful, given that increased self-discrepancies are associated with varying emotional vulnerabilities and autonomously regulated behaviors can translate into psychological wellness.

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VITA

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Education

August 2016 – Present
Pre-doctoral Clinical Psychology Internship (APA Accredited)
University of Tennessee Professional Psychology Internship Consortium
University of Tennessee Health Science Center, Memphis, TN

August 2013 – Present
Doctoral Candidate, Clinical Psychology (Full APA Accreditation)
Sam Houston State University, Huntsville, TX
Dissertation: The Association Between Physical Self-Discrepancy and Physical Activity: The Mediating Role of Motivation (Proposed 09/01/2015)
Chair: Craig Henderson, Ph.D.

December 2013
Masters of Arts, Clinical Psychology
Sam Houston State University, Huntsville, TX
Thesis: Does Ethnicity Moderate the Relationship Between Working Alliance and Substance Use Among Youth Receiving Multidimensional Family Therapy?

December 2010
Bachelors of Science, Psychology
Cum Laude
Colorado State University, Fort Collins, CO

Internship Experience

August 2016 – December 2016
Office of Clinical Services, Memphis and Shelby County Juvenile Court
Psychology Intern, Major rotation 1

Duties:
- Conducted court-ordered mental health evaluations for multi-ethnic justice-involved adolescents referred for a transfer to adult court waiver
- Evaluations included parent and youth interviews and assessment of cognitive, academic, personality, behavior, and appraisals of violence risk
- Wrote reports for juvenile transfer evaluations

Supervisor: Tucker Johnson, Ph.D

August 2016 – April 2017
UT Division of Child & Adolescent Psychiatry
Psychology Intern, Minor rotation 1

Duties:
- Provide individual psychotherapy services to children, adolescents, and their families with an emphasis on empirically supported treatments for a variety of presenting concerns, including mood and

anxiety disorders, disruptive behavior, and behavioral parent training
- Led a dyadic presentation focused on Motivational Interviewing

Supervisor: Melissa Hoffmann, Ph.D

August 2016 – August 2017 **Parent-Child Interaction Therapy Clinic**
Psychology Intern, Add-on

Duties:
- Conduct Parent-Child Interaction Therapy (PCIT) for children functioning between the ages of 2-6 years and their families
- Children's primary or secondary diagnoses typically include disruptive behavior disorders (e.g. ADHD, oppositional defiant disorder), as well as Autism Spectrum Disorders, developmental delays, anxiety, or mood problems

Supervisor: Kristin Hoffman, Ph.D. (Level 2 Trainer), Lisa Asbill, Ph.D.

August 2016 – December 2016 **The Exchange Club Family Center**
Psychology Intern, Add-on

Duties:
- Co-facilitated therapeutic behavioral parent training for diverse socioeconomic status Hispanic families in Spanish
- Focused on positive discipline techniques, building self-esteem, anger management, development of effective communication skills, and improvement of family system functioning

Supervisor: Catherine Collins, Ph.D.

December 2016 – April 2017 **Center of Excellence for Children in State Custody**
Psychology Intern, Major 2

Duties:
- Conduct multidisciplinary, comprehensive evaluations for Department of Children Services(DCS)-involved children and adolescents
- Write trauma-informed reports and care plans for DCS
- Provide feedback to family social workers
- Participate on an daily interdisciplinary clinical meetings

Supervisor: Lisa Asbill, Ph.D.

December 2016 – August 2017 **St. Jude Children's Research Hospital**
Psychology Intern, Minor 2 & Major 3

Duties:
- Provide psychological, health and behavior assessments to children, adolescents, and their families, who present with a range of medical and/or psychiatric conditions.
- Provide inpatient consultation/liaison
- Implement a variety of inpatient/outpatient individual and family therapy
- Therapeutic interventions include nonpharmacological pain management, health and behavior, pill swallowing,

Supervisor: Valerie Crabtree, Ph.D.

April 2017 – August 2017 **The Boling Center for Developmental Disabilities**
Psychology Intern, Minor 3

Duties:
- Will conduct diagnostic interviews and psychological evaluations with children with developmental disabilities such as Autism Spectrum Disorder, Intellectual Disability, Global Developmental Delay, Attention Deficit/Hyperactive Disorders, and language disorders
- Will work as part of an interdisciplinary team with pediatricians and speech pathologists

Supervisor: Laura Murphy, Ed.D.

December 2016 – August 2017 **Healthy Lifestyles Clinic, Le Bonheur Children's Hospital**
Psychology Intern, Add – on

Duties:
- Assisting developing psychoeducational modules as part of a quality improvement study
- Will conduct psychosocial assessments of children, adolescents, and their families with obesity and obesity-related medical conditions.
- Will facilitate group-based obesity interventions for children informed by CBT, DBT, and MI

Supervisor: Thomaseo Burton, Ph.D., Idia Thurston, Ph.D.

Practica Experience

August 2015 – May 2016 **Psychology Consult Service at Harris County Psychiatric Center**
Psychotherapy and Psychological Assessment Trainee

Duties:
- Conducted inpatient psychodiagnostic and cognitive/neuropsychological assessments for treatment and discharge planning with seriously mentally ill adults and adult offenders representing diverse socio-economic backgrounds
- Conduct individual psychotherapeutic services on adult and child units with an emphasis on evidence-based treatments, primarily focused on the following difficulties: self-harm/suicidality, mood and anxiety disorders, psychotic spectrum, substance use disorder, and personality disorders
- Co-facilitated therapeutic groups (e.g., Mindfulness, Emotional Processing, Interpersonal Effectiveness) and brief individual therapy with children and adolescents and juvenile justice unit serving adolescents adjudication process
- Participated in multidisciplinary team meetings, weekly case conferences, and treatment rounds

Supervisor: Margaret Wardle, Ph.D., Simone Barr, Ph.D.

October 2014 – November 2014 **Montgomery County Juvenile Probation Department**
Psychotherapy Trainee

Duties:
- Co-facilitated therapeutic groups for multiethnic families involved with the juvenile justice system for assaultive offenses
- Focused on anger management, improvement of family system functioning, development of effective communication skills, and

enhancement of coping techniques

Supervisor: Darryl Johnson, Ph.D.

May 2014 – July 2015 **Ronald J. Massey, Ph.D. & Associates Private Practice**
Psychotherapy and Psychological Assessment Trainee

Duties:
- Provided individual therapy and assessment services in a private practice setting, including diagnostic assessment, treatment planning, and outcomes assessment for children, adolescents, and adults
- Co-facilitated individual and family therapy services with an emphasis on evidence-based treatment, primarily focused on the following difficulties: mood and anxiety disorders, ADHD, disruptive behavior disorders, and parenting issues
- Common assessment referral questions: vocational limitations related to mental illness and ADHD
- Wrote integrated reports for use by clients and other treating professionals

Supervisors: Ronald Massey, Ph.D., Angie Hays, Ph.D.

August 2013 – May 2016 **Psychological Services Center, Sam Houston State University**
Assistant Forensic Evaluator

Duties:
- Assisted in conducting court-ordered evaluations consisting primarily of a comprehensive clinical interview, and symptom response assessments
- Wrote reports for adult forensic evaluations, including evaluations of competence to stand trial and criminal responsibility
- Conducted psychodiagnostic evaluations for local juvenile probation departments and provide placement and treatment recommendations
- Conducted court-ordered evaluations with Spanish-speaking offenders

Supervisor: Mary Alice Conroy, Ph.D., ABPP, Jorge G. Varela, Ph.D.

August 2013 – May 2014 **Harris County Juvenile Probation Department**
Psychological Assessment Trainee

Duties:
- Conducted psychological evaluations of multiethnic justice-involved youth to assist with treatment planning, diagnostic clarification, placement purposes, and risk assessment
- Assessed a wide range of childhood disorders, including: mood and anxiety disorders, ADHD, disruptive behavior disorders, PTSD, conduct disorder, intellectual disability and parent-child conflicts
- Conducted psychological evaluations in Spanish
- Wrote integrated reports for use by the court and probation personnel

Supervisors: Uche Chibueze, Psy.D., Nicole Dorsey, Ph.D.

August 2012 – May 2016 **Psychological Services Center, Sam Houston State University**
Psychotherapy and Psychological Assessment Trainee

Duties:
- Provided individual psychotherapy services with emphasis on

empirically supported treatments for a variety of presenting concerns, including mood and anxiety disorders, trauma-related symptoms, and personality disorders
- Conducted comprehensive psychological assessments (e.g., psychodiagnositc, ADHD, & learning disorder assessments)
- Engaged in skillful case conceptualization, treatment planning, discharge planning, and suicide risk management
- Conducted psychological evaluations in Spanish
- Wrote integrated reports for use by clients, academic institutions, and other treating professionals
- Provided clients with feedback and recommendation

Supervisors: Darryl Johnson, Ph.D., David Nelson, Ph.D., ABPP, Jorge G. Varela, Ph.D., Melissa Magyar, Ph.D.

Teaching/Supervisory Experience

August 2015 – May 2016 **Teaching Assistant**
Doctoral Clinical Practicum I, Sam Houston State University

Duties:
- Assisted in teaching introductory clinical skills to junior doctoral students
- Evaluated administration and scoring of intelligence and achievement tests with first year doctoral student clinicians
- Co-facilitated group supervision sessions

Supervisors: Darryl Johnson, Ph.D., Craig Henderson, Ph.D.

June 2015 **Invited Guest Lecturer**
Developmental Psychology, Sam Houston State University

Duties:
- Assisted in teaching an undergraduate class focused on physical development in infancy and toddlerhood

Supervisor: Craig Henderson, Ph.D.

June 2013 – May 2015 **Peer Supervisor**
Psychological Services Center, Sam Houston State University

Duties:
- Supervised junior doctoral students in the provision of psychotherapy and psychodiagnostic assessments
- Co-facilitated supervision sessions with licensed supervisor
- Reviewed therapy videos and edited documentation as needed
- Provided written and verbal constructive feedback

Supervisors: Mary Alice Conroy, Ph.D., ABPP, Craig Henderson, Ph.D.

November 2012 **Invited Guest Lecturer**
Introduction to Psychology, Sam Houston State University

Duties:
- Assisted in teaching an undergraduate class focused on introduction to neurons, brain, functioning, and psychobiology

Supervisor: Christopher Wilson, Ph.D.

Research Experience

May 2016 – July 2016 **Research Team Evaluator**
Grant-Funded Research Project

Duties:
- Assisted in data collection
- Conducted semi-structured interviews in Spanish and English with unaccompanied refugee and immigrant adolescents

Supervisor: Amanda Venta, Ph.D.

May 2013 – November 2013 **Research Team Evaluator**
Grant-Funded Dissertation Project

Duties:
- Assisted in data collection
- Conducted semi-structured interviews with college students
- Rated participants on the PCL:SV and HEXACO traits

Supervisor: Marcus Boccaccini, Ph.D.

June 2012 – June 2013 **Research Team Evaluator**
Walker County Probation Department

Duties:
- Conducted structured clinical interviews with adult offenders on community supervision
- Administered and scored extensive neuropsychological testing battery
- Assisted with preparation of poster presentation

Supervisor: David Nelson, Ph.D., ABPP

May 2012 - May 2016 **Graduate Research Assistant**
Exercise and Mental Health Lab

Duties:
- Managed and assisted in data collection with college students & justice-involved adolescents and families
- Engaged in coding of data coding, data entry, data analysis, and assistance with manuscript preparation
- Assisted in design, development, and implementation of various studies, including research on the potential mechanisms underlying the relationship between physical activity and alcohol

Supervisor: Craig Henderson, Ph.D.

August 2011 – May 2012 **Graduate Research Assistant**
Evidence-based Practice and Child Maltreatment Project

Duties:
- Assisted on research project examining mental health clinician perceptions of the barriers and solutions to the implementation of empirically-supported treatments for maltreated children
- Engaged in coding of data, data entry, data analysis, and assistance with manuscript preparation

Supervisor: Brian Allen, Psy.D.

Professional Research Presentations

Henderson, C. E., Yenne, E., Sledd, M., Schiafo, M., **Mena, C.,** Figueroa, M., Missimo, C., Goodson, A., & Langemeier, *D.* (2016, November). Don't drink and exercise: New research on exercise and alcohol use among college students. Symposium presented at the Annual Meeting of the *Texas Psychological Association*, Austin, TX.

Henderson, C. E., Manning, J., **Mena, C.,** Yenne, E., Fabian, J., Nicholas, R., & Thompson, K. (2015, November). The impact of daily physical activity on daily alcohol use. Poster presented at the annual meeting of the *Association of Cognitive and Behavioral Therapies*, Chicago, IL.

Massey, R., Hamlin, R., Henderson, C., Hays, A., & **Mena, C.** (2014, November). Training and disciplining of children 2-12: Practical core skills. Workshop presented at the Annual Meeting of the *Texas Psychological Association*, Dallas, TX.

Henderson, C., Manning, J., Tomei, J., Spies-Upton, S., **Mena, C.,** Fraser, T., Oden, G., & Hyman, B. (2014, August). Relationships between daily physical activity, mood, and alcohol use among college students. Poster presented at the annual meeting of the *American Psychological Association*, Washington, DC.

Fraser, T., Henderson, C**.,** Greenbaum, P., Wang, W., Lawrence, G., Wang, H., Gharagozloo, L., Burks, A., **Mena, C.**, Warren, C., Munoz, C., & Liddle, H. (2014, March). Changes in family functioning may differentially affect outcomes for male and female adolescents in substance use and delinquency treatment. Paper presented at the annual meeting of the *American Psychology-Law Society*, New Orleans, LA.

Henderson, C., Dakof, G., Rowe, C., **Mena, C**., Jeon, H., & Colbourn, *S.* (2014, March) A family-based substance abuse, delinquency, and HIV prevention intervention for detained adolescents. Paper presented at the annual meeting of the *American Psychology-Law Society*, New Orleans, LA.

Percosky, A., Bitting, B., Nelson, D., Johnson, J., **Mena, C.,** & Stroud, C. (2014, March). Influence of childhood abuse on neuropsychological functioning in adult offenders. Poster presented at the annual meeting of the *American Psychology-Law Society*, New Orleans, LA.

Percosky, A.B., Nelson, D.V., Henderson, C., Bitting, B.S., Johnson, J., **Mena, C.**, & Stroud, C. (2014, March). Neuropsychological functioning in an offender sample. Poster presented at the annual meeting of the *American Psychology-Law Society*, New Orleans, LA.

Mena, C., Henderson, C., Kan, L., Greenbaum, P., & Wang, W. (2013, August). Does ethnicity moderate the relationship between working alliance and substance use among youth? Poster presented at the annual meeting of the *American Psychological Association*, Honolulu, HI.

Henderson, C., **Mena, C.**, Tomei, J., Spies-Upton, S., Manning, J., & Dunham, J. (2013, April).

Daily physical activity predicts positive and negative affect among college students. Poster presented at the annual meeting of the *Sam Houston State University's College of Humanities and Social Sciences Research Conference*, Huntsville, TX.

Kan, L., Henderson, C., Fraser, T., **Mena, C.,** Wevodau, A., Stroud, C., Greenbaum, P., Wang, W., & Liddle, H. (2013, March). Synthesis of recidivism indicators among adolescents in Multidimensional Family Therapy using an integrated data analytic approach. Paper presented at the annual meeting of the *American Psychology-Law Society*, Portland, OR.

Armstrong, N., **Mena, C.**, & Allen, B. (2012, June). Clinician perceptions of the barriers and solutions to the implementation of empirically-supported treatments for maltreated children. Paper presented at the annual meeting of the *American Professional Society on the Abuse of Children*, Chicago, IL.

Manuscript in Preparation

Henderson, C., Manning, J., **Mena, C**., Yenne, E., & Schiafo, M. (2015). The impact of daily physical activity on college student alcohol use.

Additional Professional Development

October 2016	Trauma, Attachment, & Neuroscience: Brain, Mind, & Body in the healing of trauma *Presenter:* Bessel van der Kolk, M.D.
October 2016	Adverse Childhood Experiences (ACE) Study *Presenter:* Dr. Vincent Felitti,
September 2015	Motivational Interviewing Training Series *Presenter*: Craig Henderson, Ph.D.
April 2015	Callous-Unemotional Traits and Conduct Disorder: Implications for Understanding, Diagnosing, and Treating Antisocial Youths; Consolidated Continuing Education and Professional Training *Presenter:* Paul J. Frick, Ph.D.
March 2014	Ins and Outs of Private Practice *Presenters:* Ronald Massey, Ph.D., Angie Hays, Ph.D.
January 2014	Clinical and Conceptual Problems in the Attribution of Malingering in Forensic Evaluations, Consolidated Continuing Education and Professional Training *Presenter:* Richard Frederick, Ph.D.
May 2013	Best Practices in Forensic Mental Health Assessment: Evaluation of Criminal Responsibility; Consolidated Continuing Education and Professional Training *Presenter:* John Petrila, Ph.D.
October 2012	Ethical Issues Relating to Client Sexuality, *Presenter:* Phillip Lyons, J.D. Ph.D.
October 2012	Psychopathy Checklist – Screening Version Didactic Training

Presenter: Daniel Murrie, Ph.D.

October 2012	Mild Traumatic Brain Injury: The Silent Epidemic *Presenter:* Dennis Zgaljardi. Ph.D.
September 2012	Supervision Seminar Series *Trainer:* Mary Alice Conroy, Ph.D., ABPP, Jorge G. Varela, Ph.D.
October 2011	Cognitive Processing Therapy for PTSD Didactic Training *Presenter:* Charity Wilkinson, Ph.D.

Elective Coursework

Fall 2013	Forensic Assessment I (emphasis on criminal forensic evaluations) Instructor: Mary Alice Conroy, Ph.D., ABPP
Spring 2013	Advanced Developmental Psychology Instructor: Craig Henderson, Ph.D.
Fall 2012	Supervision Seminar Series Instructor: Marry Alice Conroy, Ph.D., ABPP & Jorge Varela, Ph.D.
Summer 2012	Neuropsychology/Neuropsychological Assessment Instructor: David Nelson, Ph.D., ABPP

Honors and Awards

2012-2013	**NIDA/NIAAA Early Career Investigator APA travel award** Paper: Does ethnicity moderate the relationship between working alliance and substance use among youth receiving multidimensional family therapy? Poster presented at the *American Psychological Association*, Honolulu, HI.

Service Activities

September 2015 - Present	**Campus Representative, Advocacy Coordinating Team,** American Psychological Association of Graduate Students Sam Houston State University, Huntsville, TX
August 2012 – August 2013	**Secretary**, Graduate Student Psychology Organization Sam Houston State University, Huntsville, TX