ABSTRACT

CHARACTER STRENGTHS AS PREDICTORS OF PHYSICAL ACTIVITY LEVELS, PARTICIPATION MOTIVES, AND LIFE SATISFACTION

by Joseph F. Kerns

Physical inactivity plays an especially important role in the obesity health crisis that plagues much of the world. Many current interventions emphasize removing factors which inhibit physical activity (PA), however, these often fall short. Instead, the current study investigated how positive mental characteristics may relate to this issue; specifically, the role of character strengths (CS) in PA of various intensities, PA motives, and life satisfaction (LS). Through data collected via online surveys, results revealed positive associations between (1) zest and LS; (2) zest, curiosity, self-regulation, perseverance, subjective health status (SHS) and PA; (3) SHS, fitness motives, and LS; and (4) SHS, competence, and PA. Negative relationships existed between (1) love, hope, and PA; (2) appearance motives and LS; and (3) social motives and PA. Practical implications for practitioners are outlined regarding the application of strength-based interventions for promoting PA.

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Chapter One

Introduction

Preventable disease

Very few aspects of life cross as many boundaries as our health. The ability to work, play, be active, and engage in meaningful activities is constrained by one's current health status. This becomes even more apparent once health deteriorates. Yet even with knowledge of its incredible importance, it is obvious that the vast majority of the population fails to engage in the necessary behaviors to maintain their health. The unfortunate truth is highlighted by the fact that an exceedingly high percentage of deaths are now the result of preventable diseases (Danaei et al., 2009).

The declining health of most industrialized nations is a multifaceted issue that has been a focus of research for many years now. Death and disease from lifestyle choices are at an all-time high, and continuing to rise. In fact, research has demonstrated that approximately 45% of deaths are related to lifestyle choices (Danaei et al., 2009). Obesity in particular is a major concern, as over 35% of adults in the United States are obese, with child obesity approaching 17% (Ogden, Carroll, Kit, & Flegal, 2012). The importance of physical activity (PA) in relation to health and longevity can hardly be overstated as the influence of PA on blood pressure, cancer, obesity, blood sugar regulation, and blood cholesterol has been well documented (Fentem, 1994). Regular PA has also been associated with decreased rates of osteoporosis, mental illness, and physical disability, as well as increased mobility and fitness in the elderly (Fentem, 1994). Additionally, individuals who participated in regular physical activity reported greater purpose in life, positive relations with others, self-acceptance, and personal growth (Edwards, Ngcobo, Edwards, & Palavar, 2005).

Physical Activity

One of the major contributors to lifestyle related disease is a lack of PA (Trost, Owen, Bauman, Sallis, & Brown, 2002). Physical activity and exercise are often used interchangeably, however they conceptually differ; physical activity is defined as, "any bodily movement produced by skeletal muscles that results in energy expenditure" (Caspersen, Powell, & Christenson, 1985; p. 126), and while exercise is a component of physical activity, it is a more planned, structured form which is intended – and more strongly correlated – to increasing

physical fitness. For the sake of clarity, both exercise and PA will be discussed as the questionnaire used to assess PA in the current study assesses both PA and exercise.

Recent studies have reported that only 8% of adolescents and less than 5% of adults are meeting the suggested amount of weekly PA (Troiano et al., 2008). Furthermore, approximately half of those who begin exercise programs will quit within 3-6 months (Dishman, 1993). It is therefore not surprising that disease resulting from sedentary behavior is more prevalent than ever. The complexity of this health issue becomes ever more apparent within its economic implications. It had been estimated that the financial burden of excess weight, physical inactivity, and related consequences annually cost the United States more than $507 billion, and are expected to continue to increase (Chenoweth & Leutzinger, 2006).

This issue is clearly not isolated to the United States, and research suggests that physical inactivity has become an issue across the globe, particularly in developed countries where more than 1 in 4 people are inactive (Dumith, Hallal, Reis, & Kohl, 2011). The problem has become so severe, in fact, that according to the World Health Organization (2010), physical inactivity has become the fourth leading risk factor for mortality worldwide. Similar recent reports estimate that physical inactivity is responsible for 9% of premature mortality globally (Lee et al., 2012). In context, this becomes an even more shocking statistic when it is recognized that physical inactivity appears to be as potentially detrimental to one's health as smoking and obesity (Lee et al., 2012).

The declining health and associated economic impact is clearly an exceedingly complex issue, and must be approached as such. It must be noted, however, that the benefits of PA may not be limited to preventable deaths and decreased healthcare costs, but may also have an enormous impact on an individual's quality of life. For example, PA has been found to positively influence a plethora of mental health related factors including improved confidence, intellectual functioning, positive mood, well-being, reduced anxiety and rates of depression, and a provide a general buffering effect against development of mental illness (Taylor, Sallis, & Needle, 1985). It may also lead to enhanced mental well-being in the elderly (Windle, Hughes, Linck, Russell, & Woods, 2010), office workers (Sjögren et al., 2006) and health club members (Edwards, 2006). While exercise and PA are associated with physical and psychological health, research suggests that there are also important social consequences of exercise (Mack, 2003).

These social factors were highlighted by Kanarek, Foulds, and D'Anci (2012), who had students rate other fictitious students on a variety of personality characteristics based on their involvement in exercise. It was found that the students rated the fictitious "frequent exerciser" students much more positively than the fictitious "non-exerciser" students. Frequent exercisers were rated higher on confidence, popularity, responsibility, happiness, maturity, and excitement. Conversely, non-exercisers were rated as being more lazy, immature, and boring. These findings suggest that participation in exercise also has important social implications, and may generate or perpetuate presumptions about individuals based solely on their involvement in PA.

Despite these ubiquitous physical and psychological health benefits, as well as social consequences, the surprising majority of Americans fail to meet the recommended amount of PA (Troiano et al., 2008). It has becoming increasingly more apparent that psychological factors are amongst the most influential in determining why certain individual engage in more health-promoting behaviors than others.

Interaction of Psychological Factors and Physical Activity

The importance of addressing psychological determinants and consequences of exercise and PA is one of the primary goals within the field of health psychology. Through this framework, health is able to be addressed through its biological, psychological, and social functions, determinants, and outcomes (Straub, 2007). This has provided a wealth of knowledge and helped to explain a wide range of afflictions that many individuals face regularly through uncovering the interactions between exercise and psychological factors.

Relationship between Exercise and Psychological Health and Development.

Exercise has been shown to be efficacious in treating depression and anxiety, in addition to enhancing well-being (Kanarek, Foulds, & D'Anci, 2012; Kavussanu & McAuley, 1995), which may be the result of its ability to increase an individual's resilience to stress (Kelsey et al., 2006). In fact, many health professionals and academics believe that exercise can be a very effective way to enhance mood, and promote well-being and positive mental health (Scully, Kremer, Meade, Graham, & Dudgeon, 1998). Exercise may also improve psychological well-being through both physiological changes (e.g., increased cerebral blood flow, structural changes in the brain, and changes in brain neurotransmitters) and psychological changes (e.g., enhanced feelings of control, feelings of self-efficacy, and improved self-esteem; Weinberg & Gould, 2010).

Sufficient research is available to confidently support the effectiveness of exercise as part of the treatment of depression and anxiety, the improvement of mood and self-esteem, and potentially even enhancing cognitive functioning (Fox, 1999). This complex and dynamic relationship is not limited to the influence of exercise on psychological processes and outcomes, however. The relationship between psychological factors and PA is a bidirectional phenomenon, and both psychological and physical factors contribute to the complexities of understanding an individual's physical activity levels – or lack thereof.

Relationship between Psychological Factors and Exercise Behavior. Not only may exercise influence psychological health and development, but conversely, psychological factors may help to explain exercise and PA behaviors (Kavussanu & McAuley, 1995). In fact, a number of theoretical models have been developed in attempts to better understand this relationship including the health belief model (Rosenstock, 1974), the theory of planned behavior (Ajzen, 1985), social cognitive theory (Bandura, 1986), and the transtheoretical model (Prochaska & Velicer, 1997). These models attempt to explain some of the intricacies and complexities in understanding what factors influence one's health-related behaviors, and take a multitude of factors into consideration in explaining health behaviors. For example, the transtheoretical model has been successfully applied to health behavior change by matching interventions to the stage of change of the individual. That is, the readiness of the individual to make behavioral modifications will determine what information, materials, or activities are used to encourage the person to move on to more advanced stages of change (Prochaska & Velicer, 1997).

How well, and in what way an individual copes with stress can be an important factor in regards to their willingness to adopt or maintain physical activity, and in some cases, the development of particular diseases. It has long been recognized that stress may lead to both physical and psychological disease (Kobasa, 1979). McGonigal (2013) suggests that the negative effects of chronic stress may lead to a variety of health issues including obesity and physiological and structural changes in the brain that could drastically impact one's coping ability and emotional responses to stress. Furthermore, chronic stress reduces the size of the prefrontal cortex, inhibiting one's ability to make decisions and plan, while also decreasing the size of the hippocampus which relates to memory and stress recovery. Ganzel, Morris, and Wethingon (2010) also suggest that chronic stress may increase the size of the amygdala, which

increases reactiveness to stress and exaggerates the fear response. It may, therefore, be suggested that chronic stress can lead to structural and physiological maladaptation that further limit one's likelihood of starting or adhering to PA participation. To be sure, stress is only one factor which may relate to PA participation, as a variety of other individual difference factors must also be taken into account.

Both cognitive and personality variables are two of these individual difference factors to consider in determining exercise adherence. In particular, self-efficacy (Trost et al., 2002; Yoon, Buckworth, Focht, & Ko, 2013) and self-motivation (Dishman & Sallis, 1994) have been found to be among the strongest and most consistent predictors of PA. Furthermore, beliefs and expectations have proven to be important factors in exercise adherence (Marcus, Pinto, Simkin, Audrain, & Taylor, 1994). It is therefore imperative that effective exercise programs and PA be structured in a manner that takes into account these psychological variables.

Recent research has suggested that understanding personality may provide important information pertaining to exercise behavior. For instance, Lewis and Sutton (2011) found that particular personality traits were able to predict exercise frequency and motivation. Similarly, positive affect has been related to increased exercise, positive coping behaviors, and physical health (Kelsey et al., 2006; Salama-Younes, 2011). The authors suggest that these result from the interaction of positive affect and optimistic thinking, which may lead to effective emotional regulation and long-term coping effectiveness. These findings suggest that understanding an individual's personality may aid in developing personalized exercise programs that are more intrinsically motivating to the individual and can enhance feelings of competency to promote continued participation. Creating tailored programs to address individual strengths and weaknesses may improve the individual's perceptions of, and responses to obstacles, and enhance their motivation.

Self-Determination Theory in Physical Activity. Of the varied dynamics involved in exploring PA adoption and adherence, the importance of an individual's motivation cannot be overstated. One of the most prolific and widespread theories in motivation, Self-Determination Theory (SDT; Deci & Ryan, 1985) offers a holistic insight into understanding human motives. SDT, which is actually a meta-theory with multiple sub-theories, distinguishes between what is called extrinsic and intrinsic motivation.

Although these may appear to be categorical or dichotomous motives, they are best viewed on a continuum ranging from completely extrinsic to completely intrinsic. Intrinsic motivation refers to participating in an activity for the inherent satisfaction it brings, which is typically characterized by fun and enjoyment (e.g., playing around). Extrinsic motivation is divided into four separate forms of regulation. Starting with the most extrinsic form, external regulation refers to motives which are completely dependent on outside factors (e.g., punishment). Introjected regulation involves motivation which is somewhat more internalized, but is contingent upon self-imposed pressure (e.g., guilt). Identified regulation tips over into the more autonomously determined and highly valued motives, such as exercising for health benefits. Lastly, integrated regulation involves mostly self-determined motives in which the behavior is congruent with the person's values, such as a runner who deeply identifies with her activity.

In order to promote intrinsic motivation a person's psychological needs must be met. These needs include autonomy, competence, and relatedness. If these needs are satisfied by an activity, the result is an increase in intrinsic motivation and well-being, and a greater likelihood that the individual will be actively engaged and find the activity inherently fulfilling (Deci & Ryan, 2000). SDT has been related to subjective and psychological well-being, as well as eudaimonic well-being; all of which relate to life satisfaction and quality of life (Ryan, Huta, & Deci, 2008). The fulfillment of one's needs may also relate to life satisfaction, as perceived competence, for instance, has been positively related to quality of life (Williams et al., 2009). Moreover, patients living in self-determination-promoting nursing homes reported more life satisfaction; their life satisfaction was even comparable to those not living in assisted care facilities (Vallerand, O'Connor, & Blais, 1989). SDT provides insights not only into life satisfaction, but also into exercise motives.

A variety of instruments have been developed to assess SDT in PA and exercise, such as the Motivation for Physical Activity Measure-Revised (MPAM-R; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997), the Exercise Motivation Inventory-2 (EMI-2; Markland & Ingeldew, 1997), the Behavioral Regulation in Exercise Questionnaire-2 (BREQ-2; Markland & Tobin, 2004), and the Exercise Motivation Scale (EMS; Li, 1999).

In a review of exercise, PA, and SDT, Teixeira and colleagues (2012) provided compelling evidence for the utility of SDT in understanding exercise behavior. The available

literature on exercise motives (the majority of which utilized the aforementioned instruments) demonstrated unanimous positive associations between intrinsic motives and exercise behavior. Results were mixed, however, in regards to more extrinsic motives with certain studies finding positive associations, with others finding negative, or no relationship. The authors caution that such lack of findings may stem from the varied manner in which these motives have been operationalized. For example, health/fitness motives may be the product of health threats, or they may come from the desire to create an attractive body. Therefore, it should also be noted that a single activity may have a variety of different motives that fall on various regions of the continuum, and as long as autonomous motives are present, additional external motives may still be beneficial. Caution is warranted, though, as in a meta-analysis, Deci, Koestner, and Ryan (1999) concluded that intrinsic motivation can indeed be undermined by extrinsic motives. Therefore, the use of extrinsic factors as motives for participation should be used carefully. As such, the importance of intrinsic motivation remains of paramount importance in the adoption and adherence of PA.

Although people tend to begin exercise programs for extrinsic reasons, intrinsic motivation is crucial for sustaining PA adherence. For example, with the development of the MPAM-R, Ryan and colleagues (1997) found that body-related outcomes (extrinsic) were some of the strongest motives for initiating PA (especially with women), but enjoyment and competence (intrinsic) predicted adherence. Fitness motives, for instance, were positively correlated with attendance, while more extrinsic motives (e.g., appearance) were not. Besides increasing attendance, intrinsic motives such as enjoyment and competence were also related to longer duration and more physically challenging workouts.

More recently, Sit and colleagues (2008) used the MPAM-R to assess PA motives, barriers, and participation in Chinese women. The results showed that the primary motives for being physically active were to improve health and fitness, and for the enjoyment of engaging in the activity itself. Furthermore, participants who were more highly active generally scored higher on participation motives and perceived all barriers as significantly lower. Thus, understanding a person's motivation for exercise can paint a detailed picture of the varied reasons why they engage in PA, as well as the perceived barriers which prevent participation.

Physical activity motives extend beyond just participation, however, and other factors must be considered to fully understand the issue. Using a SDT perspective, Duncan and

colleagues (2010) examined the relationship between exercise motives and exercise intensity, frequency, and duration. As may be expected, more autonomous motives were related to each of the exercise factors. However, intrinsic motivation was not the primary predictor as may be expected. Identified and integrated regulations were both predictive of exercise frequency, and for exercise duration, integrated regulation was the only significant predictor. The authors also mention that integrated regulation may be connected to behavioral persistence. This may partly result from the manner in which integrated regulations are related to the way the activity becomes part of the individual's identity. For example, having an "exerciser" identity may relate to the personal value system the individual has developed around PA. In an interesting deviation from the autonomously predicted exercise outcomes, for women, introjected regulation was the only significant predictor of exercise intensity. In other words, the intensity of women's workouts were partly driven by a sense of obligation; a fairly logical finding given the powerful societal pressure put on women to adhere to strict body types. This type of motivation, the authors warn, does not lead to persistence, nor enjoyment of the activity.

These findings are congruent with previous research (Ryan et al., 1997) which found that body-related extrinsic motives predicted PA initiation, particularly with women, but it was intrinsic motives such as enjoyment which predicted long-term adherence. These more autonomous motives such as improved fitness, enjoyment, and competence were also related to attendance, duration, and engaging in more challenging workouts. Autonomous forms of motivation, then, still seem to be the most appropriate in promoting frequency of PA participation and duration.

PA motives also relate to another important concept, quality of life (QOL). Research has indicated that intrinsic exercise-related goals were associated with higher QOL and exercise-related behaviors, while extrinsic goals negatively predicted these outcomes (Gillison, Standage, & Skevington, 2006). The link between SDT, PA, and QOL, while certainly a complex relationship, is undoubtedly one which deserves further exploration.

Physical Activity and Life Satisfaction. Longevity is a common and noble goal of many health professions. While death is ultimately unavoidable, delaying the inevitable is still a priority for most people. However, length of life may not have any relation to its quality. The Gerontological Society of America astutely recognized this as their motto states, "Adding life to years, not just more years to life." Many biomedical interventions do well to increase duration of

life, however the condition which one finds themselves in throughout these additional years may not be gratifying or particularly valued by the person if they are fraught with pain and suffering. Actually, in some cases prolonging an excruciating battle with disease may, in fact, further diminish one's QOL. The question which has grown more popular in recent years, is how can one's QOL be improved? Part of the answer to this question is through PA (Rejeski & Mihalko, 2001).

According to Deiner, one of the pioneering researchers in life satisfaction, QOL refers to the degree to which one's subjective appraisals of their ideal life and their actual circumstances match (Pavot & Diener, 1993) with life satisfaction being essentially a universal evaluation of this QOL. It is a cognitive assessment which is based on idiosyncratic standards, and therefore must be judged subjectively. Deiner, recognizing the scientific inability to accurately measure life satisfaction, developed the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffen, 1985) which has since been used extensively to assess QOL through life satisfaction. This scale has become the preeminent measure of life satisfaction, and has helped investigators uncover the relationship between PA and life satisfaction. Rejeski and Mihalko (2001), for instance, reviewed the literature on PA and QOL in older adults (most of which used the SWLS) and determined that PA positively influenced health-related QOL, regardless of the participant's health, age, or activity status.

PA has often been related to, or used as a means of enhancing QOL in clinical populations including patients with chronic heart failure (Belardinelli, Georgiou, Cianci, & Purcaro, 1999), severe chronic pulmonary hypertension (Mereles et al., 2006), breast cancer (Courneya et al., 2003; Young-McCaughan & Sexton, 1991) and colorectal cancer survivors (Courneya & Friedenreich, 1997; Courneya et al., 2003), as well as HIV+ patients (Stringer, Berezowskaya, O'Brien, Beck, & Casaburi, 1998) and many other populations. Nearly unanimously, PA is found to be related to, and in experimental designs, responsible for increases in QOL. Therefore, not only can PA lead to many positive objective physical outcomes, it can also result in subjective improvements such as an enhanced QOL.

McAuley and colleagues (2000) used the SWLS as part of their investigation of exercise and satisfaction with life. During a 6-month PA intervention, participants' life satisfaction increased significantly, and decreased again after the conclusion of the program as PA participation declined. Social support – a factor which may also relate to the basic needs of SDT

– and PA participation were important factors in life satisfaction. Of course, these benefits can only manifest when the individual regularly engages in PA, which is why interventions must also emphasize eliminating barriers to PA (McAuley et al., 2000).

Psychological Barriers. Understanding an individual's perceptions of, and responses to barriers to exercise and PA are likely to provide applicable insights into the health behaviors of the population. Research in this area has found that most perceived barriers stem from psychological factors rather than physical (Toscos, Consolvo, & McDonald, 2011).

In a review of the determinants of PA and exercise behavior, Dishman, Sallis, and Orenstien (1985) provide an extensive overview of personal, environmental, and activity characteristics outlining which factors proved to be significant, and to what extent they were positively or negatively related to PA and exercise. First, in relation to environmental factors, most consistent evidence demonstrated that the environment was linked to increases in PA and exercise (e.g., through social support, perceived available time) much more often than it served as a negative predictor. In fact, the only environmental factor which demonstrated a repeatedly documented decreased probability of exercise or PA was "disruptions in routine." However, personality factors may be important in how an individual deals with these disruptions. For example, research has found that individuals who are more mastery-oriented, intrinsically motivated, and attribute success and failure to effort rather than ability, are more persistent in the face of adversity (Duda, 1988; Dweck, 1986; Miller, Behrens, Green, & Newman, 1993). Therefore, this environmental factor may still be largely influenced by personal factors. In this vein, the most consistent predictors in Dishman and colleagues' review were personal characteristics.

An increased probability of exercise and PA were associated with attitudes, enjoyment of activity, perceived health, expectancies of health benefits, and behavioral skills. Conversely, decreased probability was related to mood disturbance, routine disruptions, and perceived discomfort. A finding which may be particularly surprising to many was that, in fact, exercise and health related knowledge had no significant impact on participation.

In a more recent study, Salmon, Owen, Crawford, Bauman, and Sallis (2003) also found that environmental barriers were not strongly related to PA participation. Conversely, personal barriers (e.g., lack of time, feeling tired, other priorities, work, and family commitments), were all inversely correlated with reported time spent participating in PA. Interestingly, individuals

that reported "other priorities" as barriers to PA were 40% more likely to spend more than 8 hours per week sitting and socializing, suggesting that understanding competing motives may be an important consideration. Conversely, enjoyment of both structured and unstructured PA was a significant predictor of all PA outcomes measured, and even further, enjoyment of structured PA was related to twice the reported participation in vigorous activities. As enjoyment is a sign that the individual is intrinsically motivated, increased participation would be expected. Part of what may explain these individual differences is the manner in which certain personality factors may lead to more adaptive perceptions of, and responses to potential obstacles.

Exploring the relationship between personality and exercise, Courneya and Hellsten (1998) had participants complete the NEO Five-Factor Inventory (Costa & McCrae, 1992), and a variety of measures assessing exercise motives, preferences, and perceived barriers. The results demonstrated that motives, intensity, exercise preference, and perceived barriers were all related to personality. For example, individuals that were high in conscientiousness perceived fewer barriers, while extraverts had more energy to overcome perceived barriers. Moreover, high extraversion and openness to experience were related to greater fun and enjoyment of PA, while neuroticism was negatively correlated to enjoyment. Overall, the results demonstrated that personality is an important factor in understanding how an individual perceives and responds to barriers, their motives for participation, and their preference and enjoyment of different activities. More specifically, the Five-Factor Inventory used by Courneya and Hellsten to measure personality provides certain insights into how individual differences factor into PA. However, perhaps another approach may offer an even more comprehensive framework within which these adaptive behaviors and characteristics related to exercise adherence can be examined.

Positive Psychology

In recent years, an influential movement has been sweeping through the field of psychology which turns its gaze onto the often understudied area of positive psychological functioning; this is positive psychology (Straub, 2007). According to Seligman & Csikszentmihalyi (2000), positive psychology is, "a science of positive subjective experience, positive individual traits, and positive institutions [which] promises [to] improve quality of life and prevent the pathologies that arise when life is barren and meaningless" (p.5). There is a clear dearth of research aimed at understanding what helps people flourish and live engaging,

meaningful, and happy lives. The research stemming from positive psychology has given us a better understanding of human strengths and virtues, as opposed to only psychological weakness and deficits (Seligman & Csikszentmihalyi, 2000). Within the umbrella of positive psychology, positive emotions, character traits, institutions, and communities which foster such qualities may be examined. While positive psychology is not, nor does it claim to be, a novel idea nor a revolutionary redirection of the field of psychology, it has spearheaded the push for developing psychometrics to allow proper measurement and scientific study of related positive psychological concepts. This had been a fatal shortcoming of earlier its earlier relative, humanistic psychology (Seligman & Csikszentmihalyi, 2000). Martin Seligman, the father of the positive psychology movement, has repeatedly reminded that the field's value lies in its complementary nature to expand on what is already known, and develop a more balanced field of psychology as a whole. The wealth of knowledge to be gained from the exploration of flourishing individuals and communities offers an opportunity to supplement rather than supplant the existing paradigm in psychology.

Through this research, novel approaches to psychological interventions and cognitive-behavioral therapies may be implemented to enhance the quality and productivity of individuals' lives. Positive psychology may afford an opportunity to promote PA – in addition to physical and mental health – in a new and exciting way (Cherubini, 2009; Seligman, 2008). Furthermore, the focus on building psychological strengths may serve as a far more effective preventative care method than the belated countermeasures used after disease has manifested. For example, while exercise has proven to be an efficacious treatment for many physical and psychological diseases and disorders, it is an even more effective tool for prevention (Thompson et al., 2003). It is of upmost importance that we emphasize the development of psychological strengths that have been shown to encourage proactive, preventative health-related behaviors rather than waiting for disease to develop.

Avoiding Stigma and Idealism in Positive Psychology. Prior to discussing the possible applications of positive psychology in the health-domain, a number of issues must be addressed in order to best preface and contextualize the strengths and limitations of the field, as well as common misconceptions of its objectives. Positive psychology as a whole has been rather naively, or at times, derogatorily labeled as "happiology," while being embodied by the clichéd smiley face depiction of what we expect a fulfilled person to represent. This has been a rather

unfortunate stigma, optimistic as it may be, as the scope of the field is greatly contracted and depreciated by such a simplistic interpretation. Furthermore, such a myopic assessment of the aims of the field undermine the pursuit of well-intended and motivated individuals attempting to better themselves, as anything less than a perpetual state of happiness is interpreted as a failure. The typical cultural view of happiness is an inadequate and misguided perspective which overemphasizes hedonic pursuits. This oversimplified interpretation fails to acknowledge the nuanced nature of the flourishing individual and the important role of meaning.

Instead, Seligman (2002) proposed the Authentic Happiness model, in which he delineates three separate but integral paths towards fulfilment: 1) positive emotions and pleasure; 2) engagement; and 3) meaning. Furthermore, research has shown that pleasure – what we often associate with happiness – is actually the least important of the three in regards to life satisfaction (Peterson, Park, & Seligman, 2005). It is with this perspective of the respective strengths and limitations of the field in mind that this current study seeks to further understand the complex relationship between character strengths and participation in PA and exercise.

Positive Psychology in the Physical-Domain. Just as happiness is more than a lack of suffering, so too can psychological strength be viewed as more than simply an absence of weakness (Seligman & Csikszentmihalyi, 2000). In other words, the personality of a happy and successful individual may actually be composed of completely different characteristics of varying degrees from their underperforming counterparts. That is, those who are able to identify and capitalize on their strengths may be able to thrive under the same circumstances that another may flounder. For example, two individuals may experience similar levels of anxiety, but if one adopts an optimistic outlook and is confident in their ability, the impact of anxiety on their performance may be drastically different.

The potential implications for positive psychology and PA have not been overlooked. In fact, the figurehead of the positive psychology movement and former APA president, Martin Seligman (2008), has supported the relationship, and strongly encouraged further study in this area, even going so far as to propose a new field: positive health. Many other academics shared in Seligman's ideas, and positive psychology has been incorporated into exercise psychology textbooks (Hefferon, & Mutrie, 2012; Jackson & Kimiecik, 2008; Mutrie & Faulkner, 2004; Straub, 2007), special interest groups within the Association for Applied Sport Psychology, and targeted as the topic of numerous articles.

The influence of positive psychology has begun to permeate into the field of physical and health education. Cherubini (2009) has proposed that positive psychology offers a unique approach to health and wellness that may help to develop better quality PA programs through a variety of mechanisms including (a) its ability to promote positive emotions and personal well-being (e.g., positive affect, greater physical and mental health, improved resiliency), (b) developing curiosity and excitement regarding PA, (c) creating engagement in PA, promoting flow experiences, and fostering intrinsic motivation and mastery-oriented goals, (d) through its ability to promote meaning in one's life through PA participation and social connections, and (e) its ability to promote genuine feelings of happiness and enjoyment in PA through these mechanisms.

Additionally, Straub (2007) suggests that positive psychology may be important in understanding health, wellness, and thriving. In particular, Straub states that these psychological strengths lead to increased psychological and physiological thriving. In essence, this is the person's ability to maximize his potential and live a life of meaning and contentment. Most importantly, he affirms that the traditional approach of resolving problems after they have occurred must be preceded by a heavy emphasis on promoting positive psychological strengths which may prevent disease and illness and enhance overall quality of life. Similarly, Salama-Younes (2011) suggests that positive psychology could birth an entirely new area of practical application for both positive and exercise psychology; in fact, positive psychology may function as a useful tool in promoting positive psychological adaptations (e.g., well-being and optimism) in the rehabilitation of injured and/or disabled populations (see Wehmeyer, 2013 for more about positive psychology and disability).

Seligman (2008) suggested that the idea of positive psychology be perpetuated further in the physical realm as he proposed the idea of "positive health." In the same vein which positive psychology endorses the idea that thriving mentally requires more than an absence of disease, it is proposed that positive physical health be viewed similarly. Positive physical health may be represented and measured via three types of variables, (a) subjective appraisals, (b) biological measures, and (c) individual functionality. Research in this realm may help to better understand the interaction of positive mental health alongside positive physical health, and how these factors influence quality of life, longevity, health costs, and a variety of other measures.

Previous Research in Psychological Strengths and PA. A substantial body of research has assessed determinants of PA (King et al., 1992) and factors associated with physical inactivity (King et al., 2000). This has provided a wealth of knowledge which can be used to promote PA and healthy behaviors in certain populations. Still, the data gets us no closer to understanding idiosyncratic buffering variables which may be crucially important in understanding the outliers. In essence, the importance of mediating factors and subjectivity on an individual basis are often lost or overlooked. It is with this in mind that we may ask: why is it that certain individuals still maintain a healthy lifestyle despite encompassing a seemingly overwhelming number of risk factors? Unfortunately, these individuals are often disregarded as simple irregularities and cast aside without the recognition that perhaps they could provide insight into understanding how to effectively promote healthy behaviors. How better to gain an understanding of health-promotion and maintenance than those who do so under the most difficult of circumstances?

This is precisely the query posed by a recent series of continuing large-scale studies on obesity and health-related behaviors (Ball et al., 2011; Ball et al., 2012; Hume et al., 2012; MacFarlane, Abbott, Crawford, & Ball, 2010). It was found that certain women demonstrated resilience to obesity, despite a variety of sociodemographic and environmental risk factors. These women demonstrated higher levels of PA and healthier eating habits, with increased levels of self-efficacy and positive outcome expectancies being linked to these behaviors. Clearly, an alternative method for promoting healthy behaviors may be to place less emphasis on reducing one's risk factors for inactivity, and instead developing positive traits which endorse physical activity, even in the presence of often inescapable impediments.

Similarly mental toughness has been recognized as a potentially viable personality variable for promoting PA and adherence to exercise programs, even in the presence of obstacles. For instance, Gerber et al. (2012) found that individuals higher in MT were more likely to meet or exceed the recommendations for daily PA. Beyond just participation, MT has also been correlated with increased satisfaction with exercise and increased feelings of well-being, and more frequent occurrences of flow experiences (Clough & Strycharczyk, 2012). Additionally, it has been demonstrated that MT is a concept which may be taught through workshops and individualized training (Clough & Strycharczyk, 2012; Gucciardi & Gordon,

2011). This may offer a significant opportunity to promote PA and exercise adherence in the general population.

Another conceptually similar construct, hardiness, has a more substantial foundation of research supporting a strong link to positive health outcomes (Kobasa, 1979; Kobasa, Maddi, Puccetti, & Zola, 1985; Oman & Duncan, 1995; Smith, Young, & Lee, 2004). In fact, so apparent were the prospective benefits of hardiness in health that researchers developed scales to measure hardiness specific to the health-domain, including the Health-Related Hardiness Scale (Pollock & Duffy, 1990) and the Revised Health Hardiness Inventory (Gerbhardt, van der Doef, & Paul, 2001). Health-related hardiness has since been linked to higher levels of PA, exercise, general health practices, and better eating habits (Gerbhardt, van der Doef, & Paul, 2001). Similarly, Hanson (1996) found that women who had higher levels of hardiness showed more stable weight loss when involved in an exercise program.

One would seem ostensibly remiss for any broad discussion of positive psychology to overlook the extensive benefits of optimism. An optimistic individual's favorable expectancies for the future have been linked to greater persistence to overcoming obstacles when pursuing health-related goals (Kavussanu & McAuley, 1995; Scheier & Carver, 1985), improved performance and confidence (Şar & Işiklar, 2012), problem-focused coping strategies (Grove & Heard, 1997), resilience to stressful life events and better mental health (Carver, Scheier, & Sergerstrom, 2010), greater physical well-being (Kavussanu & McAuley, 1995), increased health-related behaviors, internal locus of control, and higher self-esteem (Smith, Young, & Lee, 2004). In addition to optimism being linked to general health-related behaviors (Seligman & Csikszentmihalyi, 2000), Hamid (1990) also found that individuals who scored higher in optimism also exercised more frequently and more closely monitored their dietary nutrition. Similarly, it has been suggested that optimism – among other psychological strengths – may actually develop through participation in PA (Kavussanu & McAuley, 1995).

PA as a Means of Positive Development. There are a number of situations in which PA may precede the development of positive psychological characteristics. First, McGonigal (2012) suggests that PA may actually lead to physiological and structural changes in the brain. This has been studied in great depth by Dienstbier (1989), who has found that physical stress and adaptation may lead to comparable psychological development. Likewise, Kavussanu & McAuley (1995) found that participation in PA or exercise may allow for the individual to

engage in mastery experiences which can increase self-efficacy, improve feelings of competency and foster an optimistic mindset. Additionally, optimism may develop through the ability of exercise to manage and/or reduce anxiety levels and symptoms of depression, or through positive feelings associated with physical arousal. The study also found that optimistic individuals exercised more, had higher physical self-efficacy, and lower anxiety. Holder, Coleman, and Sehn (2009) investigated the impact that passive and active leisure had on well-being and revealed that passive leisure activity (e.g., TV) was negatively correlated with well-being while active leisure (e.g., physical activity) was in fact positively correlated with well-being.

As the literature seems to suggest, just as positive psychological characteristics may lead to enhanced health-promoting behaviors, it may be equally likely that engaging in regular physical activity may lead to the development of these same psychological strengths. That is, they may function as both antecedents and products of each other, depending on the situation. Therefore, it may prove to be quite beneficial to encourage their development, both independently and concurrently. Nevertheless, the problem remains that despite knowledge of these benefits, many people are still inactive. Knowledge then, it seems, is likely not the vital component to PA adoption and adherence. The meaning which one attributes to their involvement in PA, comparatively, may be a more personal and persuasive factor.

The Importance of Meaning in PA

The current dominant paradigm in health promotion, the biomedical model, has failed to address the importance of subjectivity, such as personal significance, emotions, thoughts, and motivations which may explain long-term PA adherence (Kimiecik, 2011). Instead, this pervasive model relies on a relatively reductionisitic approach to disease and illness in which the body essentially operates as a machine, either succumbing to disease which must be remedied, or working without dysfunction – the biomedical equivalent of "health." Certainly, this model has served the health-domain well, but its limitations must be recognized. The incorporation of subjective factors could balance the more objectively-grounded biomedical model to provide a well-rounded, holistic understanding of all the complexities and nuances involved in the multifaceted nature of PA involvement.

Traditionally, in seeking to understand health-related behaviors of individuals, many researchers have relied on quantitative measurements to explain behaviors such as physical activity, smoking, and eating habits. For instance, certain studies have explained physical

inactivity through inaccessibility to walkways and parks and other environmental factors (Toscos, Consolvo, & McDonald, 2011), and many other studies suggest socioeconomic status or race to be important considerations (Trost et al., 2002). Not all phenomena can be explained in quantifiable terms, though, and certain researchers have begun to explore subjective factors through qualitative methods.

Qualitative Investigation of Meaning in Physical Activity. To better understand how one's relationship with physical activity may influence their participation, Jose and Hansen (2013) conducted focus groups with young Australians to investigate what types of attitudes and meaning the participants attributed to leisure-time physical activity. Although some participants acknowledged the difficulty of always adhering to physical activity, their opinions of physical activity were largely positive. For example, commonly used words regarding the participants' meaning of physical activity included fun, fitness, energy, achievement, relaxation, enjoyment, and satisfaction – terms we might commonly associate with intrinsic motives. Additionally, participants responded that physical activity gave them the energy or fitness capabilities to engage in other things which they valued. Others stated that while PA itself wasn't enjoyable, what that believe they gained from it was valuable.

In a similar qualitative investigation, Lindelof and colleagues (2012) sought to assess how attitudes towards PA influenced participation in a group of adolescents in a weight loss camp. PA, in this case, was found to be less enjoyable and meaningful to the participants, and thus, their motivation and adherence suffered. In this study, the absence of enjoyment and meaning associated with PA may be the result of a lack of intrinsic motivation. In order to develop healthy and long-lasting adherence to PA, the authors suggest that values must be instilled early in life to establish purpose and meaning for remaining physically active.

Enhancing Meaning in PA. It is likely putting the cart before the horse in aiming to encourage physical activity without first discovering or developing the personal meaning of physical activity for that individual. That is, any such intervention or strategy attempting to inspire physical activity participation must first place a foundational emphasis on the cultivation of subjective meaning in which the individual can identify purpose to such an activity. Fortunately, research has begun to explore novel approaches to this troublesome health concern, and thus far, the results are encouraging.

In seeking to further elucidate the importance of incorporating meaning, Lewis and colleagues (2014) implemented an intervention aimed at enhancing eudaimonic well-being. The concept of eudaimonic well-being encompasses a much more holistic understanding of human health, integrating flourishing, self-actualization, and finding meaning and purpose in what one is doing (Hefferon, & Mutrie, 2012). Originally proposed by Aristotle, eudaimonia is seen as acting in accordance with one's inner values and developing what is best within oneself (Peterson, 2006). In such a conceptualization, purpose and meaning are paramount in explaining healthy functioning and behavioral antecedents of physical activity. As such, it is believed that people do not simply change their minds based on things they know, but rather on how they feel. Based upon this precept, Lewis and colleagues (2014), along with their intervention, the Well-Being Way, sought to enhance the participants' engagement with their experiences and understand their felt meaning. The participants were encouraged to align their concepts of idealized self with their daily behaviors. Results revealed that despite the fact that physical activity was not directly targeted as part of the intervention, individuals who participated in the program significantly increased their reported daily activity levels (as measured by steps per day). The authors speculated that as people more strongly identify with their intrinsic life goals, energy is mobilized to achieve these goals, and enhanced meaning is attributed to the process. These results were congruent with previous research which suggested that individuals with higher levels of life purpose adopted and maintained more health promoting behaviors (Ryff & Singer, 1998). These findings suggest that, in fact, not only may physical activity be increased through enhancing one's purpose and meaning in life, but also a constellation of health-related behavioral changes may result from such a process of personal growth!

Antonovsky's Salutogenesis Model. An early critic of the academic and applied work in health promotion, Antonovsky (1996) proposed an alternative approach and theoretical framework. Antonovsky emphasized the importance of an appropriate guiding philosophy with pertinent and pragmatic questions within the realm of health promotion, and identified a number of inherent issues with the dominant paradigm. First, health promotion seemed to have assimilated into the curative and preventative foci of disease prevention; a conceptually similar but fundamentally disparate pursuit in its objectives and application. Furthermore, resulting from an overemphasis on risk factors, health was often equated to lack of threats to one's health, and once again, salutary (health-promoting) factors were neglected. The final shortcoming

relates to the pathogenic orientation by which diagnosis reigns paramount. In essence, do the intricacies of a human being wash away beneath the spotlight of diagnosis? Complexity fades, leaving all but a singular pathology which itself serves as a lone signifier of one's general health. Not surprisingly, such a viewpoint often blinds the practitioner from concurrent manifestations of, or opportunities to endorse positive health in other avenues of the patient's life. Antonovsky insightfully proposes that in promoting greater health, one not need do so in every aspect of life. Indeed, one can enhance their health – through positive relationships, for example – while at the same time suffering from a physical disease. This more holistic understanding of the body and mind served as the basis for Antonovsky's alternative proposal.

In a message echoed by positive psychologists today, Antonovsky argued that health is more than the absence of illness. Yet, this is the common thread within the field in which individuals are dichotomously classified as either sick or not. Metaphorically, Antonovsky portrays this dilemma as those who are either safely on the shore (healthy) versus those who are drowning in the sea (sick). What may we gain, he continues, to instead shift this metaphorical focus away from the naïvely simplified notion of bifurcated health states, and rather acknowledge a continuum of health in which we are all "in the dangerous rivers of life" where the questions become, "How dangerous is *our* river? How well can we swim?" (p.14).

Clearly, Antonovsky's allegory reintroduces the inherent complexity of the human being in which individual difference, in circumstance and resourcefulness, are both recognized and imperative to where one finds himself on the *continuum* of health. It is with this philosophy in mind that Antonovsky presents his salutogenesis model. Consistent with his ideology, salutogenesis is aptly named, as its Latin translation represents "the origins of health," which emphasizes "studying the strengths and weaknesses of promotive, preventative, curative, and rehabilitative ideas and practices, [and] is a theory of the health of that complex system, the human being" (p.13).

Underpinning this idea of complexity, Antonovsky presents a framework which he calls the Sense of Coherence. Essentially, this signifies a global orientation in which life is seen as (a) manageable, in that one has sufficient ability and resources; (b) meaningful, in which things are worthwhile with purpose and reason; and (c) comprehensible, as things are relatively predictable and ordered. Inevitably, people encounter hardships throughout life; a term Antonovsky coined Generalized Resource Deficits. What influences one's interpretation of, and responses to these

factors are called Generalized Resistance Resources, which as the name implies, reflect a person's resource-based ability to cope and avoid stress. The balance between these resources and deficits ultimately determines if the end result is pathogenic, neutral, or salutary.

The salutogensis model provides a convincing rationale and a potentially fruitful path towards investigating and understanding true health promotion. While the theory's specific elements are not explicitly targeted as part of the current investigation, its foundational elements undergird the philosophical and academic orientation within which this study finds its roots. Many aspects of the salutogenesis model align well with concepts within positive psychology, and while a comprehensive review of these similarities is beyond the scope of this paper, a brief comparison may better illuminate these parallels.

First, Generalized Resistance Resources may represent constructs such as hardiness, resilience, optimism, social support, and a variety of other concepts often promoted within positive psychology. Similarly, meaningfulness is a crucial component to a comparatively global concept, eudaimonia. Lastly, Sense of Coherence has demonstrated the same cultural universality as positive psychology's widely accepted notion of character strengths. Perhaps these resemblances stem from the manner in which the alternative lens of "promoting good" diverges from the traditional focus of "fixing bad." Promoting good, as we will see, lies at the conceptual core of the current investigation's hypothesis.

Enhancing Personal Meaning through Virtues and Values. Through traditional psychology's vast and ever expanding knowledge of psychological disorder and disease, the Diagnostic and Statistical Manual of Mental Disorders, now on its fifth edition (DSM-5) serves as an exceptionally comprehensive and detailed resource in diagnosis, classification, and description of psychological disorders. The utility of this resource can hardly be overstated in the field of clinical psychology, and undeniably, it has served as an educational bible for countless practitioners. Unfortunately, the trend in clinical psychology, as in experimental psychology, has been a principal emphasis on finding what is wrong. To be sure, this perspective has in many ways served the field and society as a whole quite well, with 14 psychological disorders now being either highly treatable, or in some cases, curable (Seligman & Csikszentmihalyi, 2000).

Still, such a comprehensive manual exposes its shortcomings as soon as virtue and values require description and a widely agreed upon nomenclature. Certainly, treating illness may make

life bearable, but does this make life exceptional? Is anything short of complete thriving indicative of pathology, or is it in fact representative of the presence of something entirely different? In response to the absence of such a thorough equivalent for understanding psychological strengths and virtues, Peterson and Seligman (2004) set out to provide a framework and corresponding descriptive resource on understanding character strengths.

The culmination of their years of efforts resulted in the text, *Character Strengths and Virtues: A Handbook for Classification* (CSV; Peterson & Seligman, 2004), which has since served as a functional antithesis of the DSM and aided researchers and practitioners in studying and fostering positive psychological characteristics (Peterson & Park, 2009). Just as the DSM has provided researchers and practitioners alike a means of classifying, studying, and developing intervention strategies for a variety of psychological conditions, so too has the CSV allowed a greater exploration of the exceptional qualities and experiences of flourishing individuals and communities.

Alongside the CSV, Peterson and Seligman (2004) also developed the Values in Action Inventory of Strengths (VIA-IS) to allow measurement of these character strengths. Put simply, character strengths may be seen as morally valued individual difference variables which represent positive traits seen in behaviors, thoughts, and feelings. For inclusion in the VIA-IS, character strengths must meet a variety of criteria including: being recognized across cultures; representing a stable traitlike quality; and is morally valued, just to name a few (see Peterson & Seligman, 2004 for a complete list of inclusion criteria).

Through a highly ambitious and selective process, the researchers were able to distill their findings down to 24 character strengths (e.g., humor, self-regulation, curiosity), which fall within six central virtues (e.g., wisdom, humanity, transcendence). Moreover, the authors reported five second-order factors within which the strengths may also be grouped: 1) emotional; 2) interpersonal; 3) intellectual; 4) theological; and 5) strengths of restraint. In relation to meaning, Peterson and Seligman (2004) carefully considered the importance of eudaimonic well-being when developing the list of character strengths. They believed that eudaimonia is not simply an outcome resulting from successfully using one's strengths, but actually inherent in the process of itself.

Somewhat surprisingly – or perhaps predictably, as this was included as a selection criteria when compiling values for inclusion in the VIA-IS – relatively little variation existed

among different cultures, age, gender, political orientation, or education in regards to the prevalence of each of the character strengths (Park, Peterson, & Seligman, 2006). For example, kindness, fairness, and gratitude, among others, consistently appear as common top strengths, while self-regulation, modesty, and prudence are much less common. This finding suggests that the questionnaire may prove to be valuable in a wide range of populations while minimizing confounding artifacts which are often found when using many other psychological tests across different cultures.

Caution is warranted still, as the authors are quick to acknowledge this list is likely non-exhaustive, and should rather serve as a starting point for continued research. Nevertheless, in the years since the VIA-IS and CSV have been published, a burgeoning body of research has emerged and expanded our understanding of "the good life" (Peterson, Ruch, Beermann, Park, & Seligman, 2007).

Building Character Strengths

Although there is largely agreement upon the existence of character strengths (regardless of their appearance on the VIA-IS or not), the ability of, or the degree to which these strengths can be cultivated is an issue which has found less scientific consensus. Steger et al. (2007) found that many of the 24 character strengths in the VIA-IS were influenced by genetics to varying degrees. The level of heritability, nonetheless, far from predicts all of the expression of character strengths, and individuals are likely able to have significant, albeit not complete, control over the development of their strengths.

While a detailed discussion of genetics is far beyond the scope of this paper, it should be noted that the prevalent belief that genes are immutable and unalterable may be exaggerated, as recent research has suggested that regular physical activity can actually alter DNA and gene expression (Rönn et al., 2013). It seems plausible that, just as regular meditation can produce lasting neurological and immunological changes (Davidson et al., 2002), concerted effort in a psychological strength building program may also produce lasting change via observable structural and neurochemical changes in the brain. This is, however, simply speculation, and before we ask "how" the interventions work, their effectiveness must first be established.

Previous interventions targeting strength building have successfully enhanced self-perceptions of academic abilities (Austin, 2006), well-being (Rust et al., 2009), and self-confidence and achievement motivation (Govindji & Jinley, 2008), to name but a few. It should

be noted that in most cases, well-being has been the targeted variable of interventions, and the results have shown positive but modest improvements (Quinlan et al., 2012). However, Fredrickson's (1998) broaden and build theory of positive emotion suggests that even modest effects of a strength-building program could nonetheless create a self-perpetuating upward spiral of developmental benefits. According to the theory, experiencing positive emotions leads to an increase in one's personal resources (physical, intellectual, social) which can promote creative thinking, positive social interactions, and a variety of other beneficial outcomes. As such, even modest improvements should be seen as valuable with the potential to increase exponentially over time.

Another line of research in character strength building interventions has targeted whether strengths are best cultivated in isolation, in particular combinations, or collectively. Proyer et al. (2012) developed an intervention to enhance curiosity, gratitude, hope, humor, and zest (strengths linked to life satisfaction) compared to another group which trained strengths not commonly linked to life satisfaction. The group which trained the strengths related to life satisfaction did, in fact, report greater life satisfaction following the intervention than either the non-life satisfaction strengths group, or a waitlisted control group. An interesting finding, although not the original intention of the study, was that individuals who dropped out of the program had lower scores in the strengths of perseverance and self-regulation than those who completed the whole program.

Character Strengths and Life Satisfaction. In recent years, investigators have sought to demonstrate a causal link between positive psychological interventions and beneficial outcomes through random-assignment, placebo-controlled testing in order to support the notion that strengths are amenable to growth and development. For example, Seligman, Steen, Park, and Peterson (2005) tested five proposed interventions to determine their ability to increase life satisfaction and reduce symptoms of depression. Two of the interventions (reflecting on three good things that happened each day, and using signature strengths in a new way) successfully increased happiness while reducing symptoms of depression for six months compared to a placebo group, while the gratitude visit (writing and delivering a letter of gratitude) produced significant but shorter-lasting benefits. As may be expected, the greater the participant's adherence to the exercises, the more significant positive effects they reported. The authors

suggest that a package of positive interventions may, in fact, prove to be more efficacious than presenting them in isolation.

In investigating the influence of character strengths and life satisfaction, Park, Peterson, and Seligman (2004) found that greater levels of satisfaction in life were related to higher levels of a given character strength. In essence, the higher degree to which an individual identified with any particular strength, the more likely they also reported life satisfaction. In relation to specific strengths, particularly strong associations with life satisfaction were found with the strengths of zest, curiosity, love, hope, and gratitude (often referred to as strengths of the "heart"). These findings have been replicated even when character strengths were rated by peers (Buschor, Proyer, & Ruch, 2013). The authors, therefore, suggest that interventions seeking to enhance life satisfaction may do well to target these specific strengths.

An example of an effective strengths-based intervention may be seen in the work of Proctor and colleagues (2011) in their program, "Strengths Gym." The intervention targeted adolescent school children, as the school setting has become increasingly recognized as a viable option for promoting positive psychological interventions. As a result of the program, students' reported higher levels of life satisfaction, positive affect, and self-esteem, with lower scores on negative affect.

Recently, character strengths have begun to be investigated individually and collectively in particular domains. For example, research has targeted the impact of character strengths on work-related behavior and satisfaction (Gander, Proyer, Ruch, & Wyss, 2012), and in education and school settings (Park & Peterson, 2008). Although virtually no research has directly targeted physical activity, this may be a fruitful endeavor as Gander and colleagues (2012) found that health-promoting behaviors and positive experiences at work were related to character strengths.

Character Strengths and Self-Determination Theory. Although there seems to be little to no research directly investigating character strengths and SDT, Peterson and Seligman (2004) discuss connections between certain strengths and aspects of motivation. For instance, the strength of persistence (perseverance, industriousness) is said to be related to intrinsic motivation, as is the love of learning. The authors further mention the strengths of vitality (zest, enthusiasm, vigor, energy), which also relate to Ryan and Frederick's (1997) concept of subjective vitality – a reflection of organismic well-being associated with physical symptoms and perceived body functioning. Vitality is tied to intrinsic energies and eudaimonic well-being, as

these result from acting autonomously with basic needs being supported. Eudaimonia further relates to the strength of integrity (authenticity, honesty; Peterson & Seligman, 2004), which Peterson and colleagues (2007) discuss in relation to SDT as a route to happiness. Ryan, Huta, and Deci (2008) also discuss this eudaimonic route to happiness through a SDT perspective.

These relationships may all intertwine in regards to PA participation. As discussed previously, Duncan and colleagues (2010) found that exercise frequency and duration were associated with motives in which the activity had been integrated as part of the individual's identity. This may relate back to the concept of eudaimonia and acting in accordance with one's inner values. Similar to the findings of Lewis and colleagues (2014), exercise, in this context, may serve as part of a meaningful and fulfilling life, which may further lead to enhanced life satisfaction.

The connections between character strengths and SDT are an understudied area, but this is not the only area lacking in scientific evidence. With the thriving application of SDT in the health-domain, and character strengths being investigated in various disciplines, it would seem prudent to investigate their relationship in the realm of PA.

Character Strengths in Physical Activity. The potential benefits of effectively identifying, cultivating, and utilizing one's signature strengths to enhance life satisfaction and well-being has gained considerable support in the last decade (see Sin & Lyubomirsky, 2009 for a meta-analytical review). A noteworthy finding of one such study was that gratitude may be related to time spent exercising (Emmons & McCullough, 2003). However, in this time there has been virtually no direct investigation into the role that these strengths may play in the promotion, adherence, and satisfaction of physical activity. In fact, it appears that only one study has been conducted which specifically targeted physical fitness and health-oriented behaviors in relation to character strengths.

Proyer, Gander, Wellenzohn, and Ruch (2013), recognizing the gap in the current research, and perhaps heeding the call of Seligman to investigate positive health, set out to study the relationship between character strengths, health-oriented behaviors, physical fitness, and subjective health status. A sample of 440 adults between 18 and 75 years old completed the VIA-IS along with measures of health behaviors, subjective health, and self-rated physical fitness. The results demonstrated significant correlations between certain strengths and each of the dependent measures. For example, self-regulation, curiosity, zest, leadership, and hope were

positively correlated with overall fitness. In fact, all of the 24 strengths, with the exception of modesty and religiousness, were positively related to health behaviors. The strongest correlations between specific strengths and health behavior were found in self-regulation, zest, kindness, honesty, love, and social intelligence. The authors speculate that utilizing one's strengths to a greater degree may endorse enhanced activity and engagement in life. Of course, this research is correlational, so it is entirely possible that people who are physically active develop these psychological strengths through PA. It should be noted though, that other studies found that lower scores in certain strengths predicted attrition (Proyer et al., 2012). Therefore, one may speculate that strengths both influence the adoption and maintenance of PA, and concomitantly, the drop outs from physical activity programs.

A particularly interesting finding of the Proyer and colleagues (2013) study found zest, curiosity, hope, and humor were most strongly related to an active way of life. These relate to the strengths of the "heart" discussed in Park, Peterson, and Seligman's (2004) study which found these strengths were most related to life satisfaction. The significant overlap between the strengths which most strongly predict life satisfaction and the strengths most predictive of leading an active way of life suggest that this commonality may be more than coincidental. Additional investigation may help to further explore to what extent, and in what ways these parallels relate to PA participation and motives.

With evidence building for the efficacy of character strengths interventions, the time is right to bridge the gap into the realm of PA. The well-established applications of other positive psychological characteristics such as hardiness (Gerbhardt, van der Doef, & Paul, 2001; Hanson, 1996; Pollock & Duffy, 1990) and optimism (Hamid, 1990; Kavussanu & McAuley, 1995; Scheier & Carver, 1985; Seligman & Csikszentmihalyi, 2000; Smith, Young, & Lee, 2004) have been effectively integrated into the health-domain and PA. The successful employment of these concepts supports the argument for expanding the contemporary concept of character strengths to PA. Therefore, based on the literature, the purpose of the present investigation is to provide preliminary support for the significance of character strengths in PA, and provide foundational evidence for the future development of strengths-based interventions in the realm of PA. Specific hypotheses and purposes are delineated below.

Defining Character Strengths. Although 24 distinct character strengths are included within the VIA-IS, the current investigation will directly examine only a purposefully chosen

selection of these strengths. The specific strengths selected are based on their significance demonstrated in previous research, and their hypothesized relationships with the outcome variables of interest in this study. Complete discussions and definitions of each of these strengths are outlined by Peterson and Seligman (2004).

The strengths which will be of particular interest in this study are (1) zest – energy and excitement towards life; (2) curiosity – an interest in many subjects; (3) love – value of close relationships with others; (4) hope – positive expectancies for the future and action to achieve this outcome; (5) gratitude – awareness and appreciation for good things that happen; (6) humor – enjoyment of laughter and making others smile; (7) self-regulation – disciplined control of desires and emotions; and (8) perseverance – working hard to complete a task.

Purposes

Although there is sufficient evidence to develop certain hypotheses for the current investigation, other aspects remain more preliminary in nature. For example, Peterson and Seligman (2004) connected the strength of zest to the concept of subjective vitality (Ryan & Frederick, 1997) which has been associated with perceived body functioning, however, the relationship between character strengths and subjective health status is still lacking.

Purpose 1. Explore the relationship between zest and subjective health status.

Additionally, the relationship between social motives, PA, and life satisfaction will be examined. McAuley and colleagues (2000) found that not only did life satisfaction increase during a PA intervention, but the more social support the individual received, the greater the increase in satisfaction with life. Similarly, Gillison and colleagues (2006) found that intrinsic exercise-related goals were associated with increased QOL and exercise behaviors. Therefore, in the case of the present study, social motives as well as intrinsic motives may prove to be important factors in both the overall PA levels, as well as the participants' satisfaction with life.

Purpose 2. Examine the relationships between social and intrinsic motives for PA and life satisfaction.

Hypotheses

H_1: Zest, curiosity, love, hope, and gratitude will predict life satisfaction.

H_2: Zest, curiosity, love, hope, gratitude, humor, self-regulation, and perseverance will predict overall PA levels.

H_3: Autonomous motives for PA (fitness, competence and challenge, and enjoyment) will predict overall PA levels.

Chapter Two

Methods

Participants

Participants were recruited via mass email to a random sample of alumni from two Midwestern universities. Only alumni who had provided their emails to be included in the alumni database were contacted. Approximately 14,000 emails were sent to potential participants with an open rate of 28%. The survey was taken by 722 respondents, resulting in a response rate of 18% of those who opened the email.

Of the 722 surveys initiated, 593 were completed (with no, or only minor missing data). Incomplete data was the result of either entirely skipped sections, which appears to be the result of accidental "double-clicking" on the "next" button, or participant attrition, in which participants discontinued involvement at some point throughout the survey.

The remaining sample predominantly consisted of participants (394 women, 193 men, 3 other, 3 no response, M_{age} = 43.6 years, *SD* = 15.74, age range: 19-87 years) from a white ethnic background (93.1%, *n* = 552). As an alumni sample, the vast majority (98.8%, *n* = 584) of participants had completed a 4-year college degree or above. The body mass index of the sample indicated that the group was slightly above the "normal" classification (*M* = 25.78, *SD* = 5.12), however, this is still below the national average (see table 1 for a full overview of demographic information).

Procedure

After gaining approval from the institutional ethics board, participants were recruited via email. An initial recruitment email (see Appendix C) was sent to a sample of alumni requesting their participation in the study. Approximately two weeks later, a follow-up email (see Appendix D) was distributed as a reminder for participation. All participants were informed of the general nature of the study, reminded that their participation is completely voluntary, and assured that their responses would remain completely confidential. In the initial contact email, participants were also made aware of a monetary incentive that was offered in the form of a raffle in which three participants were randomly chosen to receive $100. Participants also completed an informed consent release (see Appendix A) before questionnaires were distributed. Participants were given the researcher's contact information for follow up questions and/or comments.

To gain access to the VIA-IS, researcher permission was requested through an online application available on the instrument's official website (www.viacharacter.org). The questions were obtained in order to maintain procedural simplicity by including the questionnaire as part of an amalgamated group of instruments contained within a single online survey. After data was collected, raw scores were returned to the VIA Institute to be scored. This is divergent from the manner in which the instrument is most often completed, which is on the official website. However, all questions appear in the current study exactly as they appear in their original format.

Through an online survey, participants completed the VIA-IS, MPAM-R, Godin-Shephard Leisure-Time Physical Activity Questionnaire, SWLS, and demographic information (see Appendix B). Upon completion of the survey, participants were sent a debriefing email (see Appendix E) explaining the objectives of the study in greater detail. Additionally, participants were informed upon completion of the questionnaires that they were entered into a raffle and winners will be selected once data collection is complete. After all data was successfully collected, three participants were drawn at random, informed of their selection, and mailed a check for $100.

Materials

Demographic Information. Participants completed demographic information including age, height, weight, gender, education, ethnicity, and a single item assessing subjective health status (see Appendix B).

The Godin-Shepard Leisure-Time Physical Activity Questionnaire. Originally developed as part of a doctoral dissertation, the Godin-Shepard Leisure-Time Physical Activity Questionnaire (Godin & Shephard, 1985) has since been widely used as a simple, brief measure of PA. Unlike other abbreviated measures of PA which have demonstrated unacceptable validity such as the IPAQ-Short Form (see Lee, Macfarlane, Lam, & Stewart, 2011), the Godin PA questionnaire has proven to be a valid tool. Specifically, Godin and Shephard (1985) reported significant correlations between the questionnaire and objective measures such as VO_{2max} ($r = 0.24$, $p < 0.001$) and percentile body fat ($r = 0.13$, $p < 0.01$), with 69% of individuals being correctly classified as either fit or unfit. Numerous subsequent studies (Gionet & Godin, 1987; Jacobs, Ainsworth, Hartman, & Leon, 1993; Miller, Freedson, & Kline 1994; Sallis, Buono, Roby, Micale, & Nelson, 1993) supported the reliability and validity of the scale. PA is assessed

by participant self-report on how many times in a typical 7-day period he/she engages in more than 15 minutes of PA, with distinctions between strenuous, moderate, and mild exercise. These responses may then be summed to produce a single MET value for overall PA, which can be used to categorize individuals into different activity levels or used to compare against recommended PA guidelines.

Motivation for Physical Activity Measure-Revised. A measure of motivation grounded in self-determination theory, the Motivation for Physical Activity Measure-Revised (MPAM-R; Ryan et al., 1997) assesses a variety of motives for PA. The questionnaire consists 30 items evaluating five subscales: fitness, appearance, competence and challenge, enjoyment, and social motives. Questions are scored on a 7-point Likert scale ranging from 1 ("Not at all true for me") to 7 ("Very true for me"). Subscale alphas ranged from .78 to .92 (Ryan et al., 1997). Wilson, Rodgers, and Fraser (2002) confirmed the internal consistency, with each of the five subscales exceeding .82, but warned that correlations were low to moderate among psychological needs satisfaction constructs. Nevertheless, the MPAM-R appears to be a psychometrically sound tool for assessing PA motives within a SDT framework.

Satisfaction with Life Scale. The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffen, 1985) has been used extensively to assess global life satisfaction – a concept essentially synonymous with happiness or subjective well-being. An initial 48 items were ultimately reduced to 5 to eliminate redundancies. In the initial study, the SWLS demonstrated acceptable psychometric properties, with significant (although not excessive) correlations with related measures, an alpha coefficient of .82, and a test-retest (2 month) stability coefficient of .82. The psychometric properties of the SWLS have been supported by numerous studies since its development (see Pavot & Diener, 1993 for a full review). Scores above 20 represent satisfaction with life, while scores below 20 represent dissatisfaction, with more precise categorizations falling into specific ranges (e.g., 5-9: extremely dissatisfied).

Values in Action Inventory of Strengths. To measure character strengths, the VIA-IS (Peterson, Park, & Seligman, 2005) was used. The instrument consists of 120 items, with 5 items representing each of the 24 identified strengths. Participants respond on a 5-point Likert scale ranging from 1 ("Very much unlike me") to 5 ("Very much like me"). The scale has demonstrated good reliability ($\alpha > 0.70$) and consistent test-retest correlations over four months

(Park, Peterson, & Seligman, 2006). Recent studies have also supported the psychometric properties of the brief 120-item scale used in the current study (McGrath, 2013).

Analyses

All analyses were performed with SPSS (Version 21.0). Descriptive analyses were conducted, including ANOVAs to examine potential differences between demographic groups; specifically, age and gender.

Purpose 1. An ANOVA was conducted, followed by Tukey's HSD post hoc analyses with Bonferroni correction (.05/n=3).

Purpose 2/Hypotheses. Data were analyzed using multiple linear regression analyses to assess if social and autonomous motives and certain character strengths (see hypotheses) predict PA levels, life satisfaction and subjective health status. As the Godin-Shephard questionnaire distinguishes between mild, moderate, and strenuous PA, models were created for each of these intensity levels. Both character strengths and social and autonomous motives for PA represented the independent variables of the study, while life satisfaction, PA, and subjective health status were the dependent variables. For each model, single linear regression analyses were initially used to test for significant covariates (gender, age, education, ethnicity, BMI, subjective health status), with only significant covariates retained. The Bonferroni correction (.05/n) was applied in groups of 3 or more. Participants with missing data were excluded from certain analyses (see table 1).

Chapter Three

Results

Demographics

The sample (n = 593) was fairly evenly distributed in the three age groups of 18-35 (38.11%), 36-55 (36.26%), and 56 years and older (22.93%). ANOVAs revealed no significant differences between the different age groups and life satisfaction or subjective health status. There were significant differences between each of the groups and BMI and total weekly PA. Post hoc analyses ($p<.02$) revealed that 18 to 35 year olds had a significantly lower average BMI (MD=1.54, p=.02) and significantly greater total PA METs (MD=13.45, p=.00) than 56 and older. These results were expected though, as BMI typically increases with age (Reas, Nygård, Svensson, Sørensen, & Sandanger, 2007), while PA decreases (Sallis, 2000).

In regards to overall activity level, the sample was categorized according to the guidelines put forth by Godin (2011). These categories are delineated by units of metabolic equivalents (METs) in reference to the expected benefits of activity, with specific distinctions between substantial benefits (active; 24 units or more), some benefits (moderately active; 14 to 23 units), and low benefits (insufficiently active; less than 14 units). The sample was much more active than the general population, with a very small portion being classified as inactive (1.3% [n = 8), with a substantial amount falling into the moderate (11.8% [n = 70]), or active (86.8% [n = 515]) categories.

Purposes

Zest and Subjective Health Status. As an exploratory investigation, the first purpose of the study was to determine if any relationship exists between the character strength of zest and subjective health status. Subjective health status was scored on a 5 point Likert scale with the response options of "poor" (no responses), "fair" (M = 3.28, SD = .71, n = 33 [5.6%]), "good" (M = 3.53, SD = .62, n = 166 [28.1%]), "very good" (M = 3.77, SD = .63, n = 252 [42.7%]), and "excellent" (M = 3.98, SD = .59, n = 139 [23.6%]).

An analysis of variance (ANOVA) revealed that differences existed between subjective health status ratings and zest. A Tukey's HSD post hoc test revealed significant mean differences (MD) between individuals who scored "fair" and "very good" (MD = -.49, SE = .12, p = .00), "fair" and "excellent" (MD = -.71, SE = .12, p = .00), "good" and "very good" (MD = -.23, SE = .06, p = .00), "good" and "excellent" (MD = -.45, SE = .07, p = .00), as well as "very

good" and "excellent" (MD = -.22, SE .07, p = .01). In essence, zest was significantly higher with each increasing interval on the subjective health rating scale, with the single exception between "fair" and "good."

PA Motives and Life Satisfaction. The second purpose of the current study was to further investigate the relationship between PA motives and life satisfaction (see table 4 for all means, standard deviations, and relationships for the different exercise motives).

A multiple regression analysis was conducted with exercise motives as the independent variables, and PA as the dependent variable. A significant negative relationship existed between appearance and life satisfaction (M = 5.13, SD = 1.42, p = .00), and a positive relationship was found between fitness and life satisfaction (M = 5.92, SD = 1.06, p = .01). Subjective health status (M = 3.84, SD = .85) was also retained in the model as a covariate (p = .00).

Hypotheses

PA Motives and PA Levels. A multiple regression analysis was conducted with PA motives and significant covariates as the independent variables, and PA levels as the dependent variable. Models were created for mild, moderate, and strenuous PA levels. Subjective health status was retained in both moderate and strenuous models as a significant covariate, with the addition of age and gender in the strenuous model. Both the moderate (p = .000, R^2 = .066) and strenuous (p = .000, R^2 = .275) models were significant. Positive relationships existed between subjective health status (M = 3.84, SD = .85) and both moderate (p = .04) and strenuous PA (p = .00) models. No relationships were found between motives and mild or moderate PA. A significant positive relationship was found between strenuous PA and competence (M = 4.80, SD = 1.50, p = .00), and a significant negative relationship between strenuous PA and social motives (M = 3.55, SD = 1.57, p = .02). See table 4 for all beta levels and standard errors.

Character Strengths and Life Satisfaction. A multiple regression analysis was conducted with character strengths and significant covariates as the independent variables, and life satisfaction as the dependent variable. Subjective health status was retained in the model as a significant covariate. As expected, the life satisfaction model was significant (p=.000) with an adjusted R^2 = .323; hence variables in the model predicted 32% of the variance in participants' life satisfaction. Significant relationships existed between life satisfaction and zest (M = 3.73, SD = .65, p = .00), love (M = 4.13, SD = .60, p = .00), hope (M = 3.87, SD = .62, p = .02), and

gratitude (M = 4.04, SD = .62, p = .00). Curiosity (M = 3.96, SD = .58), however, was not significantly related (p = .25).

Character Strengths and PA Levels. A multiple regression analysis was conducted with character strengths and significant covariates as the independent variables, and PA levels as the dependent variable. Subjective health status was retained in the both moderate and strenuous models as a significant covariate, with the addition of age and gender in the strenuous model. The physical activity models were significant for strenuous (p = .000; adjusted R^2 = .22) and moderate PA (p = .000; adjusted R^2 = .05), but not for mild PA (p = .08; adjusted R^2 = .01). Therefore, the strenuous model predicted the most variance in participants' PA, at 22%. Specific significant positive relationships existed between zest and moderate (p = .03) and strenuous PA (p = .04); curiosity and mild (p = .02) and strenuous PA (p = .03); self-regulation and moderate (p = .01) and strenuous PA (p = .00); and perseverance and strenuous PA (p = .02). Significant negative relationships existed between love and strenuous PA (p = .02); and hope and moderate PA (p = .04). See table 3 for all beta levels and standard errors.

Chapter Four

Discussion

The health crisis that much of the industrialized world faces is often characterized by the obesity epidemic, but obesity itself is only part of the concern. Physical inactivity may actually be as dangerous as obesity and smoking (Lee et al., 2012), and is far less obvious in terms of its prevalence. Unquestionably, there are important interactions between affect, behavior, cognitions and PA (Kanarek, Foulds, & D'Anci, 2012; Kavussanu & McAuley, 1995; Taylor, Sallis, & Needle, 1985), and we must continue to investigate the unique role of personality in an individual's motives (Lewis & Sutton, 2011), intensity, and the perception of barriers (Courneya et al., 1998). Research has demonstrated that these individual differences can function as buffers against risk factors, essentially empowering individuals to overcome obstacles and remain resilient against adversity (Ball et al., 2012; Hume et al., 2012; MacFarlane, Abbott, Crawford, & Ball, 2010). To promote PA, then, it may be imperative to target personality strengths which enable people to overcome barriers and find meaning and value in PA. With this in mind, it was the intention of the current study to explore the relationships between character strengths, life satisfaction, PA motives, and PA levels.

Zest and Subjective Health Status

Consistent with previous research (Dishman, Sallis, & Orenstien, 1985), PA levels were associated with subjective health status. The relationship of interest in the present study, though, was the manner in which Peterson and Seligman (2004) suggested that zest may be closely related to what Ryan and Frederick (1997) discussed as subjective vitality; a construct associated with more positive perceptions of body functioning. The current investigation provided initial support for such a relationship, finding that increases in zest did indeed differentiate individuals at nearly every interval on a subjective health rating scale. Zest, by its definition, represents an energetic and enthusiastic approach to life, and undoubtedly this has a favorable impact on perceptions of physical and psychological health. The current study's findings were similar to those of Proyer and colleagues (2013), who found that zest was one of the most predictive character strengths in regards to subjective health status, self-reported physical fitness, and health behaviors. Hence, zest is likely to be one of the most important strengths to target in any intervention which seeks to enhance not only the perception of good health, but positive and proactive behaviors to pursue it.

While this finding in the present study is only correlational in nature, in experimental studies, zest has proven to have causal impacts on global concepts such as life satisfaction (Seligman, Steen, Park, & Peterson, 2005). As such, it seems plausible that causal relationships could potentially exist between zest and perceptions of health, although experimental methodologies are needed to validate such an association.

PA Motives and Life Satisfaction

One relationship which has substantial experimental support is that of life satisfaction and PA participation. Studies have suggested that quality of life may be enhanced through PA (Belardinelli, Georgiou, Cianci, & Purcaro, 1999; Courneya et al., 2003; Courneya & Friedenreich, 1997; Mereles et al., 2006; Stringer, Berezowskaya, O'Brien, Beck, & Casaburi, 1998; Young-McCaughan & Sexton, 1991), and that social support is a particularly important contributing factor (McAuley et al., 2000). Similarly, intrinsic exercise goals also appear to be related to increased PA, as well as improvements to quality of life (Gillison et al., 2006). While, the utility in studying PA motives is often confined to its relation to PA levels, the present study sought to magnify the scope of application and determine if PA motives also related to life satisfaction and PA of various intensities.

Results demonstrated that the appearance and fitness motives were, in fact, related to life satisfaction; negatively with the former, and positively with the latter. Social motives, however, were not associated with life satisfaction in the current study. It was initially expected that as social support relates to life satisfaction, so too might social motives. This finding was not supported, though, which may be the result of the different social constructs being measured. Specifically, McAuley and colleagues (2000) measured social relations and support in exercise groups, while the present study evaluated motives for PA. It is likely that being motivated by social factors is not enough to see substantial benefits to life satisfaction if those motives are unfulfilled. McAuley and colleagues had assessed actual support and relationships that existed, which appear to have had a stronger impact on life satisfaction. The present study did not measure the presence or amount of social support, and thus, cannot make inferences regarding the current sample. Social motives for PA, though, do not appear to influence life satisfaction.

Surprisingly, intrinsic motives were not predictive of life satisfaction as previous research would suggest (Ryan & Deci, 2000). There are numerous differences between sample demographics which may explain this incongruence in results. For example, much of the

research investigating the influence of a SDT perspective on life satisfaction has been conducted with specific populations such as elderly in retirement homes (Vallerand, O'Connor, & Blais, 1989), individuals with diabetes (Williams et al., 2009), and adolescents (Gillison et al., 2006). In many cases, the goal of attempting to fulfill basic psychological needs and foster intrinsic motivation was to bring the sample's life satisfaction up to more normal levels, not necessarily above. In the present study, the random sample selected had a high mean life satisfaction score, and as such, differences may not have emerged as in populations with lower life satisfaction. What this may suggest is that in a population where life satisfaction is not high and psychological needs are not being met, methods of fostering intrinsic motivation and fulfilling basic psychological needs can have a significant impact on life satisfaction. But, when life satisfaction is already elevated, intrinsic motives could be less impactful on enhancing quality of life.

Another possible explanation for this finding may come from the overrepresentation of females in the sample. Research has suggested that women are more motivated by extrinsic factors, such as appearance and fitness motives (Ryan et al., 1997), both of which the current study found to be significant factors related to life satisfaction. The most important factor, though, may be the manner in which perceptions affect the different mechanisms and outcomes of adopting these motives. For example, in finding that increases in self-esteem followed participation in exercise programs, Sonstroem (1997) stated that these enhancements were more from perceived rather than objective improvements from the program. This could relate to the findings in the present study, as the two motives that were related to life satisfaction, appearance and fitness, are perhaps two motives in which perceptions could be even more important than the objective benefits. For example, an individual who subjectively perceives they have made improvements to their fitness level will perhaps have greater benefits to their self-esteem and quality of life than an individual who does not perceive improvements to fitness levels.

Appearance, conversely, may be a particularly volatile motive, especially in women. Research has shown that many women suffer from body dissatisfaction, partially due to societal pressures and media depictions (Grabe, Ward, & Hyde, 2008). These factors may lead to some women initiating PA, but not long-term adherence (Ryan et al., 1997). The present study also found that appearance was not related to PA at any level. This may suggest that with inactivity and BMI increasing with age, people who are motivated by appearance may experience a

diminishing quality of life as their bodies look farther away from their ideal standards. In general, with motives it appears that perceptions may be as important, if not more so than objective metrics in terms of life satisfaction. Future studies could further investigate the interaction of these motives with related factors that influence perceptions and subsequent outcomes.

PA Motives and PA Levels

In relation to exercise intensity, both intrinsic and extrinsic motives emerged as significant factors, with competence positively related, and social motives negatively related to strenuous activity. The findings with competence are consistent with previous research (Duncan et al., 2010; Gillison et al., 2006; Ryan et al., 1997) which found that autonomous motives were related to more physically challenging activities. The present study did not find that fitness motives predicted PA levels, although with strenuous activity, fitness motives approached significance ($p = .06$). This may be divergent from the results of Ryan and colleagues (1997) study which found that attendance to a fitness center was related to fitness and social motives. However, Ryan and colleagues' study investigated new members to a university fitness center, and attendance was used to examine the relationships with PA motives. The current study, as opposed to measuring attendance, was assessing participation in PA of various intensities. A fitness center is by its very nature a relatively social setting, and as such, it can be assumed that predominantly individuals comfortable in such an environment would have attended. Alternatively, strenuous activity is not confined to any environment, and in fact, may be more related to activities found outside of structured group environments. For example, strenuous activity as delineated by the Godin-Shepard Leisure-Time Physical Activity Questionnaire (Godin & Shephard, 1985) represents activities such as vigorous long distance bicycling, judo, and football, just to name a few. Additionally, the mean age of Ryan and colleagues sample was 19.5 years, while the current sample was 43.6 years. Therefore, not only are these activities less likely to take place in social settings (such as a fitness center), but they may be activities that are less attractive or accessible to older populations. Nevertheless, it appears that further research is needed to differentiate the manner in which extrinsic motives may be mediated by other variables that influence the behavioral and psychological consequences of such motivations.

Lastly, it should be noted that Ryan and colleagues found that these extrinsic motives predicted PA initiation, but not long-term adherence, and as such, the current sample may have been in the later stages of adherence.

Character Strengths and Life Satisfaction

The relationship between character strengths and life satisfaction has been well documented, with the specific strengths of zest, curiosity, love, hope, and gratitude consistently among the most influential (Buschor, Proyer, & Ruch, 2013; Park, Peterson, & Seligman, 2004). A variety of interventions have been successfully applied to demonstrate the causal relationship between character strength use and improvements to life satisfaction (Seligman, Steen, Park, & Peterson, 2005). In the present study, as expected, life satisfaction was related to all of the previously predicted strengths, with the single exception of curiosity. While the result is mostly congruent, curiosity is typically found to be predictive, and the absence of its significance in the present study warrants explanation.

As part of a strength-based intervention, Proyer, Ruch, and Buschor (2012) had participants develop a specific set of strengths related to life satisfaction. The authors found that the lower a particular strength was, the greater the enhancement to life satisfaction once that strength was developed; this was an especially strong effect with curiosity. Peterson and Seligman (2004) warn that curiosity can be both favorable (e.g., exploring new areas) and unfavorable (e.g., peeping in windows), and thus the expression of a strength can greatly impact its outcomes. This could be an important consideration as the current sample represented a highly educated demographic, and the potential negative effect of the American education system on curiosity, interest, and motivation (Deci & Ryan, 1982) could have impacted the expression of this strength.

The rest of the predicted strengths, though, were related to life satisfaction in the expected direction. Interestingly, the mean scores for each of the character strengths were significantly higher in the current sample than national average reported by Park, Peterson, and Seligman (2006). Additionally, there was variability in the rank order of top strengths, with judgment, for example, ranking as fifth nationally, and second in the current sample (see Table 2b). Other variations existed, but overall, the order of top strengths reflected that typically seen in the general population.

Character Strengths and PA Levels

As with many health-related issues that arise, physical inactivity has been approached from a biomedical perspective, essentially viewing lack of activity as an illness to be remedied by removing inhibiting factors (Kimiecik, 2011). Not only has this view overlooked the qualitative difference between neutral and positive health, but it has undervalued and underutilized a strength-based approach. While there has been nearly unanimously positive benefits in quality of life seen in strength-based interventions, this has yet to be applied to PA promotion. Fortunately, with the relatively recent ability to empirically measure these strengths, research is now catching up and providing a unique viewpoint on how PA may relate to positive human potentialities.

The current investigation, in partial agreement with, and expanding upon Proyer and colleagues' (2013) findings, zest, curiosity, love, hope, self-regulation and perseverance were associated with PA of various intensities. However, not all of the character strengths were related in the expected direction. In particular, love and hope were both negatively related to PA. This is not congruent with the findings of Proyer and colleagues, however, this may be explained by specific methodological differences.

First, in the Proyer and colleagues study, the Multiple Health Behavior Questionnaire (MHB-39; Wiesmass et al, 2003) was used to assess a variety of health-related constructs, including an active way of life. The manner in which an "active way of life" was operationalized, though, may explain some of the discrepancies. For example, the MHB-39 considers an active way of life to include "social activities" and "getting fresh air." Neither of these are specifically reflected in the Godin-Shepard Leisure-Time Physical Activity Questionnaire (Godin & Shephard, 1985), which explicitly targets and quantifies time spent in activities such as running, baseball, yoga, etc. Moreover, while hope and love were both found to relate to an active way of life, love was not related to any other measure of physical fitness, and only one other subscale in health behaviors, and hope was related to very few other physical fitness scales, and not a single other factor on the MHB-39. In essence, the associations of these strengths seem to be mostly isolated to an active way of life. In contrast, the strength of self-regulation, for example, was much more strongly and positively related to multiple factors on the MHB-39, and to nearly all measures of physical fitness. This makes sense when we look at the differences of the strengths themselves.

For instance, self-regulation refers to the conscious control over thoughts, emotions, and behaviors in order to achieve a desired goal (Peterson & Seligman, 2004). Hope, however, is more related to positive expectancies and future-mindedness, and love refers to valuing close relationships with others. Consequently, hope itself may be grounded more in positive thought rather than action. In addition, love, could have been related to an active way of life in the manner in which the MHB-39 operationalizes activity includes social components, which is consistent with the close relationships valued by love. So, while individuals higher in hope and love may have reported an active way of life, those higher in self-regulation may have been doing more to actually achieve it. This would agree with the findings of the present study, as self-regulation was a strong predictor of both moderate and strenuous PA.

In relation to love specifically, there may be an alternative explanation for the lack of significant findings. Eyler (2003) conducted a review of potential correlates of PA and found that married people engage in less PA, especially strenuous PA, with married women being the most inactive overall. While marital status itself does not necessarily infer the presence of the character strength love, it could be reasonably presumed that someone who more greatly values sharing close and reciprocal relationships would become married. In fact, Peterson and Seligman (2004) consider marriage (or similar partnerships) as a prototype for different manifestations of this strength (e.g., romantic love). Thus, it could be argued, that married people would be higher in the strength of love, and this may explain why we find that love (particularly in the disproportionately female sample) would negatively relate to PA.

Humor and gratitude, while expected to predict PA level, were not significant at any PA intensity. Conceptually, these may not seem to have any direct link to PA, however, there is an association which may have partially explained the result found in the Proyer and colleagues study, and the lack thereof in the present investigation. Research has shown that positive affect is a very important factor in regards to exercise behavior, physical health, and positive coping methods (Kelsey et al., 2006; Salama-Younes, 2011). Humor is characterized by a joyful view of the world and the difficulties faced on a daily basis, which leads to a more positive mood, and gratitude is represented in an awareness of, and appreciation for good things that happen. Therefore, in many populations we find that people who adopt such a jovial and favorable mindset may find it much easier to handle the obstacles that impede others' ability to engage in PA. That said, this benefit may be more substantial when life satisfaction is lower. As

mentioned, the current sample demonstrated a high life satisfaction, and it is plausible that the benefits of humor and gratitude in PA are less profound when life satisfaction is already elevated. Nonetheless, it seems that humor and gratitude are viable resources towards enhancing life satisfaction directly, and indirectly through promoting activity via positive affect.

Practical Implications

It is quite clear by the extraordinarily low participation rates that most current approaches to PA promotion are ineffective, especially in regards to long-term adherence. It is becoming more and more apparent that much may be explained from psychological factors. Traditional psychology has helped to create a vast array of effective treatments and interventions. However, much of this perspective has revolved around the "disease model," and has failed to effectively address the need to encourage individuals to strive to reach their potential and maximize their efforts to achieve at higher levels (Salama-Younes, 2011). Positive psychology provides a new and relatively unexplored framework within which these issues may be addressed.

As research has demonstrated, psychological strengths may be developed through training and instruction (Sheard & Golby, 2006; Seligman, Steen, Park, & Peterson, 2005). Positive psychological skills training may be able to help individuals maximize their potential and engage in more proactive, preventative health-related behaviors. Utilizing a strength-based approach can provide a much needed shift from the deficit-based approach that plagues much of health promotion (Antonovsky, 1996), and into the era of positive health (Seligman, 2008).

Many existing interventions which have been used to develop character strengths with the intention of enhancing life satisfaction (Seligman, Steen, Park, & Peterson, 2005) could use techniques tailored towards a PA environment. For example, individuals could be encouraged to utilize their signature strengths in a new PA-relevant way. A person who is high in curiosity or love of learning, for instance, may try exploring new outdoor activities such as hiking or kayaking. Someone high in kindness or love could schedule weekly walks with a loved one to be active while investing into their relationships with others.

On an individual level, the findings of the present study may be applied in the PA and wellness domains to promote positive health behaviors through the integration of strength building techniques into health professionals' general practices. A personal trainer, for instance, may find it useful to instill aspects of curiosity into their training sessions with their client. This could be implemented by asking the client to come to each session with a specific question about

PA, nutrition, or lifestyle, and finding the answer together. They might also try a new exercise or use a new machine at each session.

Applying these ideas more broadly to groups, these strengths (e.g., zest, curiosity, self-regulation, perseverance) could be developed in physical education settings, with games and activities structured around cultivating strengths. An idea for self-regulation and perseverance may be to have each child set a goal for themselves (e.g., improve at basketball dribbling), then set a plan for how to improve and monitor progress. This could even be combined with well-established techniques that enhance life satisfaction, such as having the children write down three things they are grateful for in relation to their physical education and share them with the rest of the class. The particularly significant implications of such an intervention reside in its potential to promote PA in a more personally relevant and meaningful way, while also having a high likelihood of enhancing life satisfaction at the very same time.

Additionally, the complex, but undeniably important role that zest plays in life satisfaction and positive subjective health appraisals is one which should be utilized. The VIA Institute even suggests that engaging in rigorous PA is a great way to boost zest. The conceptual similarities between zest and an active lifestyle make it an excellent candidate for the target of a strength-based PA promotion program, but it appears that this strength also connects to an equally important facet of wellness; subjective health appraisals.

More specifically, developing zest could help enhance the efficacy of PA interventions and the work of practitioners in fields where a person's perceptions of their health are particularly important factors. A physical therapist, for example, may wish to intentionally include zest-enhancing activities as part of the rehabilitation protocol, as this could enhance the patient's perceptions of their health, which could not only improve their subjective well-being, but lead to physiological changes (e.g., stress hormone reduction) and psychological improvements (e.g., positive expectancies) that will lead to greater physical recovery and adherence.

Character strengths are not the only psychological factors associated with PA and QOL, though. Motives for PA, while clearly being essential considerations in regards to PA participation, also appear to be related to LS. It seems that when an individual is motivated to improve their fitness, they also are more likely to have an enhanced QOL, with the inverse being true for appearance motives. Moreover, we find that motives for competence are related to

strenuous activity participation. This is similar to the research findings in task and ego motivational orientations which have consistently demonstrated positive affective, cognitive, and behavioral adaptations when a mastery orientation is adopted (Ntoumanis & Biddle, 1999). Thus, if a gym wants to create an environment that is conducive to PA and QOL, they may wish to foster an environment which promotes self-referenced improvement and enhancing fitness, while significantly downplaying the importance of appearance.

Limitations

The present study has explored a variety of topics, ranging from the well-established (e.g., character strengths and life satisfaction) to the completely uninvestigated (e.g., character strengths and PA levels). The large sample obtained – a significant strength of the study – allowed more accurate statistical analyses to be performed, and the wealth of data collected provided a wide variety of potential research questions to be investigated. Nevertheless, a number of potential limitations must be addressed to understand the potential generalizability and implications of the current study's findings.

Response Rate. Nulty (2008) evaluated the adequacy of response rates to online surveys, and found studies ranging from 20% to 47% completion rates. While the current study falls slightly below this range (18%), this could be the result of the particular sample targeted. The alumni association from which most of the participants were derived reported that the typical open rate is approximately 20%, with completion rates even lower. Therefore, while the completion rate of 18% may be somewhat low in comparison to those found in other studies, it may actually be slightly high in comparison to the rates typically achieved in this given sample population. Nonetheless, the results should be interpreted cautiously as the response rate achieved is indeed below the desired rate.

Sample Demographics. Another potential limitation concerns the ethnic characteristics of the sample. White/Caucasians were significantly overrepresented (93.1%) compared to all other ethnicities. Particular estimates show that white/Caucasians represent a slightly higher portion of college graduates (U.S. Department of Education, National Center for Education Statistics, 2012), however, this certainly doesn't account for the overrepresentation of white/Caucasians in the current sample, and caution is warranted as not all ethnicities were equally represented.

The dissimilarity of the BMI in the current sample to that of the general population should also be noted. While it is estimated that 34.9% of the United States population is obese (Ogden, Carrol, Kit, & Flegal, 2014), the sample in the current study had less than half of the obesity rate at only 16.2%. However, this decreased rate may be partially expected as obesity prevalence is higher in African American and Hispanic/Latino populations, both of whom are underrepresented in the current sample. Moreover, higher education level has been negatively related to obesity in women (Ogden, Lamb, Carrol, & Flegal, 2010), and with females making up 66.4% of the sample, this may partly explain the reduced rates of obesity. Lastly, the vast majority of the sample was moderately active or above (98.7%), which is higher than we would expect to find in the general population.

Self-report Physical Activity Measures. A common concern in assessing PA is that of self-report data. This is a valid issue, and one which undoubtedly interferes with the accurate collection of PA-related data. That said, with large samples it is often not practical or possible to collect objective PA metrics, and in such cases, self-report must be used. The current study, in seeking to attenuate the inevitable error of self-report, selected one of the more reliable and valid instruments available as a brief self-report measure of PA: the Godin-Shepard Leisure-Time Physical Activity Questionnaire. To be sure, research has shown that individuals typically over-report their activity levels, however, results may be more accurate when participants are only asked to recall recent activity (Sallis & Saelens, 2015), which was the case in the current study. Still, self-report measures are by all accounts less reliable and valid than objective measures, and future studies may do well to use more accurate methods of measurement if possible.

Future Directions

Character strengths, while extensively recognized in relation to life satisfaction, still find little recognition as a potentially fruitful path for promoting PA. Despite the occasional suggestion of PA as a means of utilizing character strengths, there seems to be no mention of applying these techniques in the other direction – character strengths to promote PA. While the current study has sought to encourage further investigation into this realm, more is needed to substantiate the role that character strengths serve in PA promotion efforts.

Future studies may wish to build off of the existing strength-based programs (e.g., Proctor et al., 2011), and adapt methodologies and intervention strategies to fit PA goals and metrics. It may be useful to determine whether interventions targeting particular strengths are

more efficacious strategies for enhancing PA than broad interventions that seek to have individuals utilize their own signature strengths. Previous research found that targeting specific strengths related to life satisfaction (curiosity, gratitude, hope, humor, and zest) led to greater improvements than when character strengths not specifically related to life satisfaction were developed (Proyer et al., 2012). Therefore, it is likely that to maximize the promotion of PA through character strength development, targeted interventions may prove to be most efficacious.

Based on the findings of the present study and of Proyer and colleagues (2013), zest, curiosity, humor, self-regulation, and perseverance could be valuable strengths in achieving this goal, with love and hope requiring further investigation. Determining the optimal combination of strengths, and what specific intervention strategies align with each of these strengths would be a viable research endeavor. Such studies could also provide significant contributions through prospective, experimental methods to better infer the causal relationships underpinning these constructs.

As it is likely that a mutual relationship exists between psychological strengths and PA, it is highly encouraged that both factors are targeted concurrently. In this manner, new and effective interventions and training modalities can be developed to promote PA participation and life satisfaction more effectively than many currently utilized methods. Such interventions could intentionally and systematically develop techniques to cultivate their development both broadly, and in the specific domain of PA.

Lastly, as the results of the current study suggest, PA motives may not only be related to PA of various intensities, but also to life satisfaction. The relationship discovered in the current study was not as expected, though, as it was extrinsic (fitness), and not autonomous motives that were predictors of life satisfaction. Future studies may wish to delve further into the motives related to adherence compared to those that predict life satisfaction.

Conclusion

The complex psychological nature of PA is far from fully understood. What we can be sure of, though, is that certain individual differences seem to empower people to engage in more positive health related behaviors. Finding ways to develop, foster, and exploit these factors could serve as a holistic and multifaceted avenue in which to promote PA. The findings of the present study in relation to this goal are as follows:

- Having a zest for life is related to more positive perceptions of health.
- Particular motives for being physically active (e.g. fitness) relate to improved QOL, while others (e.g., appearance) relate to reduced QOL.
- When an individual strives for competence in their PA, it is associated with more physically challenging activities, whereas social motives are inversely associated with participation in physically challenging activities.
- Certain strengths (e.g., zest, curiosity, self-regulation, perseverance) are related to increased PA levels, and could be the target of interventions seeking to improve PA and LS concurrently.

We have seen throughout history the remarkable nature of human beings to strive for self-actualization and overcome great adversity. The health crisis that we face today is not one which can be fixed without first recognizing the necessity of empowering each person on an individual level. And while building an individual's character strengths may not be a panacea for this immense issue, it is surely a step in the right direction.

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Appendix A

Consent Form

Dear Participant:

You are invited to participate in a study on character strengths and physical activity participation, enjoyment, and motives. I will ask you to complete a few questionnaires regarding your physical activity levels and motives. Your answers will be kept confidential and not shared with anyone. The estimated completion time is 20 minutes, for which you will be entered into a raffle for a chance to win $100. Your participation is completely voluntary and you may withdraw from the session at any time or decline to any answers that make you uncomfortable. If you decide not to complete the questionnaires, you will not be entered into the raffle. You will not be asked to do anything that would expose you to any risk greater than those of everyday life. The benefits of the study are twofold: first, you will be helping to study a topic which may lead to the promotion and enjoyment of physical activity; second, you will get an opportunity to learn more about yourself through a detailed and individualized report on your own character strengths.

If you have any further questions about the study, please contact Joe Kerns at kernsjf@miamioh.edu. If you have questions about your rights as a research participant, please call the Office of Advancement of Research and Scholarship at 529-3600 or email: humansubjects@muohio.edu.

Thank you for your participation. I am very grateful for your help and I hope that you are able to benefit from your involvement in the study.

Before continuing, please confirm the following statement:

> I agree to participate in the study of character strengths and physical activity. I understand that my participation is voluntary and that my information and responses will be kept confidential. By clicking "Next" I acknowledge that I am 18 years or older and would like to be involved in the study.

Appendix B

DEMOGRAPHIC QUESTIONNAIRE

The purpose of the following questions is to gather basic information that will be relevant to the generalizability of the study. ***All personal information will remain confidential.***

Your email address is required in order to enter you into the raffle drawing.

You will not receive any "spam" messages, and your email address will not be given to any other parties.

E-mail Address: _____

Age: _____

Gender (circle one)**:** Male Female Other

Height: _____ lbs

Weight: _____ (in feet and inches)

Ethnicity:

African-American Asian-American Caucasian/White

Hispanic/Latino Middle-Eastern Native American

Pacific Islander Biracial/Multiracial

Other: _____

Education: What is the highest degree or level of school you have completed?

Some high school High school graduate or equivalent

Some college Associate degree

Bachelor's degree Graduate or professional degree

Which bests describes your current health status? (*Circle only one*)

Poor Fair Good Very Good Excellent

Appendix C

RECRUITMENT EMAIL

Hello,

My name is Joe Kerns and I am a graduate student in the Department of Kinesiology and Health at Miami University of Ohio. I am sending you this email because I am conducting my thesis research on psychological characteristics and physical activity, and I would like to offer you the opportunity to participate. If you are interested, as a token of appreciation, you will be entered into a raffle in which three (3) participants will be randomly selected to win $100 each. Additionally, you will be given a chance to learn more about yourself and reflect on your strengths.

This study is interested in better understanding a variety of psychological factors which relate to physical activity participation, enjoyment, and motivation, as well as life satisfaction. Surprisingly, there is virtually no research looking at the role of selected positive psychological strengths in physical activity – a gap this study intends to bridge with your help.

If you would like to be involved in the study and entered into the raffle, you will be asked to complete an online questionnaire (approximately 15-20 minutes completion time). All data collected will be completely confidential.

You will be asked for your email so you may be entered into the raffle drawing. After completion of the questionnaire, you will receive an email providing more detailed information regarding the nature of the study. Your email will NOT be shared or used for any other purposes. Should you decide, you may withdraw from the study at any time.

Thank you so much for your time, and I greatly appreciate your contribution to my research.

To participate in the study, please click on the link below.

Follow this link to the Survey:
LINK

Sincerely,

Joe Kerns
Master's Candidate
Miami University of Ohio

Appendix D

FOLLOW UP REMINDER EMAIL

Hello,

A couple of weeks ago I sent you an email requesting your help on a research topic of great importance: investigating psychological strength-based methods for promoting physical activity and life satisfaction. If you have already completed this survey, thank you very much!

If you have not yet had the chance to participate, I would greatly appreciate your contribution to the research. I will include the original email and participation link below if you would be interested in helping. It only takes between 15-20 minutes to complete, and to show my appreciation, you will be entered into a raffle drawing in which three participants will be randomly selected to win $100. Thank you for your time, and for your contribution!

Sincerely,

Joe Kerns
Master's Candidate
Miami University of Ohio

Appendix E

DEBRIEFING EMAIL

Thank you so much for your participation in my study! Your responses are greatly appreciated and will help to answer my research questions.

Purpose of the Study:

As I mentioned in my initial email, the purpose of this study was to investigate the role of character strengths in physical activity participation and motives. In other words, I wanted to look at whether or not certain character strengths (e.g., humor, perseverance) are related to a person's overall activity levels, as well as their motivation for participating in physical activity (e.g., fitness, enjoyment). Previous research has demonstrated the importance of character strengths and well-being, however little research had expanded this to the physical activity domain.

Confidentiality:

Your responses will remain completely confidential, available only to myself. However, if you decide that you would like your data removed from the study and permanently deleted, please contact me at kernsjf@miamioh.edu.

Final Report:

If you would like to receive a summary of the findings of this study once it is completed, please feel free to email me and express your interest. Once the results have been compiled and written up, I can provide you with a copy if requested.

Useful Contact Information:

If you have any questions or concerns regarding any aspect of the study, or if you have any problems regarding the research, please contact me at kernsjf@miamioh.edu. If you have questions about your rights as a research participant, please call the Office of Advancement of Research and Scholarship at 529-3600 or email: humansubjects@muohio.edu.

Further Reading:

If you would like to learn more about character strengths, please refer to the following:

Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A classification and handbook*. New York: Oxford University Press/Washington, DC: American Psychological Association.

Again, thank you so much for your participation!

Sincerely,
Joe Kerns
Master's Candidate
Miami University of Ohio

Table 1. Descriptive Statistics, Health, Physical Activity, and Motives for Physical Activity

	n (%)	Life Satisfaction Mean (SD)	*p*	Subjective Health Status Mean (SD)	*p*	Body Mass Index Mean (SD)	*p*	PA Total Weekly METs Mean (SD)	*p*
Total	593 (100%)	26.82 (5.70) *Missing=2*		3.84 (.85) *Missing=3*		25.78 (5.12)		66.83 (38.18)	
Demographic Characteristics									
Age in Years									
18-35	226 (38.11%)	26.64 (5.49)		3.84 (.88)		**25.04 (5.45)** *Missing=4*		**72.70 (36.93)**	
36-55	215 (36.26%)	26.79 (5.67)	.64	3.90 (.79)	.29	**26.01 (4.79)** *Missing=6*	**.02**	**65.03 (36.71)**	**.00**
56+	136 (22.93%)	27.22 (6.17)		3.76 (.89)		**26.58 (4.71)**		**59.25 (41.13)**	
Sex*									
Male	193 (32.55%)	26.82 (5.82) *Missing=1*	.93	3.85 (.85)	.79	**26.64 (4.48)** *Missing=1*	**.01**	69.36 (39.23)	.19
Female	394 (66.44%)	26.78 (5.67) *Missing=1*		3.83 (.85)		**25.39 (5.39)** *Missing=14*		65.05 (36.90)	

Abbreviations: SEM = Standard error of the mean. SD = Standard deviation. METs = Metabolic equivalent of task. PA = Physical activity

*Other/no response = 6 participants

P-value for difference in mean from ANOVA F test.

Statistically significant differences ($p < .05$) are bolded.

Table 2a. Character Strengths Means (SD)

Descriptive Statistics

	Mean	Std. Deviation
Appreciation of B & E	3.7444	.74703
Bravery	3.5632	.65785
Creativity	3.7858	.67579
Curiosity	3.9619	.58341
Fairness	4.1143	.48318
Forgiveness	3.7096	.68383
Gratitude	4.0368	.61781
Honesty	4.3518	.41934
Hope	3.8648	.57173
Humility	3.5288	.65150
Humor	4.0968	.61601
Judgment	4.2496	.48341
Kindness	4.2078	.51479
Leadership	3.8567	.53804
Love	4.1265	.60010
Love of Learning	3.7589	.73507
Perseverance	3.9926	.62543
Perspective	3.8192	.56721
Prudence	3.7261	.61853
Self-Regulation	3.2523	.70205
Social Intelligence	3.9083	.61585
Spirituality	3.3265	1.08764
Teamwork	3.7258	.54959
Zest	3.7282	.65163

*Note. B & E = Beauty and Excellence

Table 2b. Character Strengths Rank Ordered (SD)

Descriptive Statistics

	Mean	Std. Deviation
Honesty	4.3518	.41934
Judgment	4.2496	.48341
Kindness	4.2078	.51479
Love	4.1265	.60010
Fairness	4.1143	.48318
Humor	4.0968	.61601
Gratitude	4.0368	.61781
Perseverance	3.9926	.62543
Curiosity	3.9619	.58341
Social Intelligence	3.9083	.61585
Hope	3.8648	.57173
Leadership	3.8567	.53804
Perspective	3.8192	.56721
Creativity	3.7858	.67579
Love of Learning	3.7589	.73507
Appreciation of B & E	3.7444	.74703
Zest	3.7282	.65163
Prudence	3.7261	.61853
Teamwork	3.7258	.54959
Forgiveness	3.7096	.68383
Bravery	3.5632	.65785
Humility	3.5288	.65150
Spirituality	3.3265	1.08764
Self-Regulation	3.2523	.70205

*Note. B & E = Beauty and Excellence

Table 3. Multiple Regression Table for Character Strengths, Life Satisfaction, and PA Intensities.

	Mean (SD)	Life Satisfaction n=588		Mild PA (METs) n=590		Moderate PA (METs) n=590		Strenuous PA (METs) n=575	
		β (SEM)	*p*	β (SEM)	*p*	β (SEM)	*p*	β (SEM)	*p*
Age								**-.28 (.06)**	**.00**
Gender								**-.09 (2.08)**	**.02**
Subjective Health Status	3.84 (.85)	**.17 (.24)**	**.00**			**.10 (.79)**	**.03**	**.22 (1.24)**	**.00**
Zest	3.73 (.65)	**.18 (.48)**	**.00**	-.08 (1.03)	.20	**.15 (1.50)**	**.03**	**.13 (2.39)**	**.04**
Curiosity	3.96 (.58)	-.05 (.44)	.25	**.13 (.96)**	**.02**	-.02 (1.37)	.72	**.11 (2.15)**	**.03**
Love	4.13 (.60)	**.23 (.37)**	**.00**	-.06 (.79)	.22	-.09 (1.14)	.05	**-.10 (1.82)**	**.02**
Hope	3.87 (.57)	**.12 (.52)**	**.02**	.01 (1.12)	.83	**-.13 (1.63)**	**.04**	-.06 (2.61)	.32
Gratitude	4.04 (.62)	**.15 (.41)**	**.00**	.05 (.89)	.40	.09 (1.28)	.11	-.04 (2.08)	.39
Humor	4.09 (.61)			.02 (.76)	.61	.01 (1.08)	.85	-.41 (1.74)	.33
Self-Regulation	3.25 (.70)			.07 (.68)	.13	**.14 (1.02)**	**.01**	**.14 (1.60)**	**.00**
Perseverance	3.99 (.63)			.02 (.78)	.71	.02 (1.12)	.61	**.10 (1.76)**	**.02**

*Bold indicates statistical significance at p-value < .05.
Abbreviations: SEM = Standard error of the mean. SD = Standard deviation. METs = Metabolic equivalent of task. PA = Physical activity.

Table 4. Multiple Regression Table for PA Motives, Life Satisfaction, and PA Intensities.

	Mean (SD)	Life Satisfaction n=587		Mild PA METs n=591		Moderate PA (METs) n=575		Strenuous PA (METs) n=574	
		β (SEM)	*p*	β (SEM)	*p*	β (SEM)	*p*	β (SEM)	*p*
Age	43.64 (15.74)					**.09 (.04)**	**.04**	**-.20 (.06)**	**.00**
Gender								**-.08 (1.93)**	**.03**
Subjective Health Status	3.84 (.85)	**.30 (.28)**	**.00**			**.09 (.75)**	**.04**	**.18 (1.14)**	**.00**
Interest/Enjoyment	5.04 (1.43)	.04 (.29)	.55	.06 (.54)	.46	.08 (.78)	.32	.05 (1.19)	.46
Competence	4.80 (1.50)	-.09 (.28)	.21	.06 (.53)	.45	.13 (.76)	.09	**.29 (1.17)**	**.00**
Appearance	5.13 (1.42)	**-.24 (.20)**	**.00**	.02 (.37)	.77	.44 (.54)	.40	.02 (.82)	.66
Fitness	5.92 (1.06)	**.15 (.30)**	**.01**	-.06 (.56)	.33	.01 (.81)	.94	.10 (1.24)	.06
Social	3.55 (1.57)	.06 (.17)	.19	.06 (.31)	.21	.02 (.45)	.65	**-.10 (.69)**	**.02**

*Bold indicates statistical significance at p-value < .05.
Abbreviations: SEM = Standard error of the mean. SD = Standard deviation. METs = Metabolic equivalent of task. PA = Physical activity.