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Adult Character Strength Use and Its Relationship to Physical and Mental Health

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Walden University
2019

Abstract

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by

Angela Bergen

MS, Walden University, 2010

BS, University of Rhode Island, 2006

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

In this study, the use of human character strengths was evaluated as a component of mental and physical health. The majority of previous character strengths research has been limited to monotonic use of character strengths. This study evaluated subjective outcomes based on a new measure of how much adults reported underusing, optimally using, and overusing their character strengths. This exploratory study was theoretically grounded in the upward spiral model of lifestyle change. The underuse, optimal use, and overuse of character strengths were evaluated as predictors of physical and mental health status, health behaviors, and emotions. Using a convenience sample of 100 participants and a correlational design with regression analyses, as well as mediation with bootstrapping methods, the study determined that the optimal use of character strengths was predictive of better physical health, better mental health, more frequent health behaviors, and more frequent positive emotions. The underuse of character strengths was predictive of worse physical health, worse mental health, less frequent health behaviors, and more frequent negative emotions. Additionally, the overuse of character strengths was predictive of worse physical health, less frequent health behaviors, and more frequent negative emotions. Overuse of character strengths was not found to be predictive of worse mental health. Positive emotions mediated 53% of the relationship between optimal use of character strengths and health behaviors. Motivating individuals to engage in healthier lifestyles, although critical, can be challenging at times. This study is socially significant because it may offer increased knowledge on promoting positive emotions, the upward spiral of healthy behavioral choices, and better physical and mental health.

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Dedication

To my daughters, Aveena and Evaly, for their ever-present reflections of human character strengths, for their encouragement and patience, and for their belief in me.

To my husband, Matt, for his support every step of the way, for his devotion to our daughters during this journey, and for being so willing to hold this space for me.

To my friends and family, for their positive reinforcement and constant enthusiasm to help me keep moving forward.

To other strengths researchers/educators/exemplars, for illuminating the beauty of humankind and thus attracting more of it into our collective experience.

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Chapter 1: Introduction to the Study

Introduction

A classification of character strengths and virtues was established in 2004 by an organization previously called Values In Action (VIA) Institute on Character; however, the current name is now with the acronym only, the VIA Institute on Character. A baseline relationship between monotonic character strengths and health has been identified. The 24 character strengths in the VIA classification have recently been further measured and delineated into categories of underuse, overuse, or optimal use of each individual strength (Niemiec, 2014; Freidlin, Littman-Ovadia, & Niemiec, 2017). This new level of precision offered an opportunity to evaluate if there were potential mental and physical benefits of a person being aligned with the optimal use of character strengths, as well as if there were mental and physical drawbacks of predominately underusing or overusing character strengths. Alignment of human character is just one component of mental and physical health; however, it may act as a significant catalyst in the positive feedback loops associated with better overall states of physical and mental health. The present study was conducted in response to the need for continued research concerning optimal utilization of strengths of human character and the relationships of such use with physical and mental health promotion.

The United States is experiencing an abundance of health burdens, particularly from chronic disease. Modifiable risk factors are largely responsible for the leading causes of death, including heart disease, cancer, chronic respiratory disease, stroke, and accidents, and many of these risks are avoidable by making changes in lifestyle behaviors (Centers

for Disease Control and Prevention [CDC], 2014). One of the most effective means of managing or helping to prevent the onset of chronic disease is a healthy lifestyle. While people are generally aware that lifestyle factors are important in disease prevention, not enough people are compliant in regular engagement of health promoting behaviors (Bryan & Hutchinson, 2012).

There is a need to support and motivate individuals in choosing positive health behaviors. Positive emotions are a precursor to engaging in health-promoting behaviors, and if this dynamic can be leveraged, the social implications could tip the scales in favor of better health. Human character strengths, as a positive psychology construct, have been associated with positive outcomes (Wood, Linley, Maltby, Kashdan, & Hurling, 2011; Proctor, Matlby, & Linley, 2011; Myers & van Woerkom, 2016; Proyer, Gander, Wellenzohn, & Ruch 2013; Freidlin, Littman-Ovadia, & Niemiec, 2017). In this study, the goal was to further explore and compare the physical and mental health outcomes of individuals who more optimally utilized their character strengths, as compared to physical and mental health outcomes of those who predominately underused or overused their strengths. Significant predictions would support working on optimizing the use of character strengths as a means by which positive emotions can be increasingly generated, rendering a person more likely to engage in health-promoting behaviors. Because the optimal use of strengths is a new concept, my intention was to contribute to the early research available on the topic.

This chapter includes a summary of the background of the literature, problem statement and purpose of the study, research questions, a review of the theoretical

framework, and the nature of the study. The chapter concludes with notes on definitions, assumptions, and delimitations.

Background

Health risk behaviors, such as lack of physical activity, poor nutrition, tobacco use, and drinking too much alcohol cause much of the illness, suffering, and early death related to chronic diseases and conditions (CDC, 2015). Poor health behaviors such as these can lead to inflammation (Loprinzi, 2016), and chronically high levels of inflammation predict disease (Fagundes, Bennett, Derry, & Kiecolt-Glaser, 2011). Viewed together, health behaviors contribute to the presence or absence of inflammation, which can lead to the presence or absence of gene expression toward disease. This is a powerful concept, yet while people are generally aware that lifestyle factors are important in disease prevention, not enough people are compliant or actually engage in health behaviors regularly (Bryan & Hutchinson, 2012).

Positive psychology emphasizes what is right with a person to encourage human flourishing (Peterson & Seligman, 2004), and this concept can be extended to health. Under the positive psychology umbrella, there is a growing body of research devoted to the examination of character strengths as conceptualized by the VIA strengths classification system (VIA-IS), which categorizes 24 universal character strengths, organized under six broad virtues (Peterson & Seligman, 2004). Strengths use is said to provide a key support in the attainment of goals leading to greater well-being (Linley, Nielsen, Gillett, & Biwas-Diener, 2010), as well as being a way to build long term individual resilience and optimal functioning (Wood et al., 2011). Though psychological

well-being is fortified by character strengths interventions, the bigger question was whether character strengths interventions also affected physical health (Park, Peterson, Szvarca, & Vander Molen, 2014). There is evidence that supports the fact that positive mental states may create better health behavior compliance (Fredrickson, 2013). Intervention frameworks geared toward enhanced positive mental states, such as by using character strengths, may be useful in designing weight management programs (Hintsanen et al., 2012), and are easily administered to patients with chronic illness (Huffman, DuBois, Millstein, Celano, & Wexler, 2015). Li et al. (2017) showed that character strengths are stress-defense factors, associated with lower heart rate and blood pressure.

In this study, I aimed to address a gap in knowledge within the intersecting disciplines of positive psychology and health psychology. While character strengths use and interventions have shown to be associated with positive outcomes as evidenced by recent literature, research had not yet examined the notion that the use of character strengths can be optimized. Furthermore, the relationships between the underuse, optimized use, and overuse of character strengths and physical health outcomes had not been explored to date. Considering the health challenges that many Americans are facing, it was reasonable to explore whether a balanced use of character strengths is possibly related to more positive emotions, which in turn may be associated with better physical and mental health outcomes. The aim of conducting this study was to fulfill this gap in knowledge and better elucidate the relationships between these factors.

Problem Statement

The positive findings of character strengths use and character strengths interventions have only measured the monotonic endorsement of strengths, where the prominence of use of each strength is ranked in relation to the other strengths without the degree or direction of use taken into account. Getting a ranked output of monotonic strengths from the VIA-IS does provide the valuable insight on which strengths are more prominent for each individual person. However, this ranking system does not take into account that strengths can be overused or underused. Freidlin et al. (2017) highlighted the importance of not just viewing monotonic character strengths as previous studies have, but rather evaluating the overuse, underuse, or optimal use of character strengths so as to guide individuals toward fine-tuning their strengths of character for optimal outcomes.

The present research filled a gap in the understanding of the overuse, underuse, and optimal use of character strengths and what their relationships are with subjective measures of physical and mental health status, health behaviors, and emotions. Previous studies with general well-being outcome measures have looked only at monotonic strengths endorsement. This study was therefore unique in evaluating character strengths use more specifically, by using the classifications of strengths being overused, underused, or optimally used. The results of this study will contribute to the progression of character strengths research as well as provide insight as to whether the optimization of character strength usage would be worthwhile to explore as a facet of physical and mental health promotion.

Purpose of the Study

The purpose of the present study was to examine if strengths of human character, when optimally used, predicted positive physical and mental health statuses. Character strengths have been researched in the arenas of human potential as well as both physical and mental health. The measurement and classification of general character strengths were further delineated to subsequently include subcategories of the underuse, overuse, and optimal use of each of the character strengths (Niemiec, 2014; Freidlin et al., 2017). This more precise stance on strengths use presented a novel opportunity to evaluate whether or not the optimal use of character strengths, specifically, predicts positive indices of health and also if the underuse and/or overuse of strengths predict negative indices of health, which were aims of this study.

The underuse, optimal use, and overuse of character strengths (each as separate subscales of the Over-Under-Optimal Use strengths survey; see Appendix A) were evaluated for prediction of four indices of health, namely global physical health status (a subscale score of the PROMIS Global Scale; see Appendix B), global mental health status (also a subscale score of the PROMIS Global Scale), frequency of health behaviors (global score of the Wellness Behaviors Inventory; see Appendix C), positive emotions (a subscale score of the Modified Differential Scale of Emotions; see Appendix D), and negative emotions (also a subscale of the Modified Differential Scale of Emotions). Furthermore, positive emotions were tested as a potential mediator between optimal character strengths use and health behaviors to discern whether positive emotions exerted

an upward spiral mechanism by which optimal strengths use contributed to health behaviors.

Research Questions and Hypotheses

I derived the following research questions and hypotheses from the review of existing literature in the areas of character strengths, emotions, and aspects of physical and mental health. There will be a more detailed discussion of the nature of the study in Chapter 3.

Research Question #1

To what extent does optimal character strength usage, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global physical health status, as measured by a subscale of the PROMIS Global Scale survey?

$H_0$1: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will not significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

$H_1$1: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

Research Question #2

To what extend does optimal character strength usage, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global mental health, as measure by a subscale of the PROMIS Global Scale survey?

$H_0$2: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will not significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

$H_1$2: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

Research Question #3

To what extent does optimal character strength usage, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict health behaviors, as measure by the global score of the Wellness Behaviors Inventory (WBI)?

$H_0$3: Optimal use of character strengths as measured by a subscale of the OUOU will not significantly predict health behaviors as measured by the global score of the WBI.

$H_1$3: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will significantly predict health behaviors as measured by the global score of the WBI.

Research Question #4

To what extent does optimal character strength usage, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict positive emotions, as measured by a subscale of the modified Differential Emotions Scale (mDES)?

$H_0$4: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will not significantly predict positive emotions as measured by a subscale of the mDES.

$H_1$4: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will significantly predict positive emotions as measured by a subscale of the mDES.

Research Question #5

If optimal use of character strengths, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predicts health behaviors, as measured by the global score of the Wellness Behaviors Inventory (WBI), do positive emotions, as measured by a subscale of the modified Differential Emotions Scale (mDES), to some extent mediate the observed effect of optimal characters strengths usage on health behaviors?

$H_0$5: If optimal use of character strengths as measured by an optimal use subscale of the OUOU predicts health behaviors as measured by the global score of the WBI, the effect will not be mediated by positive emotions as measured by a subscale of the mDES.

$H_1$5: If optimal use of character strengths as measured by an optimal use subscale of the OUOU predicts health behaviors as measured by the global score of the WBI, the effect will, to some extent, be mediated by positive emotions as measured by a subscale of the mDES.

Research Question #6

To what extent does underuse of character strengths, as measured by an underuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global physical health status, as measured by a subscale of the PROMIS Global Scale survey?

$H_0$6: Underuse of character strengths as measured by an underuse subscale of the OUOU will not significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

$H_1$6: Underuse of character strengths as measured by an underuse subscale of the OUOU will significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

Research Question #7

To what extend does underuse of character strengths, as measured by an underuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global mental health, as measure by a subscale of the PROMIS Global Scale survey?

$H_0$7: Underuse of character strengths as measured by an underuse subscale of the OUOU will not significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

$H_1$7: Underuse of character strengths as measured by an underuse subscale of the OUOU will significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

Research Question #8

To what extent does underuse of character strengths, as measured by an underuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict health behaviors, as measure by the global score of the Wellness Behaviors Inventory (WBI).

$H_0$8: Underuse of character strengths as measured by an underuse subscale of the OUOU will not significantly predict health behaviors as measured by the global score of the WBI.

$H_1$8: Underuse of character strengths as measured by an underuse subscale of the OUOU will significantly predict health behaviors as measured by the global score of the WBI.

Research Question #9

To what extent does underuse of character strengths, as measured by an underuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict negative emotions, as measured by a subscale of the modified Differential Emotions Scale (mDES)?

$H_0$9: Underuse of character strengths as measured by an underuse subscale of the OUOU will not significantly predict negative emotions as measured by a subscale of the mDES.

$H_1$9: Underuse of character strengths as measured by an underuse subscale of the OUOU will significantly predict negative emotions as measured by a subscale of the mDES.

Research Question #10

To what extent does overuse of character strengths, as measured by an overuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global physical health status, as measured by a subscale of the PROMIS Global Scale survey?

$H_0$10: Overuse of character strengths as measured by an overuse subscale of the OUOU will not significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

$H_1$10: Overuse of character strengths as measured by an overuse subscale of the OUOU will significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

Research Question #11

To what extend does overuse of character strengths, as measured by an overuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global mental health, as measure by a subscale of the PROMIS Global Scale survey?

$H_0$11: Overuse of character strengths as measured by an overuse subscale of the OUOU will not significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

$H_1$11: Overuse of character strengths as measured by an overuse subscale of the OUOU will significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

Research Question #12

To what extent does overuse of character strengths, as measured by an overuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict health behaviors, as measure by the global score of the Wellness Behaviors Inventory (WBI)?

$H_0$12: Overuse of character strengths as measured by an overuse subscale of the OUOU will not significantly predict health behaviors as measured by the global score of the WBI.

$H_1$12: Overuse of character strengths as measured by an overuse subscale of the OUOU will significantly predict health behaviors as measured by the global score of the WBI.

Research Question #13

To what extent does overuse of character strengths, as measured by an overuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict negative emotions, as measured by a subscale of the modified Differential Emotions Scale (mDES)?

$H_0$13: Overuse of character strengths as measured by an overuse subscale of the OUOU will not significantly predict negative emotions as measured by a subscale of the mDES.

$H_1$13: Overuse of character strengths as measured by an overuse subscale of the OUOU will significantly predict negative emotions as measured by a subscale of the mDES.

Theoretical Framework

Acute behavioral choices such as nutrition, exercise, and smoking/alcohol habits accumulate over time into an overarching lifestyle trend that can either lead toward wellness or illness (CDC, 2017). One dynamic that contributes to this accumulated lifestyle trend is that there are biological underpinnings to behavior choices that incentivize individuals to repeat the same neurochemically rewarding behaviors over time, regardless of whether those behaviors happen to be healthy or unhealthy (Fredrickson, 2013a). Harnessing this power of neurochemically-motivated behavior explicitly in a positive direction has been found to be preceded by the experience of positive mental states, whereas inflammatory markers of disease states appear to be reciprocally associated with negative mental states (Fredrickson, 2013a). Mental states, therefore, appear to be related to the behavioral enactment of both healthy and unhealthy lifestyle choices. By better understanding the emotional processes that act as the precursors to the behavioral health choices people make, there becomes an opportunity to intentionally promote the increased frequency of those positive emotional states which are shown to be most beneficial in stimulating an increase in positive behaviors.

Broaden and Build Theory

Fredrickson (1998) outlined the specific positive emotions that can enhance a person's experience. The first part of Fredrickson's (2013a) broaden-and-build theory states that positive emotions broaden our view, and the second part of the theory states that this broadened view helps build new habits. Ultimately, a person can draw from these new robust resources and apply them to other contexts and life experiences. This

process of becoming more open minded and resourceful is the basis of the broaden-and-build theory of positive emotions. Positive emotions predict sustained behavior change, and the reciprocal nature of positive emotions and health creates an upward spiral dynamic (Fredrickson & Joiner, 2002). Therefore, the broaden-and-build theory served as a conceptual foundation for the subsequently developed upward spiral model of lifestyle change (Fredrickson, 2013a), which was the primary theoretical informant of this study.

Upward Spiral Model of Lifestyle Change

Fredrickson more recently created an offshoot of the broaden-and-build theory called the upward spiral model of lifestyle change. This model proposed that positive emotions can both help people commit to new positive health behaviors and raise their psychological inclination for subsequent wellness behaviors and sustained behavior change (Fredrickson, 2013a). As it directly addresses lifestyle changes and health promotion, I used the upward spiral model of lifestyle change as the framework for the present study.

Because positive emotions are the precursor to healthy behavioral adherence per this theoretical model, future research may aim to create interventions that intentionally generate positive emotions due to the beneficial sequalae of positive emotions. In the current study, I sought to determine whether or not the optimized use of character strengths predicted positive outcomes such as physical health, mental health, health behaviors, and positive emotions. Furthermore, if significant predictability was established, a further test of mediation would be completed to discern if positive emotions at least partially mediated the proposed relationship between optimal character

strengths usage and engagement in health behaviors, as such a dynamic has been theorized by the upward spiral model of lifestyle change. The results were proposed to justify future research on character strengths interventions meant to optimize strengths usage in order to intentionally elicit positive emotions and thereby catalyze the upward spiral of positive behavioral and lifestyle changes.

Nature of the Study

In this study, a cross-sectional, multi-correlational design was utilized. Self-administered web-based questionnaires were employed to examine whether optimal usage of character strengths had predictive utility for (a) global physical health, (b) global mental health, (c) higher frequency of health behaviors, and (d) positive emotions. Additionally, the underuse and overuse of strengths were both examined for predictive utility over (a) global physical health, (b) global mental health, (c) lower frequency of health behaviors, and (d) negative emotions. The effects of the underuse, optimal use, and overuse of character strengths on the aforementioned health factors were investigated using a multiple regression approach. If significant primary effects were found, further mediation testing would be conducted to evaluate secondary effects.

Participants completed a demographic questionnaire to gather information on age, gender, ethnicity, and education level. In the current study, three subscales of the Over-Under-Optimal Use survey (OUOU; Freidlin et al., 2017) measured the (a) underuse, (b) optimal use, and (c) overuse of character strengths as independent variables. Two subscales of the PROMIS Global Scale (Hays, Bjorner, Revicki, Spritzer, & Cella, 2009) measured (a) global physical health status and (b) global mental health status which were

used as dependent variables in separate regressions, a global score of the Wellness Behaviors Inventory (WBI; Sirois, 2001; 2017) measured the frequency of engagement in health behaviors which was used as a dependent variable, and two subscales of the modified Differential Emotions Scale (mDES; Fredrickson, Tugade, Waugh, & Larkin, 2003) measured (a) positive emotions and (b) negative emotions, which were used as dependent variables in separate regressions. Positive emotions were also tested as a potential mediating variable in the exploration of a secondary effect.

Data was collected via an online survey platform, Survey Monkey, that facilitated the administration of survey questions and data collection of answers from an adult convenience sample recruited and compensated through an online laborer pool called Amazon Mechanical Turk. Data analyses were conducted using the IBM Statistical Package for Social Sciences (IBM SPSS) version 24. Primary statistical analyses included four standard multiple regression models testing whether optimal character strengths usage had predictive utility for physical health, mental health, health behaviors, and positive emotions. In the event that primary effects were found, secondary mediation analysis of positive emotions was conducted via Baron and Kenny's (1986) four step process with further bootstrapping analysis via the PROCESS macro version 3.2.01 (Hayes, 2012; 2019) if partial mediation was indicated. Additionally, eight other standard multiple regression models were performed to test whether underuse or overuse of character strengths had predictive utility for physical health, mental health, health behaviors, and negative emotions.

Definitions

Character strengths: are the morally valued positive traits in people; the psychological ingredients of goodness in human beings across cultures, nations, and beliefs (Peterson & Seligman, 2004).

Character strengths interventions: are activities in which the goal is to increase well-being or personal achievement through the identification and development of strengths (Quinlan, Swain, Vella-Brodrick, 2012).

Monotonic character strengths: are the endorsement of human values and capacities in such a way that either never decreases or never increases; simply measures the prominence of use of each strength in ranked relation to the other strengths and does not signify degree or direction of use (Peterson & Seligman, 2004).

Optimal use of character strengths: is a balanced use of strengths represented by the Aristotelian golden-mean (optimal use) between the underuse and overuse of each character strength (Freidlin, et al., 2017).

Health-promoting behaviors: refer to healthy eating, exercise, and relaxation for examples (Sirois, 2001; 2017).

Assumptions and Delimitations

In the present study, the willingness of the participants to volunteer in this study was assumed not to bias the study. Individuals less than 18 years of age were assumed to have refrained from participation, and participants were assumed to have completed the questionnaires truthfully and to the best of their ability. Additionally, all instruments, the

OUOU, PROMIS Global Scale, mDES, and WBI, were presumed to be appropriate means for measuring the designated variables in this study.

Another assumption of this study was that the cross-sectional evaluation of the over-under-optimal use of character strengths gave an accurate representation of a participant's generalized, allocated use of their character strengths across most life situations. The OUOU survey being utilized in this study to assess character strengths usage was assumed to contain appropriate, descriptive language that captured accurate participant responses that would hold true across most life scenarios.

The final assumption of this study was that subjective measures of physical and mental health were substantial enough to explore whether or not there were effects present between the variables. This study would be enhanced by measuring objective measures of health. Indices such as weight, body mass index, body fat percentage, blood pressure, cholesterol, fasting glucose, cortisol, and C-reactive protein would bolster the evaluation of participants' physical health. Likewise, a thorough psychological assessment would more objectively evaluate mental health status accurately. Access to such resources were not available for this study, therefore subjective measures were used instead.

This study was correlational in nature, having focused on relationships between the variables of underuse, optimal use, and overuse of character strengths and physical health, mental health, health behaviors, and emotions. Due to the cross-sectional and correlational nature of the study, longitudinal data could not be aggregated and causation was not able to be assessed. Internal validity is weaker for correlational than for

experimental designs. Additionally, in correlational designs there is no way to determine whether one variable happens chronologically before another. For the purposes of this study a correlational design was appropriate because the intention of this exploratory study was to determine if the underuse, optimal use, or overuse of character strengths have predictive utility for physical health, mental health, health behaviors, and emotions.

Summary

Lifestyle factors are important for prevention of chronic disease yet compliance is problematic. Positive emotions have been identified as a precursor to health-promoting behaviors, so creating more positive emotions, therefore, is of value to health. Human character strengths have been researched in relationship to both physical and mental health. Previous research has predominately contained evaluation of monotonic character strengths only, which is one-directional usage of character strengths. Newer research (Freidlin et al., 2017; Littman-Ovadia & Freidlin, in press) suggests that character strengths can be overused or underused (rendering them not a strength any longer), or, optimally used. The present study aimed to illuminate whether the optimal use of character strengths was associated with positive emotions and physical and mental health, as monotonic character strengths are, and further aimed to evaluate whether the underuse and/or overuse of strengths was associated with negative physical and mental health. The current study was based on the Upward Spiral Model of Lifestyle Change (Fredrickson, 2013a) which purports that positive emotions can initiate and sustain new positive health behaviors by virtue of a positive feedback loop. The current study was quantitative in nature and explored if the underuse, optimal use, and overuse of character strengths had

predictive utility for physical health, mental health, health behaviors, and emotions. Participants in the current study self-administered a series of surveys through a web-based survey platform and data were subsequently analyzed. The literature that supports the foundation and justification of the current study will be discussed in Chapter 2.

Chapter 2: Literature Review

Introduction

In this study, the need was identified for continued research concerning optimal utilization of the strengths of human character as a promoting factor in physical and mental health. Since a classification of character strengths and virtues was established in 2004, a baseline relationship between monotonic character strengths and health has been identified. The 24 character strengths in the classification have been further delineated into categories of underuse, overuse, or optimal use of each individual strength. This new level of precision offers an opportunity to evaluate if there are potential mental and physical benefits of being aligned with the optimal usage of character strengths, as well as if there are mental and physical drawbacks of predominately underusing or overusing character strengths. Alignment of human character is just one component of mental and physical health; however, it may act as a significant catalyst in the upward spiraling positive feedback loops associated with better states of wellness.

The theoretical framework used in this dissertation was the upward spiral model of lifestyle change, which is an offshoot model ultimately rooted in the broaden-and-build theory of positive emotions. Key to the upward spiral model of lifestyle change is the concept that positive emotions broaden one's awareness and behaviors and, over time, builds skills and resources that lead to a self-sustaining upward spiral of healthy lifestyle behaviors. While several authors have recently made reference to the upward spiral model of lifestyle change, much of the original research on the broaden-and-build theory

has been more common within the discipline of health psychology in major peer reviewed journals.

This chapter includes a review of the emergence of character strengths as a science as well as the upward spiral model of lifestyle change, specifically as it can relate to physical and mental health. In this chapter, I discuss previous research that was conducted to explore character strengths and their association with health and well-being. This chapter also includes a discussion of research that may challenge findings of other studies. The chapter concludes with a justification for inclusively exploring the effects of overuse, underuse, and optimal use of character strengths and their relationship with physical and mental health outcomes.

Literature Search

I conducted a search of literature digitally though electronic psychology and medical databases such as PsycINFO, PsycARTICLES, MEDLINE, Thoreau, and Academic Search Complete, through the Walden University library databases. The list of search terms that I used to conduct the exploration of the literature included phrases such as *character strengths, broaden and build, upward spiral, positive emotions, affect, health behaviors, positive psychology interventions*, and *health outcomes*. I obtained and reviewed the digital versions of sources of articles from professional journals. I also used multiple books for overviews on the historical progress of the topics.

Theoretical Framework

The bidirectional relationship between physical ("body") and psychological ("mind") processes is a resource that can be utilized to help bring about changes and

improvement in mental and physical health, via psychoneuroimmunology (Littrell, 2008). In models evaluating biomarkers of inflammation, when individuals feel well physically, they are more apt to feel well mentally also and the reverse can also be true (Fredrickson, 2013a). It is therefore applicable to examine what mental health/emotional conditions may contribute to individuals taking better care of themselves physically. Evaluating whether optimal use of character strengths may be a precursor of the positive mental states said to contribute to improved physical health states may offer a unique approach to health promotion.

Broaden and Build Theory

Fredrickson (1998) outlined the specific positive emotions that can enhance a person's state of mind. There are two parts to the broaden-and-build theory. First, positive emotions broaden a person's view, and then second, this broadened view helps build new habits. Joy, interest, contentment, and love have been found to be the mental states that are most associated with broadening a person's awareness and building novelty in physical, intellectual, psychological, and social resources (Fredrickson, 1998). Fredrickson then began to research what these positive emotions might offer to a person, outside of their acute experience. In future situations, a person can draw from these new robust resources such as increased creativity, social bonds, positive beliefs, and psychological resiliency, and apply them to other contexts and life experiences (Fredrickson, 2001). This process of becoming more open minded and resourceful is the basis of the broaden-and-build theory of positive emotions. The capacity to experience

positive emotions can be viewed as a fundamental asset that is central to human well-being (Fredrickson, 2001).

Positive emotions that are experienced only intermittently are not frequent or impactful enough to induce this broaden-and-build effect. Human brains are equipped with a "negativity bias" that predisposes individuals to more keenly remember things that were perceived as potentially dangerous and provoking of fear than those experiences and circumstances deemed more positive. This disproportionately negative tendency of the brain means that in order to create a positive net effect and have access to more optimal outcomes, the ratio of positive to negative emotions must be increased. This concept of the ratio of positive to negative emotions that are experienced over time is referred to as the *positivity ratio* (Fredrickson & Losada, 2005; Fredrickson 2013b). The positivity ratio increases as an individual's positive experiences outnumber their negative experiences. The idea is that people with a higher ratio of positive to negative emotions might experience better outcomes than those with a lower positive to negative ratio. Studies suggest that when people experience a positivity ratio at or above a 3-to-1 ratio of positive to negative experiences, they seem to access the broaden-and-build rewards sufficiently enough to display growth, resilience, and flourishing (Fredrickson & Losada, 2005; Fredrickson 2013b).

While it can be a challenge for individuals to quantify the ratio of their positive-to-negative experiences, the enumeration of such a concept does support and qualify the notion that there is a threshold of positivity that must be crossed to take advantage of the broaden-and-build function of positive emotions. A positivity ratio of less than 3-to-1

represents having too few positive experiences to support the optimal functioning associated with the broaden-and-build theory (Fredrickson & Losada, 2005), and as a result, individuals with this ratio may also experience greater emotional distress and lack of fulfillment (Keyes, 2002).

Fredrickson then asked how, biologically, this outnumbering of positive experiences supports the act of repeatedly seeking out more and more positive experiences, also referred to as the building stage of the broaden-and-build theory. Positive affect is said to stimulate the release of dopamine in areas of the brain associated with reward, motivation, pleasant feelings, motor activity, and specific cognitive tasks (Ashby & Isen, 1999). Anytime there is evidence that external or internal factors impact neuronal transmission or activation/inhibition of areas of the brain, neuroplasticity is enhanced. When positive emotions stimulate the release of dopamine in brain areas associated with motivation and reward, the positive emotions are ultimately exerting their benefits via positive neuroplasticity. As Garland (2010) explained, people are motivated to repeat what feels good as a result of dopaminergic pathways. The broaden-and-build theory similarly suggests that the recurrent experiences of positive emotions may trigger recurrent dopamine releases as well, contributing to a pattern of behavior that continuously seeks out more of the original positive experience.

Fredrickson's theory is an exemplar of the progressive model of positive psychology that is focused on positivity and assets, rather than dysfunction and weaknesses. The broaden-and-build theory highlights the correlation of positive emotions and positive health, achieving an upward spiral dynamic. A similar but opposite

correlation exists between negative emotions and negative health, which can lead to chronic diseases rooted in inflammation such as Type II diabetes, cardiovascular disease (both hypertension and stroke), and arthritis (Fredrickson & Joiner, 2002). The broaden-and-build theory maintains the same goal of linking mental health to physical health; however, the focal point shifts from the negative correlation to the positive correlation of the same overarching relationship. Positive emotions predict sustained behavior change, and the reciprocal nature of positive emotions and health creates an upward spiral dynamic (Fredrickson & Joiner, 2002).

Because this theory addresses the potential gains a person can make as a result of positive emotions and experiences, Fredrickson's theory has been applied to health promotion. In thinking about health promotion, it matters and is important to evaluate what internal processes are at play to stimulate healthy lifestyle choices. Positive emotions ultimately predict future increases in more positive emotions, and such an upward spiral indicates improved emotional well-being and resilience (Fredrickson & Joiner, 2002). Such knowledge can be useful in health promotion initiatives. Because it has been established that positive neuroplasticity contributes to a behavioral pattern in which a person continuously seeks out positive experiences, it follows that health promotion efforts would benefit from information regarding how best to harness and initiate such a positive behavioral feedback loop.

Upward Spiral Model of Lifestyle Change

Fredrickson (2013a) more recently created an offshoot of the broaden-and-build theory called the upward spiral model of lifestyle change. In the upward spiral model of

lifestyle change, Fredrickson (2013a) proposed that positive emotions can both commit people to new positive health behaviors and raise their psychological inclination for subsequent wellness behaviors and sustained behavior change. As this model directly addresses lifestyle changes and health promotion specifically, I used it as another facet of the larger framework of the present study. Positive emotions, according to Fredrickson and Joiner (2002), predict sustained behavior change.

Like the broaden-and-build theory, the upward spiral model of lifestyle change can be achieved via reward systems in the brain. The act of liking an activity can trigger positive emotions, which through dopaminergic pathways can turn into a pattern of wanting to repeat the activity (Fredrickson, 2013a). This reward pathway is essentially the same process involved with addictions to unhealthy lifestyles as well. Whereas negative emotions can be entangled with rigidity and addictions, positive emotions can alternatively broaden awareness and foster cravings for participating in ongoing positive health behaviors (Fredrickson, 2013a).

The upward spiral model houses both nonconscious as well as biological pathways to motivation. Figure 1 (for permission, see Appendix E) provides a conceptual model of lifestyle change. Fredrickson (2013a) described the model the following way:

> According to the upward spiral model, to the extent that a new wellness behavior evokes positive emotions, engaging in that behavior generates both (a) cue-triggered nonconscious motives that shape subsequent behavioral decisions, represented by the inner loop depicted in the figure, and (b) increases in key biological and psychological resources that boost the subsequent positive emotion yield of that wellness behavior, as represented by the outer loop of the spiral, and most critically, by the causal arrow that runs between the inner and outer loops. (p. 39)

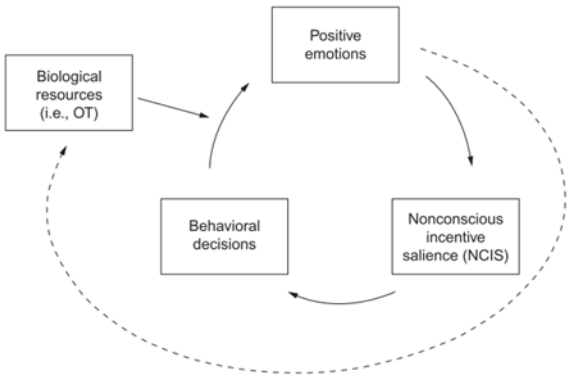

Figure 1. Upward spiral model of lifestyle change. Reprinted from *Advances in Experimental Social Psychology, Volume 47* (p. 39), by B. L. Fredrickson (in P. Devine and A. Plant, Eds.), 2013, Burlington: Academic Press. Copyright 2013 by Elsevier Inc. Reprinted with permission.

The upward spiral model of lifestyle change can be summarized as the amplification of human behaviors and the body's responses to them. Fredrickson is currently testing the model in longitudinal studies (Fredrickson, 2013a). Because positive emotions are the precursor to healthy behavioral adherence per this model, the task at hand is to intentionally generate interventions that elicit positive emotions. In this study, I sought to determine whether the balanced use of character strengths was associated with

positive emotions, to in turn justify the exploration of future testing of the use of character strengths interventions to intentionally elicit positive emotions and thereby catalyze positive behavioral and lifestyle changes.

Health Crisis and Need for Interventions

The health challenges the United States is facing today are numerous. Lifestyle is one of the most important factors in managing or helping to prevent chronic disease. According to the CDC, the rate for adults in the United States who are either overweight or obese is over 70% (CDC, 2017). Furthermore, nearly 40% of all premature deaths are attributable to modifiable lifestyle choices (CDC, 2014). Modifiable risk factors are largely responsible for leading causes of death, including heart disease, cancer, chronic respiratory disease, stroke, and accidents, and many of these risks are avoidable by making changes in personal behaviors (CDC, 2014). Such statistics show why it is critical to support and motivate individuals in choosing positive health behaviors on a daily basis.

Health risk behaviors, such as lack of physical activity, poor nutrition, tobacco use, and drinking too much alcohol cause much of the illness, suffering, and early death related to chronic diseases and conditions (CDC, 2017). Poor health behaviors such as these can lead to inflammation (Loprinzi, 2016), and chronically high levels of inflammation predict disease (Fagundes, Bennett, Derry, & Kiecolt-Glaser, 2011). Health behaviors ultimately contribute to the presence or absence of inflammation, which can lead to the presence or absence of gene expression toward disease. Genetic predispositions to most diseases just raise the likelihood of acquiring that disease state.

Epigenetic factors are the factors that tell genes how to behave and whether to turn a gene on or off, so ultimately, lifestyle choices that have a net effect of either being proinflammatory or anti-inflammatory dictate a lot insofar as gene expression of chronic disease. In fact, according to research on cancer prevention, environment and lifestyle factors are so strong that they account for 90-95% of cancer occurrences (Anand et al., 2008). This is a powerful concept, yet while people are generally aware that lifestyle factors are important in disease prevention, not enough people are compliant nor actually engage in health promoting behaviors regularly (Bryan & Hutchinson, 2012). In trying to address this social problem and increase compliance and effectiveness, character strengths interventions geared toward creating upswing spirals of lifestyle change (Fredrickson, 2013a) can be explored.

History of Character Strengths

General Strengths

The concept of using strengths to lead to health and happiness is not necessarily novel. Aristotle held the view that true happiness entailed identifying one's core virtues, cultivating them, and living in harmony with them (Aristotle, Ross, & Brown, 2009). Even in the time of Aristotle, humankind has been interested in discovering the path that would lead to the "good life". This pursuit and achievement of a life of happiness and well-being is what Aristotle called "eudaimonia", which was officially defined in *The Nicomachean Ethics* (Aristotle et al., 2009) as the exercising of good character.

Fast forwarding to the more recent past, Aristotle's notions followed with Maslow's (1943) hierarchy of needs and human potential, in which the human experience ultimately culminates to the experience of self-actualization, ideally. Rogers' (1951) concept of the fully-functioning person also contributed to this notion. The same is true for Seligman's (1998) positive psychology movement, which is grounded in Aristotelian theory focused on well-being, contentment, excitement, cheerfulness, the pursuit of happiness, and meaning in life. The "good life" is said to be achievable through the habituation and exercising of good character (Seligman & Csikszentmihalyi, 2000). While the traditional focus of psychology has been on the diagnosis and treatment of psychological illnesses, this advent of positive psychology has helped refocus some research attention on that which is working well and creates flourishing within people (Proctor et al., 2011). The progressive storyline that these pioneers laid forth have all contributed to the advancement in the science of positive subjective experiences and strengths of character, as they relate to a life of health, happiness, and meaning.

In thinking about the upward spiral model of lifestyle change and how to bring about the required positive emotions to initiate the process, one means by which to arrive at positive emotions is by employing a strengths-based perspective. General strengths have been defined in several different ways. One definition is that a strength is a way of behaving, thinking, or feeling in such a way that permits optimal functioning in the pursuit of valuable outcomes (Linley & Harrington, 2006). Clifton and Anderson (2002) defined strengths as positive traits and/or natural capacities that have been enhanced by knowledge and skill. Furthermore, Linley (2008) stated that strengths are pre-existing

capacities that are energizing and permit optimal functioning. The common threads and benefits are evident among the varying descriptions. Beyond just being handy and overall advantageous, psychological strengths are pieces of positive human functioning that can be productively applied on purpose to achieve one's full potential (Linley & Harrington, 2006). With the goal of trying to elicit positive emotions so as to catalyze the upward spiral model of lifestyle change, strengths do seem to offer a foundation.

Character Strengths

Character strengths take a slight deviation from the more generic definitions of psychological strengths as described above. In order for a strength to be classified as a character strength, its construct had to include some degree of virtue (which is unique since psychology, historically, has been free of values) and must also be morally grounded in the sense that it contributes to the "good life" (Linley & Harrington, 2006). Since the field of positive psychology is most interested in what is right with a person and what represents the most optimal human experience and the "good life", more research in the last two decades has been devoted to the values and strengths of human character which are associated with this type of well-being.

One of the projects that grew out of the collective interest in character strengths was the collaboration of researchers to develop a classification system. In 1999, Seligman highlighted the need for the positive side of the human experience and the aligning positive characteristics that help create this experience, and Peterson was recruited to spearhead the years-long project of creating a strengths framework and language, as well as developing a measurement tool (Mayerson, 2017) in collaboration with the VIA

Institute. Their collective work came as a result of extensive literature searches in psychology, psychiatry, and philosophy; reviewing lists of strengths and virtues in historical moral and religious works, as well as discussions with leaders in the field and participants of numerous conferences (Peterson & Seligman, 2004). What ultimately resulted was the VIA Classification of Strengths, a list of character strengths and virtues that were found to be universal across cultures, beliefs, and 54 nations (Park, Peterson, & Seligman, 2006). The VIA strengths classification system is the organized, culminated product of the synthesis of character strengths evident across cultures. In order for a character strength to have been appointed as such, each strength needed to meet most of the following criteria: it was fulfilling, morally valued, does not diminish others; has unfavorable opposites; is traitlike; is distinctive from other strengths; has models who exemplify it; has prodigies; selective absence of it in some situations; and has institutions/rituals to celebrate or express it (Peterson & Seligman, 2004). A total of 24 character strengths made the list, organized under 6 categorical virtues, see Table 1 (for permission, see Appendix F).

Table 1

VIA Classification of Character Strengths and Virtues

Virtue 1 – Wisdom and knowledge: Cognitive strengths that entail the acquisition and use of knowledge
Creativity: [synonyms are originality, ingenuity]: Thinking of novel and productive ways to conceptualize and do things; includes artistic achievement but is not limited to it
Curiosity: [interest, novelty-seeking, openness to experience]: Taking an interest in all of ongoing experience for its own sake; finding subjects and topics fascinating; exploring and discovering
Judgment: [critical thinking; short: judgment]: Thinking things through and examining them from all sides; not jumping to conclusions; being able to change one's mind in light of evidence; weighing all evidence fairly
Love of learning: Mastering new skills, topics, and bodies of knowledge, whether on one's own or formally; obviously related to the strength of curiosity but goes beyond it to describe the tendency to add systematically to what one knows
Perspective: [wisdom]: Being able to provide wise counsel to others; having ways of looking at the world that make sense to oneself and to other people
Virtue 2 – Courage: Emotional strengths that involve the exercise of will to accomplish goals in the face of opposition, external or internal
Bravery: [valor]: Not shrinking from threat, challenge, difficulty, or pain; speaking up for what is right even if there is opposition; acting on convictions even if unpopular; includes physical bravery but is not limited to it
Perseverance: [persistence, industriousness]: Finishing what one starts; persisting in a course of action in spite of obstacles; "getting it out the door"; taking pleasure in completing tasks
Honesty: [authenticity, integrity]: Speaking the truth but more broadly and presenting oneself in a genuine way and acting in a sincere way; being without pretense; taking responsibility for one's feelings and actions
Zest: [vitality, enthusiasm, vigor, energy]: Approaching life with excitement and energy; not doing things halfway or halfheartedly; living life as an adventure; feeling alive and activated
Virtue 3 – Humanity: Interpersonal strengths that involve "tending/befriending" others
Kindness: [generosity, nurturance, care, compassion, altruistic love, niceness]: Doing favors and good deeds for others; helping them; taking care of them
Love/intimacy: Valuing close relations with others, in particular those in which sharing and caring are reciprocated; being close to people
Social intelligence: [emotional intelligence, personal intelligence]: Being aware of the motives and feelings of other people and oneself; knowing what to do to fit into different social situations; knowing what makes other people tick

(table continues)

Virtue 4 – Justice: Civic strengths that underlie healthy community life
Teamwork: [citizenship, social responsibility, loyalty]: Working well as a member of a group or team; being loyal to the group; doing one's share Fairness: Treating all people the same according to notions of fairness and justice; not letting personal feelings bias decisions about others; giving everyone a fair chance Leadership: Encouraging a group of which one is a member to get things done and at the time; maintain good relations within the group; organizing group activities and seeing that they happen
Virtue 5 – Temperance: Strengths that protect against excess
Forgiveness: Forgiving those who have done wrong; accepting the shortcomings of others; giving people a second chance; not being vengeful Humility: Letting one's accomplishments speak for themselves; not regarding oneself as more special than one is Prudence: Being careful about one's choices; not taking undue risks; not saying or doing things that might later be regretted Self-regulation: Regulating what one feels and does; being disciplined; controlling one's appetites and emotions
Virtue 6 – Transcendence: Strengths that forge connections to the larger universe and provide meaning
Appreciation of beauty and excellence: [awe, wonder, elevation; short: beauty]: Noticing and appreciating beauty, excellence, and/or skilled performance in various domains of life, from nature to art to mathematics to science to everyday experience Gratitude: Being aware of and thankful for the good things that happen; taking time to express thanks Hope: [optimism, future-mindedness, future orientation]: Expecting the best in the future and working to achieve it; believing that a good future is something that can be brought about Humor: [playfulness]: Liking to laugh and tease; bringing smiles to other people; seeing the light side; making (not necessarily telling) jokes and provide comfort Spirituality: [faith, purpose; short: religiousness]: Having coherent beliefs about the higher purpose and meaning of the universe; knowing where one fits within the larger scheme; having beliefs about the meaning of life that shape conduct meaning of life that shape conduct and provide comfort

Note: From *Character strengths and virtues: A handbook and classification." by C.* Peterson & M. Seligman, 2004, New York: Oxford University Press and Washington, DC: American Psychological Association. www.viacharacter.org

VIA inventory of strengths. Part of this same initiative was to create a measurement tool. Once the classification was in place, the researchers needed empirical examination to quantify and rank the endorsement of human character strengths. This led to the development of the VIA Inventory of Strengths Questionnaire (VIA-IS; viacharacter.org). The VIA-IS is a 240-question Likert scale questionnaire, asking respondents to rate each item on a scale that ranges from "very much like me" to "not like me at all", and thereby evaluates and ranks 24 universal character strengths which are organized loosely under six broad virtues: (a) wisdom and knowledge (creativity, curiosity, judgment, love of learning, perspective); (b) courage (bravery, honesty, perseverance, zest); (c) humanity (kindness, love, social intelligence); (d) justice (fairness, leadership, teamwork); (e) temperance (forgiveness, humility, prudence, self-regulation); and (f) transcendence (appreciation of beauty, gratitude, hope, humor, spirituality) (Peterson & Seligman, 2004). Because the focus of the VIA-IS is the identification and the prominence of positive traits and psychological successes of people (Peterson & Seligman, 2004), the design of this questionnaire was a stark contrast from the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; American Psychiatric Association, 2013) which classifies psychological disorders and illnesses.

What emerges from the output of the VIA-IS is a list of all 24 of the character strengths, ranked in descending order from 1 to 24, with the most-endorsed strengths at the top, and the least-endorsed strengths toward the bottom. The top five strengths on the ranked output list are referred to as "signature strengths". The next 14 strengths in the ranked list are called "middle strengths", and the last 5 strengths in the ranked list are

considered to be “lower strengths”. According to Peterson and Seligman (2004), the idea behind signature strengths is that the use of these five strengths are fulfilling and are linked to an individual’s sense of self and core identity. The authors defined the criteria of a signature strengths as those which convey a sense of ownership of those strengths from the individual, a sense of yearning to act in accordance of those strengths, and that there is intrinsic motivation underlying the prevailing use of those strengths (Peterson & Seligman, 2004).

Strengths benefits at a glance. Research on the VIA Classification and VIA Inventory of Strengths has proliferated widely in disciplines of psychology, coaching, business, and education. However, the research on applied character strengths as defined by their use in practice and in achieving outcomes is a newer endeavor in the progression of character strengths research (Niemiec, 2013). From the studies that have been conducted thus far, the science of character strengths has received a net optimistic outpouring of promotion, and for good reason.

At a glance, character strengths research has exhibited a wide range, encapsulating interest from multiple disciplines. This growing body of literature has looked at character strengths across various situational, personal, and environmental variables (Proctor et al., 2011). Strengths use is said to provide a key support in the attainment of goals leading to greater well-being (Linley, Nielsen, Gillett, & Biwas-Diener, 2010), as well as being a way to build long term individual resilience and optimal functioning (Wood, Linley, Maltby, Kashdan, & Hurling, 2011). Though such psychological well-being is supported by character strengths interventions, the bigger

question is whether the intervention also affects physical health (Park, Peterson, Szvarca, & Vander Molen, 2014). There is evidence that supports the fact that positive mental states lend toward better health behavior compliance (Fredrickson, 2013). Positive psychology intervention frameworks geared toward enhanced positive mental states, such as by using character strengths, may be useful in designing weight management programs (Hintsanen et al., 2012), and are easily administered to patients with chronic illness (Huffman, DuBois, Millstein, Celano, & Wexler, 2015). Character strengths are stress-defense factors, associated with lower heart rate and blood pressure (Li et al., 2017). Finally, and most recently, Freidlin et al. (2017) highlighted the importance of not just viewing monotonic character strengths as previous studies have, but rather evaluating the overuse, underuse, or optimal use of character strengths so as to guide individuals toward fine-tuning their strengths of character for optimal outcomes.

Monotonic character strengths. Since the inception of the VIA character strengths classification and questionnaire, character strengths have been put to the test in research. Up until 2017, this research has looked only at the monotonic version of character strengths, which is a unidirectional approach to strengths. The VIA-IS simply ranks a person's 24 character strengths in order of strongest endorsement. Such a ranking approach fails to explore the possibility that a strength has the capacity to be categorically overused, underused, or optimally used. Like with the progression of any questionnaire, the original version must first be widely used and applied to pave the way with some foundational correlations between strengths and positive outcomes. Only then can newer variations of the measure be considered. Indeed, this has been the case. Below will be a

discussion of the literature on monotonic character strengths in regards to several of the aspects related to health and well-being: Positive emotions, health behaviors, and interventions. While the following review presents findings from studies on character strengths, it is important to point out that these studies look at monotonic strengths in a unilateral way as described above. The following review precedes the discussion and creation of the overuse, underuse, and optimal use of character strengths, but again this research is important in laying the foundation and justification for this dissertation.

Significance of Recent Literature

Character Strengths and Positive Emotions/Affect

According to Fredrickson's (2013a) upward spiral model of lifestyle change, step one in proposing a positive approach to health is the experience of frequent positive emotions. Before the upward spiral model of lifestyle change can take effect and exert its dopaminergic effects, how such positivity is to be achieved must be established. This review of the convergent and divergent literature has revealed that overall, working with character strengths do, in fact, pave a pathway toward positive states of mind and positive subjective experiences. Most of the literature on character strengths have utilized the VIA-IS to establish the degree of endorsement of strengths as a whole, and also to determine individuals' signature strengths to see how specific strengths might explicitly interplay with outcome variables.

After the character strengths classification was created, research on character strengths and their benefits began in generalized ways. Early studies began by looking at individuals' knowledge of their strengths (Govindji & Linley, 2007) and usage of their

strengths against measures of well-being, affect, and happiness (Govindji & Linley, 2007; Wood et al., 2011). The theory here is that people who know their strengths and use their strengths have the inherent benefit of maximizing their potential for well-being and living the "good life". This concept had been initially confirmed in a cross-sectional analysis of 214 college students (Govindji & Linley, 2007), and then followed up with a similar longitudinal analysis of 207 community members who were assessed at baseline, three-month follow-up, and six-month follow-up (Wood et al., 2011). In concordance with what Govindji and Linley (2007) observed, Wood et al. (2011) found that at both three and six-month follow-ups, greater strengths use was related to lower perceived stress, and greater self-esteem, vitality, and positive affect. The longitudinal design by Wood et al. (2011) provided evidence that further validated the preliminary findings by Govindji and Linley (2007) and therefore contributes greatly to the notion that knowledge and use of strengths is a meaningful precursor to positive emotions and happiness. As with the imperfect nature of subjective measures, both of these studies are limited in the sense that evaluation of concrete strengths use would need evidence from behavioral studies, whereas self-reported perceptions of strengths were utilized. Again, these were the more preliminary studies on strengths and affective outcomes and their collective findings set the stage for future research to explore additional outcomes.

Character Strengths and Well-being/Health/Health Behaviors

Since positive affect is just one singular concept within the broader perspectives that positive psychology and positive health encompasses, many of the studies on character strengths look beyond affect and include measures of life satisfaction, well-

being, and health. Character strengths use have been correlated with well-being in several studies (i.e. Govindji & Linley, 2007; Littman-Ovadia & Steger, 2010, Proctor et al., 2011). Other studies looked at character strengths use beyond measures of general well-being such as goal attainment (Linley et al., 2010), self-esteem, self-efficacy, and health related quality of life (Proctor et al., 2011), and health-promoting work behaviors (Gander, Proyer, Ruch, & Wyss, 2013). Yet still additional character strengths research evaluated individual strengths and their distinct contributions to well-being and the "good life". For example, Peterson, Ruch, Beerman, Park, and Seligman (2007) looked to see which strengths were more associated with the three orientations to happiness: Pleasure, engagement, and meaning, as these orientations were the inclusive definition of a good, fulfilling life within the study. The findings highlighted the strengths of love, hope, curiosity, and zest. While Peterson et al.'s (2007) work contributed to the literature on specific strengths and the "good life", Proyer et al. (2013) extended this notion by incorporating newer inquiries to broaden the implications of the findings.

Proyer et al. (2013) conducted a study on the "good character," incorporating two new inquiries beyond what Peterson et al. (2007) reviewed: physical well-being and virtuousness. They correlated the multiple health behaviors questionnaire with the 24 VIA character strengths and found that all strengths except humility and spirituality were positively associated with health behavior. In fact, the authors pointed out from mediational analyses that strengths and physical well-being were influenced by health-oriented behavior, though they noted the limitation of qualifying "health-oriented behavior" as only those behaviors listed in the questionnaire.

The authors also looked at virtuousness, which is a measure of how much the strengths/virtues were collectively endorsed (i.e. when participants scored strengths in an affirmative direction) in the study. Seeing as all but two strengths were associated with health behaviors, this study provides initial evidence that general virtuousness is associated with the endorsement of physical well-being. Other studies have singled out the benefits of specific strengths. Bravery, kindness, and humor are said to buffer a reduction in life satisfaction amidst a physical disorder, while the strengths of appreciation of beauty and excellence and love of learning can buffer a reduction in life satisfaction amidst a psychological disorder (Peterson, Park, & Seligman, 2006)

There are other lines of evidence that support the relationship between character strengths and physical well-being. Baxter (2012) utilized a character strengths intervention for eight individuals with chronic back pain. While the character strengths intervention did not change the levels of reported pain for these individuals, measures of emotional pain management were reported to improve. Levels of daily happiness significantly improved while levels of daily anger were significantly reduced (Baxter, 2012). This study showed promise for the behavioral and emotional management of chronic pain, though the study was limited by the small sample size of eight. Proyer et al. (2013) looked at the self-reported health of 440 adults, and while their participants were not a chronic pain cohort, their study also contributed support to the theory that character strengths are associated with improved health outcomes. Character strengths were positively correlated with self-reported cardio-respiratory fitness, strength, flexibility, and coordination (Proyer et al., 2013), healthier work-related behaviors (Gander et al., 2013),

sexual and drug abstinence in adolescents (Ma et al., 2008), medication adherence among children with asthma (Berg, Rapoff, Snyder, & Belmont, 2007), and general strengths of character (though not the VIA strengths in particular) were associated with lower body mass index (Hintansten et al., 2012). Character strengths were also found to be associated with perceived stress and resilience (Wood et al., 2011). Even with a clinical population, a small and brief character strengths intervention was shown to be effective. The VIA-IS was administered to 29 participants recruited from a psychosis early intervention program, and just a simple strengths-awareness activity was associated with improved positive affect and cognitive performance post-intervention (Sims, Barker, Price, & Fornells-Ambrojo, 2015).

Character strengths have also been evaluated alongside physiological parameters. Li (2017) conducted a study on the cardiovascular recovery assessment during a stressful task and compared the results of individuals who endorsed greater character strengths versus those who endorsed lesser character strengths. Participants all engaged in a social stress task, where cardiovascular arousal was assessed at baseline, during, and post-task. Li (2017) found that even though high-character and low-character groups experienced similar cardiovascular arousal patterns during the stress task, individuals with higher character strengths exhibited a more rapid cardiovascular recovery than those who endorsed lower character strengths. A limitation of this study is that it was conducted using a Chinese Virtue Questionnaire rather than the VIA Inventory or Strengths questionnaire, although the content of the two measures can be likened to each other.

Nonetheless, such data suggests that character strengths may impart a physiologically moderating factor on adaptations to stress (Li, 2017).

The findings in the above synthesis are consistent with Peterson and Seligman's (2004) preliminary postulation that character strengths would be associated with not only mental health, but physical health as well. Character strengths certainly made an impact as a positive psychology construct that has something to offer to health promotion.

Character Strengths and Positive Psychology Interventions

In what he called positive health, Seligman's (2008) review presented examples of contributions that positive psychology interventions at large may have to offer to physical health. In regard to the foundational research that has been done on the science of character strengths, Seligman (2008) stated that these studies have set the stage for a deeper exploration into the applicability of novel interventions that can help build the elements of positive health and promote prevention and treatment of physical and mental illnesses.

There is some caution and light opposition that does exist regarding the direct effectiveness of character strengths interventions. Quinlan (2012) expressed concern over the underlying mechanism by which character strengths interventions may superficially appear to contribute to positive outcomes. According to this author, the exact elemental components of the interventions have yet to be empirically uncovered, and they speculate that beyond just the individual's efforts and actions, there may additionally be social or cultural mechanisms through which character strengths interventions affect well-being. Furthermore, Quinlan (2012) argued that outcomes that may appear to be a product of

character strength usage may actually be a more simplified downstream effect of feelings of competence and relatedness of character strengths being put to use. Uncovering the exact mechanisms that make character strengths interventions "work" may be a complicated undertaking. What may be more acutely efficacious for individuals suffering from physical and mental illness is rather to place more research emphasis on which interventions seem to maximize positive affect. Ultimately, Quinlan's (2012) closing statements did support the notion that character strengths research is only at the beginning of its journey, and that effectiveness of character strengths interventions may be best measured with a broader range of variables and ways to develop strengths.

There is another line of caution with respect to the utilization of character strengths interventions. Macaskill (2016) proposed that great care should be taken with the disclosure of the intention of all positive psychology interventions in general. In particular, if the population is suffering from a life-threatening condition, it could seem insensitive to try to direct them toward increased gratitude and optimism. Though not a terminal illness example, a previous study by Macaskill (2012) did affirm that patients with chronic recurring depression felt that a character strengths assessment and a strengths intervention plan would be an asset to their treatment particularly when they were in a depressive phase. To come full circle, then, character strengths interventions and other positive psychology interventions may be best approached through a lens of sensitivity based on the population. The goals of character strengths interventions are to offer a novel and enjoyable approach to the cultivation of positive emotions and alignment with one's values. As long as the interventions are kept within the appropriate

scope and do not overpromise or make exaggerated claims of potential clinical improvements (Macaskill, 2016), success seems promising. Furthermore, as importantly and thoughtfully noted by Niemiec (2013), the VIA Classification is descriptive rather than prescriptive. So, provided this advice is heeded and the intentions are kept in check, character strengths interventions do have something to offer to both clinical and non-clinical populations since they are ultimately a lens through which to evaluate and define what is best in the nature of humans.

Keeping these cautionary notes in mind, character strengths interventions, when used in appropriate scope, do have something positive to contribute to physical and mental health. With the establishment that character strengths are a worthwhile effort in the mental and physical health domains, a few research studies have put character strength interventions to the test.

Myers (2016) defined strengths interventions as activities and processes that target the identification, development, and use of strengths. As previously discussed, Baxter (2012) found that emotional pain management in chronic back pain sufferers was improved after a character strength intervention. Hintansanen et al. (2012) established that character strengths knowledge can be used for motivating weight loss and designing weight management interventions. Madden (2011) evaluated a character strengths pilot coaching program for 38 adolescents, and at the end of the program, there was a significant increase in self-reported levels of engagement and hope. While there was no control group in this study to compare to, Koydemir (2015) did run an intervention study utilizing a control group. The authors ran an eight-week, strengths-based intervention

program for first-year college students who were recruited on a volunteer basis. While the control group experienced no significant increases, the students in the intervention group reported significant improvements in life satisfaction, subjective happiness, ontological well-being, and psychological well-being (Koydemir, 2015). Also on the topic of psychological well-being, Toback (2016) randomly assigned 81 psychiatrically hospitalized youths to either a character strengths intervention group or a control group, and found longitudinally that a brief character strengths intervention was associated with significantly higher self-efficacy and self-esteem than controls. These preliminary findings with a variety of what researchers have described as character strengths interventions coupled with the diversity of sample populations is encouraging.

Strengths interventions are being evaluated in the workplace as well. Meyers and van Woerkom (2016) evaluated the effects of a strengths intervention on employees' general and work-related well-being. While the study did not find evidence for a positive, direct effect of the strengths intervention on satisfaction with life, work engagement, and burnout, it did find support for indirect effects via positive affect as a mediator (Meyers & van Woerkom, 2016). This finding is important because it supports the idea that acute increases in positive affect are associated with positive outcomes even in the workplace.

A case for character strengths interventions is also emerging in the coaching arena. Linley and Harrington (2006) had the foresight to see that work on character strengths could someday lead to a form of coaching psychology called strengths coaching. While that perspective was established right at the outset of the VIA classification, Rashid (2014) has followed up with this concept with a proposed layout of

a 12-week positive psychology therapeutic intervention program, incorporating character strengths work both directly and indirectly throughout the 12 weeks. Some direct exercises included evaluating and discussing signature strengths, while the indirect focus was to highlight certain strengths each week of the program as they related to the positive psychology topic of that week. The positive psychotherapy approach proposed by Rashid (2014) is a testament to how far character strengths research has come and where it can continue to go.

Character Strengths and Upward Spiral Model of Lifestyle Change

To draw a line from character strengths to the upward spiral model of lifestyle change, two things would ideally need to be established. Firstly, character strengths must be shown to be associated with positive emotions, since positive emotions are the foundation of the upward spiral model of lifestyle change. Secondly, character strengths must also be shown to be associated with some of the proposed outcomes that can theoretically be achieved by activation of the upward spiral model of lifestyle change, such as healthy behaviors and possible even favorable health outcomes.

As character strengths gained more research interest, their applicability to established theory became more evident. Being that character strengths had been shown to be associated with positive affect and well-being, research started surmising that Fredrickson's (1998) broaden-and-build theory could be the means by which character strengths development can have broader implications. Out of the broaden-and-build theory grew Fredrickson's upward spiral model of lifestyle change, in which positive lifestyle habits are activated by positive emotions (Fredrickson & Joiner, 2002).

Considering that the upward spiral model of lifestyle change is the theoretical framework for this dissertation, character strengths need to be linked to the model. The key to their connection is the experience of positive emotions. By means of character strengths use, positive emotions are elicited, and the upward spiral model of lifestyle change can theoretically become activated. While many studies have taken place with healthy populations, these implications can also ring true for chronic disease populations. There is evidence suggesting that higher levels of positive affect, optimism, and well-being can lead to improved health behavior adherence, as well as health outcomes, in patients with chronic illnesses (Huffman et al., 2015).

Beyond the implications of simply activating the upward spiral model of lifestyle change, the next step would be the presence of associations between character strengths and some of the positive outcomes that the upward spiral model of lifestyle change is projected to help create. The exact mechanisms for this upward spiral are still under discussion. Quinlan (2012) pointed out that perhaps the mechanism by which character strengths interventions contribute to the cascade of positive emotions and subsequent behaviors is through a goal theory, and that by borrowing the structure of specific goals and plans as in goal theory, individuals may be more encouraged to follow through with the intervention at large. According to Kok et al. (2013), in trying to understand the mechanism by which positive emotions are associated with physical health, the reinforcing common thread that emerged was the upward spiral dynamic that was created. Positive emotions, which trigger perceptions of positive social connections and resources, ultimately promote improved physical health (Kok, et al., 2013). As a more

physiological spiral, positive emotions which are created from being physically active may trigger an intrinsic motivation for further physical activity (Proyer et al., 2013). Perhaps as a result of positive emotions, increased life satisfaction is triggered which can culminate into a refreshed interest and dedication to tasks, thereby helping an individual stave off or overcome the downward spiral of negative emotions (Meyers & van Woerkom, 2016). Ultimately, varying theoretical applications of the upward spiral model of lifestyle change are all rooted in and explained in terms of the broaden-and-build theory of positive emotions. This underlying theory has certainly had a presence in character strengths research.

Limitations of Monotonic Strengths

Like many things in life, having not enough or too much of a character strength can be problematic. While general virtuousness has been associated with the endorsement of physical well-being (Proyer et al., 2013), the measure of this was monotonic only. Measuring only for monotonic strengths with a ranked output as in the VIA-IS does provide valuable insight into which strengths are more prominent or core to each individual person. However, this does not equate to top strengths being overused and lower strengths being underused. Participants in monotonic character strengths research have not been evaluated regarding not enough, too much, or the just right amount of character strengths use. This became a limitation in strengths research. According to Freidlin et al. (2017), there may be benefit in casting the evaluative net wide enough to catch instances of character strength overuse or underuse.

Seligman (2015) summarized Peterson's unfinished work, which included the argument that while the 24 VIA character strengths represent the "good" in a person, the absence or excess of the strengths can represent the "ill" in a person. The overuse of character strengths may give the appearance that an individual is bringing their best qualities forward, yet in doing so, may experience negative outcomes. For example, courage is a strength when used in the right context such as stepping up to do an important task, yet when overused, say in a person driving too fast to impress someone (Ciarrochi, Atkins, Hayes, Sahdra, & Parker, 2016), it can be seen as maladaptive. If a person overuses the strength of curiosity, it can be perceived as invasive nosiness (e.g., a person digging too deeply or asking too many questions). Similarly, underuse of character strengths may present challenges as well, perhaps with even more negative consequences. For example, a person who underuses the strength of humor may be overly serious and underusing the strength of forgiveness can manifest as holding on to resentment and grudges.

Although not directly evaluating a categorical underuse of character strengths, Wood et al. (2011) did find an association between decreased strengths use and lower vitality and higher stress. Furthermore, an underuse of character strengths may be likened to a withdrawn state. Keyes (2002) differentiated the conceptualization of flourishing (experiencing positive emotions and functioning well) from languishing (stagnation, emptiness, and despair). The dormant-like state of languishing may be representative of predominately underusing character strengths (Freidlin et al., 2017). While character strengths are a positive psychology construct and therefore are typically viewed through a

monotonically positive lens, preliminary evidence does exist that increased precision in the science of character can further contribute to positive emotions and pursuit of the "good life". Taking into account the overuse and underuse of strengths, as differentiated from optimal use, adds both qualitative and quantitative features that allow the science of character to be evaluated along a continuum of functioning (Joseph, 2006).

Overuse Underuse and Optimal-Use of Character Strengths

Aristotelian Golden Mean

Somewhere in between not enough and too much lies the most moderately ideal presentation of character. Aristotle referred to this moderation as the "golden mean". In Aristotle's book *The Nicomachean Ethics*, he explained that the golden mean represents a balance between the extremes (Aristotle et al., 2009). For example, appropriate courage is a balanced strength, where a soldier running away from the battlefield expresses cowardice while a single soldier attacking 50 opposing soldiers would be an expression of recklessness. The golden mean lies somewhere in between, though the mean would look as uniquely different as the context of any situation. Ultimately, the golden mean is in the middle between the extreme of deficiency and the extreme of excess.

What Aristotle historically called the *golden mean* in regard to human nature, Niemiec (2014) has called *optimal use* in regards to strengths of character. According to Niemiec (2014), each of the 24 character strengths exist along a continuum and can be overused, underused, or optimally used. When too much of a strength is expressed, it becomes an overuse of that strength and likewise, in a situation where too little of a strength is expressed, there is an underuse of that strength. Identical to the concept of

Aristotle's golden mean, this delicate balancing point in between the underuse and overuse of a character strength is referred to as the optimal use of that character strength.

Niemiec (2014) stated that when a character strength is overused or underused, it is no longer a character strength, but rather it is something else. Even Peterson and Seligman (2004) introduced the concept that there may be a shadow that character strengths can cast, explaining how psychopathology can be viewed through the lens of positive psychology insofar as reflecting the unbalanced use of character strengths. *The Character Strengths and Virtues Handbook* (Peterson & Seligman, 2004) stands as the positive psychology version of the DSM. In this way, flourishing is essentially the effect of utilizing character strengths in optimal, balanced ways, while psychopathology was ultimately understood to be a series of deviations away from the optimal and balanced expressions and use of character strengths.

Gap in the Literature

While character strengths may hold one of the keys to accessing meaning, engagement, and happiness in life, they have intricacies that have yet to be evaluated fully. What manifests as psychological malfunctions and psychopathological states may, under the surface, really be complications of the overuse and underuse of character strengths. Rather than limiting the conceptualization of character strengths to be merely one-dimensional, a label has been appointed for each the underuse and overuse of each strength. What emerged was a continuum from underuse on the left to overuse on the right, for each strength, with the optimal use in the center (Peterson & Seligman, 2004; Niemiec, 2014; Rashid, 2014). The list of overuse, underuse, and optimal use of character

strengths is essentially the original list of 24 character strengths plus an added column both to the left (underuse) and right (overuse). What began as an already beneficial list of intrinsically fulfilling strengths of human virtue and character has been further enhanced and transformed into a more nuanced view of these same strengths with the added element of balance (see Table 2; for permission see Appendix G).

Table 2

Underuse, Optimal-Use, Overuse of Character Strengths

Underuse	Optimal Use	Overuse
Conformity	Creativity	Eccentricity
Disinterest	Curiosity	Nosiness
Unreflectiveness	Judgment	Cynicism
Complacency	Love of learning	Know-it-all-ism
Shallowness	Perspective	Overbearing
Cowardice	Bravery	Foolhardiness
Fragility	Perseverance	Obsessiveness
Phoniness	Honesty	Righteousness
Sedentary	Zest	Hyperactivity
Emotional isolation	Love	Emotional promiscuity
Indifference	Kindness	Intrusiveness
Cluelessness	Social intelligence	Over-analysis
Selfishness	Teamwork	Dependency
Partisanship	Fairness	Detachment
Compliancy	Leadership	Despotism
Mercilessness	Forgiveness	Permissiveness
Baseless self-esteem	Humility	Self-depreciation
Sensation-seeking	Prudence	Stuffiness
Self-indulgence	Self-regulation	Inhibition
Oblivion	Appreciation of beauty/excellence	Perfectionism
Rugged individualism	Gratitude	Ingratiation
Negativism	Hope	Pollyanna-ism
Over-seriousness	Humor	Giddiness
Anomie	Spirituality	Fanaticism

Note: From "*Mindfulness and character strengths: A practical guide to flourishing."* by R. Niemiec, 2014, Boston, MA: Hogrefe Publishing. ©Copyright Ryan M. Niemiec.

With this recent advancement in the overuse, underuse, and optimal use classification of character strengths, the next progressive step for character strengths researchers was to empirically support this hypothesized continuum. The first authors who set out to achieve this mission to empirically present the potential unbalanced use of character strengths were Freidlin et al. (2017). Up until this point, character strengths had been evaluated explicitly through the lens of a positive construct (Freidlin et al., 2017). While monotonic strengths research established a great foundation, the spotlight has recently turned toward addressing whether optimal use of character strengths is associated with the same positive outcomes as one-dimensional expressions of character strengths (Freidlin et al., 2017).

Overuse Underuse Optimal-Use Survey of Strengths

Applying the golden mean to the positive psychology paradigm of character strengths translates into a unique evaluative tool that is potentially capable of detecting deficiencies and excesses in the use of character strengths. Freidlin et al. (2017) developed a questionnaire called the Overuse Underuse Optimal-Use Survey of Strengths (OUOU). Beyond just the evaluation of the monotonic endorsement of each strength, the questionnaire captures the degree to which a person is inclined to overuse, underuse, or optimally use each strength. This is achieved by asking the respondents to view a 3-item continuum for each strength, where there is a description of underuse, a description of optimal use, and a description of overuse, and respondents are ultimately asked to allocate 100% of their use across the three descriptions of each strength (Freidlin et al., 2017). Such a questionnaire affords the opportunity to view the endorsement and use of

character strengths through a three-dimensional lens and empirically bring to life the notion that too much or too little of a good thing can sometimes be a bad thing, and that the just-right fit is somewhere in between.

Preliminary outcomes. Freidlin et al. (2017) set out to evaluate whether the overuse and/or underuse of character strengths were associated with negative outcomes and if the optimal use of character strengths was associated with positive outcomes. They answered these questions using variables of depression, flourishing, and life satisfaction. The authors did, in fact, find that use of character strengths more optimally was associated with flourishing and life satisfaction, whereas either over or underuse of character strengths was more associated with depression (Freidlin et al., 2017). These novel findings provide preliminary support for the notion of Aristotle's golden mean, as well as Peterson and Seligman's (2004) conceptualization that there can be darker sides to the use of character strengths. Freidlin et al. (2017) stated that theirs is the first study to indicate that strengths can be optimally used and that such specifically balanced use is statistically associated with positive outcomes, and that concurrently, strengths can be used in an unbalanced way and such unbalanced use is statistically associated with negative outcomes. Freidlin et al.'s (2017) study provided evidence that not only do the overuse, underuse, and optimal use of character strengths exist, but also, that these categories can be effectively measured.

Littman-Ovadia and Freidlin (in press) replicated the same findings with statistically significant findings throughout ($p < .01$) with a sample of 970 adults recruited from the general population. The authors found that the optimal use of character

strengths was positively correlated with flourishing and life satisfaction and negatively correlated with depression, while both underuse and overuse of character strengths were positively correlated with depression and negatively correlated with flourishing and life satisfaction. The authors' findings further supported the notion that the optimal use of strengths is associated with, and may lead to, positive outcomes, yet the unbalanced use of strengths may render them not *strengths* anymore.

New look at psychopathology. Beyond these basic associations, in the same study, Freidlin et al. (2017) put the OUOU to the test with an actual diagnosable psychological condition; social anxiety disorder. The authors were able to create a prescribed "profile" of underused and overused character strengths with so much accuracy that 87% of individuals with social anxiety disorder were correctly reverse sorted and re-classified as having the diagnosis, based on their overuse-underuse profile (Freidlin et al., 2017). Likewise, Littman-Ovadia and Freidlin (in press) performed similar analyses, using obsessive compulsive disorder as the highlighted psychopathology diagnosis. The researchers found that obsessive-compulsive symptoms were associated with the overuse of social intelligence, judgment, appreciation of beauty and excellence, fairness, perseverance, and prudence, as well as with the underuse of forgiveness, self-regulation, curiosity, and creativity. Using the determined "profile" of underused and overused strengths, 89.3% of the participants were successfully resorted into groups that do and do not have clinical levels of obsessive-compulsive disorder. These are thought-provoking findings that speak to the ability of character strengths to predict specific states of mind. With optimal use of character strengths being associated with positive outcomes

such as flourishing and life satisfaction (Freidlin et al., 2017; Littman-Ovadia & Freidlin, in press), such findings stand as further supporting evidence, just as monotonic character strengths research has, that character strengths can be a meaningful evaluative and developmental stepping stone on the way to the "good life". What sets these studies apart from monotonic strengths research is the notion that strengths use can be utilized in an unbalanced way, and in doing so, be correlated with negative outcomes. These submissions have the ability to move character strengths research forward. Strengthening a strength can counterbalance the underuse of that strength, while techniques for trimming excessive strength tendencies needs more discovery (Seligman, 2015).

What emerges from these ideologies is a different outlook on psychopathology. When viewing psychological health through a lens of the underuse, overuse, and optimal use of positive qualities, a potential mechanism of change is provided (Freidlin et al., 2017; Littman-Ovadia & Freidlin, in press). With a new and improved, increasingly detailed classification of strengths available to researchers, an unprecedented degree of specificity arises in the opportunity to develop optimal character. With the OUOU, there is a built-in picture of optimal or "normal" strengths use, affording the insight into which character strengths need to be tuned up or tuned down in order to strengthen the character (Freidlin et al., 2017). Wide-ranging psychological interventions can be created to effectively strengthen underused strengths and downplay overused strengths. In doing so, psychopathological treatment options may be enhanced with such character development positive psychology interventions. Furthermore, the outlook on psychopathology has an opportunity to be viewed not simply from a deficits perspective where a person is viewed

as a “problem” or a “diagnosis”, but rather from a strengths-based view wherein a person is viewed as unique and talented with capabilities waiting to be developed (Heyne & Anderson, 2012). An imbalance in character that emerged along the way for that individual becomes the playing field on which learning and growth can occur.

Balanced Character and the Current Study

Based on the findings presented in this literature review, evidence indicates that the use of character strengths in a monotonic sense is associated with positive affect and outcomes. Moreover, positive affect which is fundamentally associated with triggering the upward spiral model of lifestyle change, can contribute to healthier habits and health status (Hershberger, 2005). Ultimately, as with the progression of character strengths research, fine tuning must be done to arrive at precisely how to use character strengths interventions to promote physical and mental health outcomes. The findings presented in this review support the stance that using the OUOU as an evaluative tool as a character strengths report card, so to speak, could provide valuable insight into those specific areas of character that could use further development and refinement.

Before interventions research can be done, however, the first step for character strengths researchers is to continue to establish the correlational groundwork for the OUOU in the same fashion that monotonic strengths research progressed. In the present study, therefore, I sought to evaluate if the optimal use of character strengths was predictive of physical and mental health, higher frequency of health behaviors, and positive emotions. Simultaneously, as the nature of the OUOU allows, I sought to evaluate if the underuse and/or overuse of character strengths were predictive of poorer

physical and mental health, lower frequency of health behaviors, and poorer health outcomes. I also aimed to contribute to a research framework upon which the fine-tuning and optimizing of character strengths use may be a worthwhile intervention endeavor in achieving positive mental states, with the ultimate goal of initiating the upward spiral model of lifestyle change and achieving and sustaining healthier behaviors and outcomes.

Because character strengths and other health assets appear to be associated with more positivity and therefore better adherence to healthy behaviors, character strengths research and interventions may have some pull in the future of health promotion. Such a movement needs to exercise caution around overpromising outcomes or being insensitively optimistic in more grave health circumstances (Macaskill, 2016). Yet, being that chronic lifestyle diseases are more insidious and lengthier in duration and are also some of the most preventable diseases, they provide fertile ground and opportunity for furthering the development of character. As Macaskill (2016) eloquently explained, there is a marketing job to be done for the integration of character strengths into conversations about disease prevention or management. Continued, progressive research on optimal character evaluation and its potential health benefits represents a positive step toward that end.

Conclusion

Call for Interventions

Much of the illness, suffering, and early death related to chronic diseases and conditions is unnecessary and preventable with lifestyle interventions, since environment and lifestyle are some of the most driving epigenetic factors in the genetic expression of

disease states. Despite the general knowledge that lifestyle choices can have a strong impact on disease prevention, not enough people are compliant nor actually engage in health behaviors regularly (Bryan & Hutchinson, 2012). Lifestyle change is imperative, yet most people are aware that they are making poor lifestyle choices but being aware of this is frequently not a powerful enough force to overcome poor habits and subconscious desires (Fredrickson, 2013a). Willpower alone does not equate to lasting lifestyle change (Anderson & Heyne, 2016), though positive emotions can support and bolster willpower via the element of enjoyment (Tice, Baumeister, Shmueli, & Muraven, 2004). In trying to address this problem and increase compliance and effectiveness, balanced character strengths evaluation geared toward initiating upswing spirals of lifestyle change (Fredrickson, 2013a) may offer a fresh approach that inherently lends increased sustainability by very nature of the model. Through a mechanism of enjoyment, positive emotions are able to motivationally and neurochemically support sustained lifestyle changes.

Positive emotions have emerged as an access point to the possibilities of improved adherence of healthy lifestyle changes. While most advice for improving health circles around improved nutrition and exercise and reduced smoking and alcohol habits, there is still room for improvement in widening the scope of such advice. In addition to this basic physiological advice, individuals can be encouraged to create and sustain positive emotions which appear to be the psychological version of nutrients that contribute to social belonging, bolster stress-reducing parasympathetic activation, and

ultimately culminate in a positive feedback loop where behaviors are simultaneously rewarding and building on improved health (Kok et al., 2013).

Evaluating Balanced Character Correlations

In modern society there is evidence of an excessive accumulation of material wealth, food, alcohol, and drugs, yet meanwhile, there is simultaneously oftentimes a deficiency in the value placed on adequate exercise, disease prevention, and mindful leisure. Likewise, character strengths can be out of alignment, possibly displaying more of an affinity for the excess and deficiency extremes. Alternatively, increased familiarity with the "golden mean" and an enhanced sense of balance may help individuals better find and uphold moderation.

Summary

In this chapter, the foundation and justification for the current study was provided. The science of character strengths was reviewed. Through the lens of the upward spiral model of lifestyle change (Fredrickson, 2013a), character strengths stand as a catalyst of positive emotions that may partially contribute to the positive feedback loop associated with sustained behavior change. Identified factors that contribute to health-promoting behaviors are prudent to explore further, particularly because lifestyle habits and health behaviors contribute to inflammation and epigenetic changes within individuals that can increase the expression of chronic diseases. Modifiable lifestyle factors can play a critical role in prevention, but compliance is key. In trying to address this social problem, I subsequently explored the concept of character strengths development being geared toward creating upward spirals of lifestyle change.

Character strengths differ from the typical notion of "strengths" because they are not performance-based in nature as talents are, and furthermore, character strengths are defined within the scope of moral values. The VIA Institute published a classification of the 24 character strengths organized under 6 categorical virtues (Peterson & Seligman, 2004). Researchers subsequently conducted research on the monotonic use (one-directional degree of each strength's usage) of character strengths, and many positive associations were found under the categories of positive emotions, well-being and health, positive psychology interventions, and the upward spiral model of lifestyle change. Limitations of monotonic character strengths were discussed, being that the earlier character strengths literature did not consider that strengths can be overused or underused, as well as optimally used. Freidlin et al. (2017) and Littman-Ovadia and Freidlin (in press) highlighted this concept and identified that the overuse and underuse of character strengths were associated with negative outcomes while the optimal use of character strengths was associated with positive outcomes. This chapter concluded with a discussion of the gap in the literature where the optimal usage of character strengths has not yet been evaluated in terms of its associated with physical health and the frequency of positive and negative emotions and health behaviors. The idea of exploring the balanced use of character and positive feedback loops within the context of health promotion can contribute to the research conversation aimed at creating social change in the health of individuals in the United States. In the current study, I aimed to contribute to this process of social change. The details of the current study will be discussed in Chapter 3, including how data was collected and analyzed.

Chapter 3: Research Method

Introduction

This chapter includes a description of the current study's purpose, design, sample, instrumentation measures, data analyses, threats to validity, and ethical considerations. An overview of the study's design will include a rationale for why this particular research model was selected. I will present the sample characteristics and size, and a description of the instrumentation tools. I will also discuss the data collection process and analyses.

Purpose of the Study

The purpose of this study was to examine if strengths of human character, specifically when they are use optimally, predict physical and mental health status, health behaviors, and positive emotions. Additionally, the underuse and overuse of character strengths were evaluated for predictive utility of poorer physical and mental health status, less frequent health behaviors, and negative emotions. Character strengths are a positive psychology construct that have been researched in the arenas of human potential as well as both physical and mental health. This previous research, however, primarily included only the monotonic use of character strengths, meaning that the use of strengths was not evaluated in such a way that indicated degree or direction of use.

In 2017, Freidlin et al. further delineated the classification of general character strengths to include subcategories of underuse, overuse, and optimal use of each strength with preliminary research that suggested that the *optimal* use of strengths, specifically correlated with positive outcomes while the *underuse* and *overuse* of character strengths both correlated with negative outcomes. This more precise perspective on strengths use

presented a novel opportunity to evaluate whether or not optimal use of character strengths had effects on specific indices of health, namely physical health status, mental health status, health behaviors, and positive emotions, as well as if the underuse and/or overuse of strengths had effects on poorer physical and mental health statuses, less frequent health behaviors, and negative emotions, which were my aims in this study.

Research Design

In the present study, I sought to better understand if the underuse, optimal use, and overuse of character strengths was related to subjective physical and mental health factors. While a plethora of research has been conducted on monotonic character strengths, the current study was exploratory in nature in that there have been only two preliminary studies conducted (Freidlin et al., 2017; Littman-Ovadia & Freidlin, in press), to date, that explored outcome correlations of character strengths use differentiated by the underuse, optimal use, and overuse of each strength using the Over-Under-Optimal Use (OUOU) strengths survey for the first times.

The variables of underuse, optimal use, and overuse of strengths (all subscales of the OUOU instrument) were further explored in this study, to evaluate possible predictive qualities on factors related to physical and mental health, as previous monotonic strengths literature has done. The exploratory nature utilized in this study was appropriate as it aimed to contribute to the understanding and familiarity with a subject, within a theoretical framework, that could contribute to the foundation of more confirmatory lines of research on this topic in the future (Reiter, 2013).

To evaluate if there were effects between these constructs, a correlational approach with regression models was utilized. Specifically, I aimed to determine if underuse, optimal use, and overuse of character strengths predicted subjective measures of global physical health, global mental health, health behaviors, and emotions. If the optimal use of character strengths was found to significantly predict health behaviors and positive emotions, I was then going to evaluate positive emotions as a potential mediating variable of the relationship between optimal use of character strengths and health behaviors. This study was cross-sectional in that participants were asked to complete the surveys all at once and no further data was collected from them at any other point in time. Participants completed a demographic survey, and four instruments: an instrument measuring three subscales of underuse, optimal use, and overuse of character strengths (OUOU), an instrument measuring subscales of both global physical health and global mental health (PROMIS), an instrument measuring reported frequency of engagement in health behaviors (WBI), and an instrument measuring the two subscales of positive and negative emotions (mDES). In assessing for potential effects of character strengths usage on the above indices of health, the aim was to gain insight into the understanding of the different categories of strengths use and their relationships with health.

Methodology

Population

Information was gathered from adults aged 18 and older in the United States. To collect a convenience sample from this population, the web-based recruitment platform Amazon Mechanical Turk (AMT) was used to perform recruitment from its worker pool.

AMT posted the study link to adults living in the United States. When interested workers/participants clicked the survey link, the participants were then routed to complete the survey through Survey Monkey, which is the web-based survey platform that was used to administer the questions and collect the data. I compensated participants for taking the survey, via AMT payment facilitation.

Sample and Sampling Procedures

The participants of this study were a sample of male and female adults from the general United States population ages 18 and older who responded to the study's invitation via an AMT posting which disseminated the opportunity to participate in this research study for a small payment amount. When participants clicked the link on AMT, they were redirected to complete the study through Survey Monkey. Once the desired number of responses was reached, the AMT study link was no longer available to recruit more participants. Participants' responses were included in the study with the following criteria: (a) they were at least 18 years of age, (b) they could read and write in English, and (c) they had access to the internet to be able to complete the surveys.

Statistical power was necessary to decrease the odds of committing a Type II error; that is, rejecting the null hypothesis when it is in fact true (Aberson, 2010). GPower analysis software determined that for a linear multiple regression fixed model, R^2 increase, at $p < .05$, with 4 predictors, the sample size required to detect a medium effect size of .15, at a power of at least .80, would be at least 85 participants (Faul, Erdfelder, Lang, & Buchner, 2007).

Procedures

Participants were recruited through a paid opportunity to complete the survey via AMT, a web-based database of at-will workers who receive small amounts of payments for voluntarily completing assignments posted to the forum. After they reviewed the assignment description, time commitment required, and payment information, available workers agreed to voluntarily complete the assignment by clicking on the assignment link. The link rerouted them to Survey Monkey to first complete the informed consent, which was administered at the outset of opening the survey link. The informed consent form included brief background information on the study, the procedures for participation, a discussion of confidentiality, the voluntary nature of the study, and applicable ethical concerns. Individuals who indicated on the survey form that they were in agreement with the conditions for participation in the study then continued within the Survey Monkey platform to read instructions and complete the surveys. Following informed consent, participants completed demographic questions including age, gender, education level, and ethnicity. Following demographic data collection, the participants then complete the OUOU, the PROMIS Global Scale, the WBI, and the mDES, all items of which were manually typed into the Survey Monkey platform exactly as they appear in the instruments. An email address was provided to participants so that any additional questions regarding participation could be directed to the researcher.

Upon completion of the surveys, participants were then directed to a screen informing them that the survey was complete as well as thanking them for their time and participation. On this same screen, participants were provided a numerical confirmation

code, that they then entered into their AMT screen, as confirmation that they completed the study. I reviewed the data for quality and participants received payment via their AMT account.

The average effective hourly wage of AMT workers to encourage participation has been found to be $4.80 (Ipeirotis, 2010). Participants were estimated to need 18–25 minutes to complete all survey questions in this study. Compensating participants for 25 minutes at a pay rate of $4.80 per hour equated to a payment due of $2.00 per participant for completing the survey, which I paid to participants via AMT payment facilitation.

Participation in this study was anonymous. AMT provided a worker ID number with the completed assignment information, and the researcher did not have access to private worker data including name, address, email address, etc. Data were collected via Survey Monkey under password protection available only to myself. Data was integrated directly into SPSS to be cleaned and analyzed.

Instrumentation

Demographics

A demographics questionnaire that I developed was administered as part of the online survey. The questions collected basic information regarding the participants' age, gender, education level, and ethnicity.

OUOU

The Over-Under-Optimal-Use (OUOU) instrument is a character strengths survey designed by Freidlin et al. (2017). The OUOU is a 24-item survey. The OUOU helps determine whether a person predominately overuses, underuses, or optimally uses each of

the 24 character strengths. Respondents viewed a 3-item continuum for each strength, where there was a description of underuse, a description of optimal use, and a description of overuse of each strength, and respondents were ultimately asked to numerically allocate 100% of their estimated use across the three descriptions of each strength (Freidlin et al., 2017). The OUOU data comes in the form of percentages of each the underuse, optimal use, and overuse of each of the 24 strengths as reported by each participant; a total of 72 responses. The raw scores (percentages) were then converted into three new variables per participant (their summed underuse score, their summed optimal use score, and their summed overuse score).

Freidlin et al. (2017) found, from a pilot study of 57 international participants aged 18 and older from the general population who were recruited through positive psychology related websites, that the optimal-use factor achieved a Cronbach alpha of 0.91, while the under-overuse factors had alphas of 0.86 and 0.83, respectively. For the sample (N = 238) in the Freidlin et al. (2017) study, Cronbach alphas were 0.84 for underuse, 0.89 for optimal use and 0.75 for overuse. The researchers determined that optimal use of character strengths was positively and significantly correlated ($p < 0.001$) at r = 0.49 with life satisfaction and at r = 0.61 with flourishing. Underuse of strengths was significantly ($p < 0.001$) associated with depression ($r = 0.43$), and overuse was significantly ($p < 0.001$) correlated to depression ($r = 0.34$). In a recent study by Littman-Ovadia and Freidlin (in press), the OUOU was utilized for the second time in research.

Convergent and divergent construct validity has begun to be established. Both Littman-Ovaida and Freidlin (in press) and Freidlin et al. (2017) reported statistically

significant ($p < .01$) positive correlations between the optimal use of character strengths and flourishing as well as life satisfaction, and statistically significant ($p < .01$) negative correlations between the optimal use of character strengths and depression. Additionally, both studies also reported statistically significant ($p < .01$) positive correlations between both the underuse and overuse of character strengths and depression, and both underuse and overuse had statistically significant ($p < .01$) negative correlations with flourishing and life satisfaction.

I secured permission to use the OUOU after directly contacting Dr. Ryan Niemiec via an email inquiry as to the availability of the instrument for research use. I filled out a research request form from the www.VIAcharacter.org website and I was subsequently granted permission (see Appendix H).

The OUOU was an appropriate instrument for this study as it specifically explores the overuse, underuse, and optimal use of character strengths. The OUOU survey yields three subscales to be used as variables in the current study: underuse, optimal use, and overuse of character strengths. While research on monotonic use of character strengths results in a ranked output of top character strengths, the OUOU is the first strengths questionnaire to categorically assess the differentiation that too much or too little of a good thing may, in fact, be correlated with negative outcomes. The implications of continued need to research the overuse, underuse, and optimal use of character strengths is evident based on Freidlin, Littman-Ovadia, and Niemiec's (2017) findings.

PROMIS Global Scale

The Patient-Reported Outcomes Measurement Information System (PROMIS) Global Scale is a set of 10 items that evaluates global physical, mental, and social health in adults (Hays, Bjorner, Revicki, Spritzer, & Cella, 2009). It can be used with the general population and with individuals living with chronic conditions. A cooperative group formed under the National Institutes of Health (NIH) created the collection of PROMIS measures. The main goal of the PROMIS initiative was to develop and evaluate, for the clinical research community, a set of publicly available, efficient, and flexible measurements of patient-reported outcomes (Cella et al., 2010). The PROMIS Global Scale v1.2 has 10 Likert scale self-reported global health items.

The scores from the measure are summarized into two global health domain subscale scores: Global physical health (GPH; 4 items on overall physical health, physical function, pain, and fatigue) and global mental health (GMH; 4 items on quality of life, mental health, satisfaction with social activities, and emotional problems). The GPH score was calculated by summing the 4 GPH items, 2 of which were reverse scored. The GMH score was calculated by summing the 4 GMH items, 1 of which was reverse scored. Two of the items in the PROMIS instrument were not used for scoring.

The physical and mental health subscales had internal consistency reliability coefficients of 0.81 and 0.86, respectively (Hays et al., 2009). In a recent study, Birdee, Ayala, and Wallston (2017) utilized the PROMIS Global Scale (N = 291), and found Cronbach's alpha was 0.729 for the GPH subscale, and 0.831 for the GMH subscale. According to the outcome of Hays et al.'s (2009) study, the authors reported some

support for the construct validity of the global health items based on their correlations with comparable multi-item scales from PROMIS. The global mental health item was strongly correlated with the PROMIS depressive symptoms scale, and furthermore, the correlation we estimated between the GPH and GMH (r = 0.63; Hays et al., 2009) was very similar to correlations between physical and mental health factors derived from the SF-36, another global health instrument (r = 0.62; Farivar, Cunningham, & Hays, 2007).

PROMIS measures are copyrighted, and all English and Spanish PROMIS measures are publicly available for use in individual research, clinical practice, educational assessment, or other application without licensing or royalty fees. I had possession of the PROMIS Global Scale v1.2 as well as the scoring manual, as downloaded from the publisher's website (www.nihpromis.org).

The PROMIS Global Scale was an appropriate instrument because it produces a subscale global physical health score for the physical health variable in this study, and it also produces a subscale global mental health score for the mental health variable in this study. Furthermore, the PROMIS Global Scale is comprised of only 10 questions, which helped minimize participant burden while still achieving the sensitivity needed for reliable data.

WBI

The Wellness Behaviors Inventory (WBI) is a 12-item measure created by Sirois (2001; 2017) that assesses how often common health-promoting behaviors (e.g., healthy eating, exercising) are performed. Items in the WBI are scored on a 5-point scale with responses ranging from 1 (*less than once a week or never*) to 5 (*every day of the week*),

asking participants to report on their average preventative health behaviors over the last three months. Two of the items are not counted toward scoring, and the mean of the remaining 10 items yield a single health behaviors score.

The WBI (Sirois, 2001; 2017) is a revision of an older version of the questionnaire (Sirois, Melia-Gordon, & Pychyl, 2003). The reliability of the revised version is Cronbach's alpha = 0.75, n = 254 (Sirois, 2007). The WBI has demonstrated good convergent and criterion-related validity in previous research in which it was positively associated with medical care-seeking behaviors, and negatively associated with stress (Sirois, 2007). Previous studies indicated that scores on the WBI were negatively correlated with perceived stress and negative affect, and positively correlate with other preventive health behaviors, heath behavior intentions, positive affect, future time orientation, physical health, and perceived control over health (Sirois, 2007; Sirois, 2015). The WBI has been associated with the Big Five personality traits Conscientiousness and Agreeableness, and negatively related to Neuroticism at two separate time points (Sirois & Hirsch, 2015). A recent meta-analysis also found that across 14 data sets, the WBI was positively correlated with self-compassion, with Cronbach alpha ranging from .64 to .73 (Sirois, Kitner, & Hirsch, 2014), and was also found to be positively associated ($R^2 = 0.26$, $p < 0.01$) with self-compassion in a community sample of adults (Dunne, Sheffield, & Chilcot, 2018).

I secured permission to use the WBI after directly contacting Dr. Fuschia Sirois, the author of the WBI, via an email inquiry. Dr. Sirois subsequently sent me all materials to utilize the measure and scoring manual for this current study (see Appendix I).

The WBI was an appropriate instrument to use in this study because engagement in health-promoting behaviors is an underlying theme within the theoretical framework. The WBI was a good fit in that it gives a global perspective of an individual's recent frequency of health choices over the last three months, which is believed to be an adequate amount of time for the average of such health behaviors to contribute to overall physical and mental health scores reflected at the time of participation in the study.

mDES

The modified Differential Emotions Scale (mDES) is a 20 item instrument evaluating the self-reported experiences of a total of 20 positive and negative emotions over the past two weeks, on a 5-point scale. Izard's (1977) Differential Emotions Scale (DES) was modified by Fredrickson to better fit positive psychology studies since it aims to be a comprehensive measure of positive emotions, resulting in the modified Differential Emotions Scale (mDES; Fredrickson, Tugade, Waugh, & Larkin, 2003). Each of the 20 emotions were evaluated within the measure by asking participants to report on their experience of a triad cluster of three related emotional experiences, for a total of 20 questions prompting three emotions within each question. The positive emotions evaluated in the instrument include *amusement, awe, sexual desire, contentment, gratitude, hope, interest, joy, love,* and *pride*. The mean score of nine out of these 10 items (*awe* is omitted) produces the Positive Emotions (PE) subscale score, which represented the positive emotions variable in this study. The negative emotions evaluated in the instrument include *anger, contempt, disgust, embarrassment, fear, guilt, sadness,* and *shame*. The mean score of seven out of these eight emotions

(*embarrassment* is omitted) produces the Negative Emotions (NE) subscale score, which represented the negative emotions variable in this study. The emotions *surprise* and *sympathy* are not included in computation.

The positive emotions subscale was found to have Cronbach's alpha = 0.79, and the negative emotions subscale was found to have Cronbach's alpha = 0.69 (Fredrickson et al., 2003). Construct validity has been indicated in a Greek sample by item inter-correlations between all items ranging from r = 0.19 to r = 0.60 as expected by the researchers (Galanakis, Stalikas, Pezirkiandis, & Karakasidou, 2015). The same study further reported that the negative emotions subscale was positively correlated to stress, anxiety and depression and negatively correlated to life satisfaction, psychological resilience, optimism, inspiration, hope and subjective happiness. Additionally, the positive emotions subscale was negatively correlated to stress, anxiety and depression and positively correlated to life satisfaction, psychological resilience, optimism, inspiration, hope and subjective happiness (Galanakis et al., 2015).

I obtained a copy of the mDES and scoring information publicly online. The mDES was appropriate for this current study because affect and emotions are integral features in the theoretical framework. The modified Differential Emotions Scale (mDES) was created to be a more encompassing measure of positive emotions, than the more commonly used Positive and Negative Affect Scale (PANAS), which exclusively targets high activation positive affective states (Watson, Wiese, Vaidya, & Tellegen, 1999). For these reasons, the mDES is ideal for positive psychology research and therefore I used it in this study.

Analysis

In this study, a correlational research design was employed using multiple linear regression analyses. The instruments used for measurement of the variables in this study allowed for the data to be analyzed through regression analyses. The research questions and hypotheses are listed below.

Research Question #1

To what extent does optimal character strength usage, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global physical health status, as measured by a subscale of the PROMIS Global Scale survey?

$H_0$1: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will not significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

$H_1$1: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

Research Question #2

To what extend does optimal character strength usage, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global mental health, as measure by a subscale of the PROMIS Global Scale survey?

$H_0$2: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will not significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

$H_1$2: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

Research Question #3

To what extent does optimal character strength usage, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict health behaviors, as measure by the global score of the Wellness Behaviors Inventory (WBI)?

$H_0$3: Optimal use of character strengths as measured by a subscale of the OUOU will not significantly predict health behaviors as measured by the global score of the WBI.

$H_1$3: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will significantly predict health behaviors as measured by the global score of the WBI.

Research Question #4

To what extent does optimal character strength usage, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict positive emotions, as measured by a subscale of the modified Differential Emotions Scale (mDES)?

$H_0$4: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will not significantly predict positive emotions as measured by a subscale of the mDES.

$H_1$4: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will significantly predict positive emotions as measured by a subscale of the mDES.

Research Question #5

If optimal use of character strengths, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predicts health behaviors, as measured by the global score of the Wellness Behaviors Inventory (WBI), do positive emotions, as measured by a subscale of the modified Differential Emotions Scale (mDES), to some extent mediate the observed effect of optimal characters strengths usage on health behaviors?

$H_0$5: If optimal use of character strengths as measured by an optimal use subscale of the OUOU predicts health behaviors as measured by the global score of the WBI, the effect will not be mediated by positive emotions as measured by a subscale of the mDES.

$H_1$5: If optimal use of character strengths as measured by an optimal use subscale of the OUOU predicts health behaviors as measured by the global score of the WBI, the effect will, to some extent, be mediated by positive emotions as measured by a subscale of the mDES.

Research Question #6

To what extent does underuse of character strengths, as measured by an underuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global physical health status, as measured by a subscale of the PROMIS Global Scale survey?

$H_0$6: Underuse of character strengths as measured by an underuse subscale of the OUOU will not significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

$H_1$6: Underuse of character strengths as measured by an underuse subscale of the OUOU will significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

Research Question #7

To what extend does underuse of character strengths, as measured by an underuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global mental health, as measure by a subscale of the PROMIS Global Scale survey?

$H_0$7: Underuse of character strengths as measured by an underuse subscale of the OUOU will not significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

$H_1$7: Underuse of character strengths as measured by an underuse subscale of the OUOU will significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

Research Question #8

To what extent does underuse of character strengths, as measured by an underuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict health behaviors, as measure by the global score of the Wellness Behaviors Inventory (WBI).

$H_0$8: Underuse of character strengths as measured by an underuse subscale of the OUOU will not significantly predict health behaviors as measured by the global score of the WBI.

$H_1$8: Underuse of character strengths as measured by an underuse subscale of the OUOU will significantly predict health behaviors as measured by the global score of the WBI.

Research Question #9

To what extent does underuse of character strengths, as measured by an underuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict negative emotions, as measured by a subscale of the modified Differential Emotions Scale (mDES)?

$H_0$9: Underuse of character strengths as measured by an underuse subscale of the OUOU will not significantly predict negative emotions as measured by a subscale of the mDES.

$H_1$9: Underuse of character strengths as measured by an underuse subscale of the OUOU will significantly predict negative emotions as measured by a subscale of the mDES.

Research Question #10

To what extent does overuse of character strengths, as measured by an overuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global physical health status, as measured by a subscale of the PROMIS Global Scale survey?

$H_0$10: Overuse of character strengths as measured by an overuse subscale of the OUOU will not significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

$H_1$10: Overuse of character strengths as measured by an overuse subscale of the OUOU will significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

Research Question #11

To what extend does overuse of character strengths, as measured by an overuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global mental health, as measure by a subscale of the PROMIS Global Scale survey?

$H_0$11: Overuse of character strengths as measured by an overuse subscale of the OUOU will not significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

$H_1$11: Overuse of character strengths as measured by an overuse subscale of the OUOU will significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

Research Question #12

To what extent does overuse of character strengths, as measured by an overuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict health behaviors, as measure by the global score of the Wellness Behaviors Inventory (WBI).

$H_0$12: Overuse of character strengths as measured by an overuse subscale of the OUOU will not significantly predict health behaviors as measured by the global score of the WBI.

$H_1$12: Overuse of character strengths as measured by an overuse subscale of the OUOU will significantly predict health behaviors as measured by the global score of the WBI.

Research Question #13

To what extent does overuse of character strengths, as measured by an overuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict negative emotions, as measured by a subscale of the modified Differential Emotions Scale (mDES)?

$H_0$13: Overuse of character strengths as measured by an overuse subscale of the OUOU will not significantly predict negative emotions as measured by a subscale of the mDES.

$H_1$13: Overuse of character strengths as measured by an overuse subscale of the OUOU will significantly predict negative emotions as measured by a subscale of the mDES.

Data Analyses

I used the IBM Statistical Package for Social Sciences (IBM SPSS) version 24 to score the instruments and analyze all data. The operationalization of variables was as follows. The OUOU survey produced 3 subscale scores; a total summation score for underuse, a total summation score for optimal use, and a total summation score for

overuse. Each of these total scores represented the variables *underuse, optimal use, and overuse of character strength*s, respectively. The PROMIS Global Scale produced 2 subscale scores; a global physical health summation score of four out of the 10 survey items and a global mental health summation score of four different items on the survey. These total scores represented the variables *physical health* and *mental health*, respectively. The WBI produced a single total summation score of 10 out of the 12 survey items (two are omitted). This score represented the variable *health behaviors*. The mDES produced 2 subscale scores; positive emotions which was the mean of nine of the 19 survey items and negative emotions which was the mean of seven of the survey items. These subscale scores represented the variables *positive emotions* and *negative emotions*, respectively. The optimal strengths use scores were plotted against the participants' scores of each of the dependent variables (physical health, mental health, health behaviors, and positive emotions). The same was conducted for the underuse of character strengths scores, as well as for the overuse of character strengths scores. Distributions were analyzed on the collected demographic data. The multicollinearity and contributory effects of the independent variables were evaluated using simple correlations, for appropriateness of model fit. The *p* values of the ANOVA tables were also evaluated for significance of the overall models.

For research questions 1 - 4 and 6 - 13, standard multiple regression modeling was utilized to test the hypotheses and to determine the size of the relationships between the five criterion variables (namely global physical health, global mental health, health behaviors, positive emotions, and negative emotions) and predictor variables (namely

optimal use/underuse/overuse of character strengths, and age, gender, and education level which were included in the models as covariates). In SPSS, the enter method of multiple regression was employed, and the *p*-values of optimal use/underuse/overuse of character strengths were evaluated for statistically significant predictive utility in each model.

In the first regression model, the dependent variable was global physical health, with independent variables of optimal character strengths use, age, gender, and education level. In the second regression, the dependent variable was global mental health, with independent variables of optimal character strengths use, age, gender, and education level. In the third regression, the dependent variable was health behaviors, with independent variables of optimal character strengths use, age, gender, and education level. In the fourth regression, the dependent variable was positive emotions, with independent variables of optimal character strengths use, age, gender, and education level.

If optimal use of character strengths was found to be predictive of health behaviors, further mediation testing was to be conducted using the Baron and Kenny (1986) method, and further bootstrapping testing would be utilized via the PROCESS method macro version 3.2.01 (Hayes, 2019) if partial mediation was indicated. Baron and Kenny (1986) described four steps to determine whether mediation occurs. Step 1 is to show a significant correlation between the predictor variable (optimal character strengths use) and outcome variable (health behaviors). Step 2 is to show a significant correlation between the predictor variable (optimal use of character strengths) and mediator (positive emotions). Step 3 is that the mediator (positive emotions) affects the outcome (health

behaviors) when the predictor (optimal character strengths use) is controlled for. Step 3 is accomplished with a regression analysis, with the outcome (health behavior) as the dependent variable and with the mediator (positive emotions) and predictor (optimal use of character strengths) entered simultaneously as independent variables. Step 4 determines whether complete or partial mediation has occurred; complete mediation is indicated by the effect of the predictor (optimal use of character strengths) on the outcome (health behaviors) being completely removed when the mediator (positive emotions) is controlled for. If Steps 1–3 are satisfied but Step 4 is not, partial mediation was indicated and bootstrapping was then completed to determine the size of the partial mediation effect of positive emotions.

Four additional regression analyses were conducted. The independent variables for all analyses were underuse of character strengths, overuse of character strengths, age, gender, and education level. The four separate dependent variables were global physical health, global mental health, health behaviors, and negative emotions.

Descriptive statistics in Chapter 4 includes a table of the means and standard deviations of the under, optimal, and over strengths-use percentages allocated among each of the 24 character strengths. Chapter 4 also includes a table of intercorrelations between the sets of dependent variables and each of the independent variables, and model summaries and coefficients of all regressions as well as mediation results as were indicated.

Threats to Validity

External Validity

It is important to identify potential threats to external validity when considering the integrity and generalizability of the study (Persaud & Mamdani, 2006). There were potential threats to external validity in the current study, one of which included the generalizability of the sample. In this study, a convenience sample of English-speaking participants living in the United States aged 18 years and older were recruited from the online laborer pool provided by Amazon Mechanical Turk. While the aim of this population was wide, research has concluded that the population of Mechanical Turk workers are as representative of the general United States population relative to more traditional participant pools such as in-person and student samples, and they consistently exhibited similar decision-making behavior and pay attention to experimental materials at least as much as those from traditional participant pools (Berinsky, Huber, & Lens, 2012). The study link was posted to the AMT laborer forum and participants independently and voluntarily chose to participate at their own discretion. Factors such as the offered payment amount, the estimated length of completion time, and the extent to which the worker is interested in the subject matter of the survey possibly influenced who chose to participate and introduced bias into the sample. Research, however, has shown high alpha reliability of varying compensation rates for surveys, suggesting that despite a low hourly rate of compensation, Amazon Mechanical Turk workers are somewhat intrinsically motivated to participate and some view it as an alternative leisure activity (Buhrmester, Kwang, & Gosling, 2011).

Internal Validity

Potential threats to internal validity must also be discussed when considering whether a study will measure what it aims to. The subjectivity of the surveys may have impacted internal validity in this study, as different people use different criteria to report on a subjective state (Veenhoven, 2002). Participant bias posed a threat to this study's internal validity, as individuals may have a tendency for responses to conform to social desirability (Veenhoven, 2002). Furthermore, questions in this study assessed individuals' character, emotions, and health. Questionnaires on such topics have the capability of leading participants to answer questions with unintentional bias. In particular, participants may have answered through a lens of how they preferred to perceive themselves which may be somewhat incongruent with their normal behavior or status. Another possibility is that participants may have answered the questions in such a way that reflected what they believed were desired responses. Taken together, these issues posed a potential threat to the study's internal validity. However, the design of this study aimed to minimize this threat by encouraging and instructing participants during the outset of participation in the study to be as honest as possible, emphasizing that there are no right or wrong answers.

Another internal validity threat was the various confounding variables that can contribute to an individuals' physical and mental health statuses, the dependent variables in the current study. The independent variables being evaluated were character strengths usage, age, gender, and education level. There are numerous potential confounding variables that contribute to the degree of a person's well-being other than just the factors

that were considered in the present study; thus, this study was approached through an exploratory lens.

Finally, temporal precedence and directionality could not be established in this study, meaning that even if predictive utility was found among the independent variables, there was no way to determine causality or the direction of which variable comes chronologically first. The independent variables were not manipulated and this study was cross-sectional in nature. Since the variables were not examined longitudinally, this limited the ability to draw causal inferences.

Ethical Considerations

The informed consent form was administered to participants at the outset of the study. The informed consent form included the procedures for participating in the study, confidentiality issues, the voluntary nature of the study, the risks and benefits of participating in the study, and a way to contact me with individual questions regarding the study.

It was clearly stated in the informed consent that all records in this study would remain confidential and that only I would have access to those records. Potential participants were made aware that they were free to withdraw from the study at any time during the process. There were no foreseeable physical or emotional risks or benefits for this study. Informed consent was signed digitally which signified that the participant agreed to and understood the conditions of the study. Data were anonymous and will be stored only with myself for five years, and then all data will be destroyed. The Institutional Review Board (IRB) was sought for approval of this research design.

Summary

The purpose of the current study was to examine if strengths of human character, when underused, optimally used, or overused, predicted physical health, mental health, health behaviors, and emotions. To evaluate if there were any significantly predictive relationships ($p < .05$) between these constructs, a multiple regression approach was used. Participants included male and female adults, ages 18 and older, living in the United States who were recruited via an online laborer pool, AMT. GPower analysis software was utilized to determine that for a linear multiple regression fixed model, R^2 increase, at $p < .05$, with 4 predictors, the sample size required to detect a medium effect size of .15, at a power of at least .80, would be at least 85 participants (Faul, Erdfelder, Lang, & Buchner, 2007). After establishing informed consent, the data collected from participants included demographic information and answers to surveys on the subjects of underuse, optimal use, and overuse subscales of character strengths (OUOU), physical and mental health subscales (PROMIS Global Scale), health behaviors (WBI), and positive and negative emotions subscales (mDES).

In this chapter, I described data analyses, where the percentage of time that strengths use was allocated as underuse, optimal use, and overuse, across all 24 character strengths, was summed for each participant. These strengths underuse, optimal use, and overuse totals were tested for prediction of the participants' scores of each of the dependent variables (physical health, mental health, health behaviors, and positive emotions/negative emotions). If optimal use of character strengths was found to be predictive of health behaviors and positive emotions, then positive emotions was to be

further evaluated as a potential mediating variable between optimal strengths use and health behaviors using the method of Baron and Kenny (1986). Threats to validity and ethical considerations were discussed. Chapter 4 will summarize the research findings from the current study.

Chapter 4: Results

The purpose of this study was to examine if strengths of human character, specifically when they were used optimally, predicted better physical and mental health, more frequent health behaviors, and positive emotions. Additionally, the underuse and overuse of character strengths were evaluated for predictive utility of poorer physical and mental health status, less frequent health behaviors, and negative emotions. The instruments used in the study were the OUOU, PROMIS Global Scale, WBI, and mDES. The OUOU determines whether a person predominately overuses, underuses, or optimally uses each of the 24 character strengths (Freidlin et al., 2017). The PROMIS Global Scale evaluates global physical, mental, and social health in adults (Hays et al., 2009). The WBI assesses how often common health-promoting behaviors (e.g., healthy eating, exercising) are performed (Sirois, 2001; 2017). The mDES evaluates the self-reported experiences of a total of 20 positive and negative emotions (Fredrickson et al., 2003). The data were analyzed using a series of regression analyses to understand the interrelationships among character strengths, physical and mental health, health behaviors, and positive and negative emotions. Mediation testing was also used in the analyses. My goals through these analyses were to answer the following research questions:

> Research Question 1: To what extent does optimal character strength usage, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global physical health status, as measured by a subscale of the PROMIS Global Scale survey?

H_o1: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will not significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

H_a1: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

Research Question #2: To what extend does optimal character strength usage, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global mental health, as measure by a subscale of the PROMIS Global Scale survey?

H_o2: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will not significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

H_12: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

Research Question #3: To what extent does optimal character strength usage, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict health behaviors, as measure by the global score of the Wellness Behaviors Inventory (WBI)?

H_o3: Optimal use of character strengths as measured by a subscale of the OUOU will not significantly predict health behaviors as measured by the global score of the WBI.

$H_1 3$: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will significantly predict health behaviors as measured by the global score of the WBI.

Research Question #4: To what extent does optimal character strength usage, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict positive emotions, as measured by a subscale of the modified Differential Emotions Scale (mDES)?

H_o4: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will not significantly predict positive emotions as measured by a subscale of the mDES.

$H_1 4$: Optimal use of character strengths as measured by an optimal use subscale of the OUOU will significantly predict positive emotions as measured by a subscale of the mDES.

Research Question #5: If optimal use of character strengths, as measured by an optimal use subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predicts health behaviors, as measured by the global score of the Wellness Behaviors Inventory (WBI), do positive emotions, as measured by a subscale of the modified Differential Emotions Scale (mDES), to some extent mediate the observed effect of optimal characters strengths usage on health behaviors?

H_o5: If optimal use of character strengths as measured by an optimal use subscale of the OUOU predicts health behaviors as measured by the global score of the WBI, the effect will not be mediated by positive emotions as measured by a subscale of the mDES.

H_15: If optimal use of character strengths as measured by an optimal use subscale of the OUOU predicts health behaviors as measured by the global score of the WBI, the effect will, to some extent, be mediated by positive emotions as measured by a subscale of the mDES.

Research Question #6: To what extent does underuse of character strengths, as measured by an underuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global physical health status, as measured by a subscale of the PROMIS Global Scale survey?

H_o6: Underuse of character strengths as measured by an underuse subscale of the OUOU will not significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

H_16: Underuse of character strengths as measured by an underuse subscale of the OUOU will significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

Research Question #7: To what extend does underuse of character strengths, as measured by an underuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global mental health, as measure by a subscale of the PROMIS Global Scale survey?

H_o7: Underuse of character strengths as measured by an underuse subscale of the OUOU will not significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

$H_1$7: Underuse of character strengths as measured by an underuse subscale of the OUOU will significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

Research Question #8: To what extent does underuse of character strengths, as measured by an underuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict health behaviors, as measure by the global score of the Wellness Behaviors Inventory (WBI).

H_o8: Underuse of character strengths as measured by an underuse subscale of the OUOU will not significantly predict health behaviors as measured by the global score of the WBI.

$H_1$8: Underuse of character strengths as measured by an underuse subscale of the OUOU will significantly predict health behaviors as measured by the global score of the WBI.

Research Question #9: To what extent does underuse of character strengths, as measured by an underuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict negative emotions, as measured by a subscale of the modified Differential Emotions Scale (mDES)?

H_o9: Underuse of character strengths as measured by an underuse subscale of the OUOU will not significantly predict negative emotions as measured by a subscale of the mDES.

$H_1$9: Underuse of character strengths as measured by an underuse subscale of the OUOU will significantly predict negative emotions as measured by a subscale of the mDES.

Research Question #10: To what extent does overuse of character strengths, as measured by an overuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global physical health status, as measured by a subscale of the PROMIS Global Scale survey?

H_o10: Overuse of character strengths as measured by an overuse subscale of the OUOU will not significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

$H_1$10: Overuse of character strengths as measured by an overuse subscale of the OUOU will significantly predict global physical health as measured by a subscale of the PROMIS Global Scale.

Research Question #11: To what extend does overuse of character strengths, as measured by an overuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict global mental health, as measure by a subscale of the PROMIS Global Scale survey?

H_o11: Overuse of character strengths as measured by an overuse subscale of the OUOU will not significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

$H_1$11: Overuse of character strengths as measured by an overuse subscale of the OUOU will significantly predict global mental health as measured by a subscale of the PROMIS Global Scale.

Research Question #12: To what extent does overuse of character strengths, as measured by an overuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict health behaviors, as measured by the global score of the Wellness Behaviors Inventory (WBI).

H_o12: Overuse of character strengths as measured by an overuse subscale of the OUOU will not significantly predict health behaviors as measured by the global score of the WBI.

$H_1$12: Overuse of character strengths as measured by an overuse subscale of the OUOU will significantly predict health behaviors as measured by the global score of the WBI.

Research Question #13: To what extent does overuse of character strengths, as measured by an overuse subscale of the Over-Under-Optimal Use (OUOU) strengths survey, predict negative emotions, as measured by a subscale of the modified Differential Emotions Scale (mDES)?

H_o13: Overuse of character strengths as measured by an overuse subscale of the OUOU will not significantly predict negative emotions as measured by a subscale of the mDES.

$H_1$13: Overuse of character strengths as measured by an overuse subscale of the OUOU will significantly predict negative emotions as measured by a subscale of the mDES.

Data Collection

Data were collected over a 1-week period, using Survey Monkey. The target of the original sample size was 85 participants to detect a medium effect size of .15, at a power of at least .80. Participation recruitment through MTurk was successful and allowed for complete data to be collected for 100 participants. The study link was posted to the MTurk platform, available to United States dwelling adults aged 18 and older. A total of 100 participants completed surveys, and all surveys were completed in full without any missing data.

Sample Demographics

All participants completed the demographic information. In order to be included in the study, participants had to be age 18 and older. The final sample was composed of 100 participants. The majority of participants were male (57%), and the participants were mostly (75%) white/Caucasian. The majority, 48%, of the sample size were ages 35–44. Most participants, 55%, reported having a bachelor's or graduate degree. The sample in the present study was relatively representative of United States population, with the exception that the percentage of college-educated participants in the present study is

nearly double the national average, indicating an underrepresentation of low education respondents. Participant demographics are displayed in Table 3.

Table 3

Demographic Characteristics of the Sample (n=100) for Gender, Age, Ethnicity, and Highest Level of Education

Demographic Characteristics	*N*	%
Gender		
Female	43	43%
Male	57	57%
Age		
18-24	0	0%
25-34	10	10%
35-44	48	48%
45-54	22	22%
55-64	10	10%
65-74	9	9%
75+	1	1%
Ethnicity		
White or Caucasian	76	76%
Black or African American	11	11%
Hispanic or Latino	9	9%
Asian or Asian American	2	2%
American Indian or Alaska Native	1	1%
Other	1	1%
Highest Level of Education		
High School Diploma or GED	9	9%
Some college credit, no degree	21	21%
Trade/Technical /Vocational training	1	1%
Associate Degree	14	14%
Bachelor's Degree	43	43%
Master's Degree	8	8%
Doctorate Degree	4	4%

Descriptive Statistics for the Variables

Descriptive statistics were analyzed for the variables of strengths underuse, strengths optimal use, strengths overuse, physical health, mental health, health behaviors, positive emotions, and negative emotions. Strengths underuse, optimal use, and overuse variables were evaluated with the OUOU survey, physical and mental health variables were evaluated through the PROMIS Global Scale, health behaviors were assessed using the WBI, and positive and negative emotions were gathered through the mDES. Descriptive statistics for the variables are found in Table 4, intercorrelations of the variables are found in Table 5, and the distribution of strengths use are found in Table 6.

Table 4

Descriptive Statistics for Underuse, Optimal Use, Overuse, Physical Health, Mental Health, Health Behaviors, Positive Emotions, and Negative Emotions (n=100)

Variable	*N*	Range	*Mean*	*SD*
Strengths Underuse	100	36-1849	642.09	314.46
Strengths Optimal Use	100	302-2341	1387.70	429.30
Strengths Overuse	100	11-1045	370.21	244.78
Physical Health	100	5-10	8.04	1.428
Mental Health	100	2-10	7.12	2.08
Health Behaviors	100	13-49	34.72	7.52
Positive Emotions	100	1.33-4.78	3.39	.83
Negative Emotions	100	1-4.71	1.82	.90

Table 5

Correlation Matrix for Underuse, Optimal Use, Overuse, Physical Health, Mental Health, Health Behaviors, Positive Emotions, and Negative Emotions (n=100)

	Strengths Underuse	Strengths Optimal Use	Strengths Overuse	Physical Health	Mental Health	Health Behaviors	Positive Emotions	Negative Emotions
Strengths Underuse		-.827**	.166	-.212*	-.484**	-.464**	-.585**	.574**
Strengths Optimal Use			-.691**	.370**	.447**	.491**	.575**	-.669**
Strengths Overuse				-.377**	-.162	-.266**	-.257**	.436**
Physical Health					.464**	.467**	.443**	-.406**
Mental Health						.529**	.683**	-.504**
Health Behaviors							.601**	-.389**
Positive Emotions								-.388**

*$p < .05$, **$p < .01$

Table 6

Strengths Use Distribution (n=100)

Strength	Use Type	Mean	Std. Deviation
Creativity	Underuse (conformity)	30.30	22.82
	Optimal Use	46.17	23.95
	Overuse (eccentricity)	23.53	19.42
Curiosity	Underuse (disinterest)	24.74	19.79
	Optimal Use	60.16	23.64
	Overuse (nosiness)	15.10	15.20
Judgment	Underuse (unreflectiveness)	24.28	19.08
	Optimal Use	53.06	23.29
	Overuse (cynicism)	22.66	17.72
Love of Learning	Underuse (complacency)	25.65	22.5
	Optimal Use	64.94	25.53
	Overuse (know-it-all-ism)	9.41	12.14
Perspective	Underuse (shallowness)	28.33	24.38
	Optimal Use	57.56	25.92
	Overuse (overbearing)	14.11	15.90
Bravery	Underuse (cowardice)	36.68	28.42
	Optimal Use	50.40	27.94
	Overuse (foodhardiness)	12.92	17.72
Perseverance	Underuse (fragility)	20.40	20.95
	Optimal Use	61.13	26.41
	Overuse (obsessiveness)	18.47	16.97
Honesty	Underuse (phoniness)	22.69	22.87
	Optimal Use	61.49	25.17
	Overuse (righteousness)	15.82	15.84
Zest	Underuse (sedentary)	24.94	25.46
	Optimal Use	60.63	28.33
	Overuse (hyperactivity)	14.43	15.67
Love	Underuse (emotional isolation)	24.08	28.63
	Optimal Use	62.50	29.56
	Overuse (emotional promiscuity)	13.42	14.51
Kindness	Underuse (indifference)	21.11	19.55
	Optimal Use	62.65	23.40
	Overuse (intrusiveness)	16.24	17.30
Social Intelligence	Underuse (cluelessness)	12.67	17.18
	Optimal Use	60.96	27.20
	Overuse (over-analysis)	26.37	22.71

(table continues)

Strength	Use Type	Mean	Std. Deviation
Teamwork	Underuse (selfishness)	53.60	26.69
	Optimal Use	37.82	24.87
	Overuse (dependency)	8.58	13.32
Fairness	Underuse (partisanship)	23.14	18.55
	Optimal Use	63.45	23.85
	Overuse (detachment)	13.41	13.70
Leadership	Underuse (compliancy)	47.65	35.67
	Optimal Use	44.89	33.30
	Overuse (despotism)	7.46	11.85
Forgiveness	Underuse (mercilessness)	22.69	26.02
	Optimal Use	61.83	28.69
	Overuse (permissiveness)	15.48	17.79
Humility	Underuse (baseless self-esteem)	21.15	21.00
	Optimal Use	64.36	26.45
	Overuse (self-depreciation)	14.49	18.61
Prudence	Underuse (sensation-seeking)	23.86	22.77
	Optimal Use	56.78	25.61
	Overuse (stuffiness)	19.36	18.33
Self-Regulation	Underuse (self-indulgence)	20.78	24.06
	Optimal Use	63.02	30.35
	Overuse (inhibition)	16.20	19.76
Appreciation of Beauty/Excellence	Underuse (oblivion)	17.78	23.16
	Optimal Use	63.29	28.10
	Overuse (perfectionism)	18.93	19.30
Gratitude	Underuse (rugged individualism)	21.55	23.86
	Optimal Use	68.65	29.07
	Overuse (ingratiation)	9.80	15.71
Hope	Underuse (negativism)	27.75	29.36
	Optimal Use	57.72	29.71
	Overuse (pollyana-ism)	14.75	17.36
Humor	Underuse (over-seriousness)	20.89	24.29
	Optimal Use	63.35	27.62
	Overuse (giddiness)	15.76	17.70
Spirituality	Underuse (anomie)	45.60	42.70
	Optimal Use	40.89	37.16
	Overuse (fanaticism)	13.51	20.84

The OUOU, a 24-item survey, aims to determine whether a person predominately overuses, underuses, or optimally uses each of the 24 character strengths. Participants

numerically allocated 100% of their estimated use divided out across the three categories of each strength use (underuse, optimal use, and overuse) (Freidlin et al., 2017). Ranges for each category of strengths use endorsement were between 0-100%, where higher percentages represent higher endorsement of the category of strengths use. Cronbach's alphas were 0.883 for underuse, 0.941 for optimal use and 0.921 for overuse.

The PROMIS Global Scale is a 10-item scale that assesses global physical, mental, and social health in adults (Hays et al., 2009). Participants were asked to rank each item on varying 5 point Likert scales. A higher score indicates positive health rankings. The scores are summarized into a global physical health score and a global mental health score, with Cronbach's alpha were 0.754 and 0.862, respectively.

The WBI is a 12-item measure created by Sirois (2001; 2017) that assesses how often common health-promoting behaviors are performed. Items are scored on a 5-point scale with responses ranging from 1 (*less than once a week or never*) to 5 (*every day of the week*), asking participants to report on their average preventative health behaviors over the last three months. The mean of 10 out of the 12 items is calculated to obtain a total score, with higher scores reflecting more frequent performance of health behaviors. Cronbach's alpha was calculated 0.789.

The mDES is a 20-item instrument evaluating the self-reported experiences of positive and negative emotions over the past two weeks, on a 5-point Likert scale (Fredrickson et al., 2003). The mean score of nine items produces the Positive Emotions (PE) subscale score, with Cronbach's alpha of 0.911. The mean score of seven items produces the Negative Emotions (NE) subscale score, with Cronbach's alpha of 0.918.

Data Analysis

I transferred the raw data from surveymonkey.com and analyzed data using SPSS software, version 24. Analyses were conducted based on the research questions to better understand the relationships between character strengths usage, physical and mental health, health behaviors, and positive and negative emotions. I chose to use regression analyses in order to determine if there were relationships between the variables, to understand the relationships, and to determine if the variables had predictive utility. I conducted preliminary analyses to ensure no violation of the assumptions of linearity, multicollinearity, normality, and homoscedasticity. Linearity was a reasonable assumption based on no symmetry in scatterplot graphical testing. The correlation matrix was evaluated to determine if independent variables within the regression models exhibited multicollinearity. No multicollinearity ($r > .80$) was observed between independent variables within the models. Normality was tested using skewness and Kurtosis of non-categorical variables: Strengths underuse skewness (.956) and Kurtosis (1.829), strengths optimal use skewness (-.207) and Kurtosis (-.64), strengths overuse skewness (.796) and Kurtosis (-.138), PROMIS Physical skewness (-.624) and Kurtosis (-.335), PROMIS Mental skewness (-.348) and Kurtosis (-.839), WBI skewness (-.505) and Kurtosis (.236), mDES positive emotions skewness (-.270) and Kurtosis (-.65), mDES negative emotions skewness (1.339) and Kurtosis (1.350), age range skewness (.895) and Kurtosis (.220), and education level skewness (-.452) and Kurtosis (-.942). All data suggested that the assumption of normality is reasonable. I tested homoscedasticity using

residuals vs predicted plot for each model. There was no detected pattern to suggest heteroscedasticity, and homoscedasticity was assumed to be reasonable.

Relationship Between Optimal Strengths Use and Physical Health

Regression/Research Question #1: A regression analysis was performed with optimal character strengths use as the predictor variable (with age, gender, and education level as covariates) and global physical health as the criterion variable. Optimal strengths use, age, gender, and education level accounted for 22.7% of variance in physical health scores (F (1, 99) = 6.985; $p < .001$). Greater optimal usage of character strengths is a statistically significant predictor of higher physical health scores, which indicated greater physical health ($\beta = .482$; t (99) = 4.996; $p < .001$). The slope is .002 and the intercept is 6.415. The null hypothesis was rejected.

Age was another statistically significant predictor variable in the model. Higher age was a statistically significant predictor of lower physical health scores, which indicated less physical health ($\beta = -.279$; t (99) = -2.941; $p < .01$). The slope was -.349 and the intercept was 6.415. Gender and education level were not found to be significant predictors of global physical health. See Table 7.

Table 7

Descriptive Statistics for Optimal Strengths Use, and Global Physical Health (n=100)

	B	*SE B*	*β*
Optimal Strengths Use	.002	.000	.482***
Age	-.349	.119	-.279**

(table continues)

	B	*SE B*	β
Gender	.370	.264	.129
Education Level	.017	.077	.020

*$p < .05$. **$p < .01$. ***$p < .001$.

Relationship Between Optimal Strengths Use and Mental Health

Regression/Research Question #2: A regression analysis was performed with optimal character strengths use as the predictor variable (with age, gender, and education level as covariates) and global mental health as the criterion variable. Optimal strengths use, age, gender, and education level accounted for 23.1% of variance in mental health scores (F (1, 99) = 7.152; $p < .001$). Greater optimal usage of character strengths was a statistically significant predictor of higher mental health scores, which indicated greater mental health ($\beta = .482$; t (99) = 5.011; $p < .001$). The slope was .002 and the intercept was 2.881. The null hypothesis was rejected. Age, gender, and education level were not found to be significant predictors of global mental health. See Table 8.

Table 8

Descriptive Statistics for Optimal Strengths Use, and Global Mental Health (n=100)

	B	*SE B*	β
Optimal Strengths Use	.002	.000	.482***
Age	-.015	.172	-.008
Gender	.744	.384	.178
Education Level	-.023	.112	-.018

*$p < .05$. **$p < .01$. ***$p < .001$.

Relationship Between Optimal Strengths Use and Health Behaviors

Regression/Research Question #3: A regression analysis was performed with optimal character strengths use as the predictor variable (with age, gender, and education level as covariates) and health behaviors as the criterion variable. Optimal strengths use, age, gender, and education level accounted for 32.2% of variance in health behavior scores (F (1, 99) = 11.284; $p < .001$). Greater optimal usage of character strengths was a statistically significant predictor of greater health behavior scores, which indicated more frequent engagement in health-promoting behaviors ($\beta = .553$; t (99) = 6.125; $p < .001$). The slope was .010 and the intercept was 15.197. The null hypothesis was rejected.

Education level was also a statistically significant predictor variable in the model. Higher education level was a statistically significant predictor of greater health behavior scores, which indicated more frequent engagement in health-promoting behaviors ($\beta =$ .265; t (99) = 3.124; $p < .01$). The slope was 1.193 and the intercept was 15.197. Age and gender were not found to be significant predictors of health behaviors. See Table 9.

Table 9

Descriptive Statistics for Optimal Strengths Use, and Health Behaviors (n=100)

	B	*SE B*	β
Optimal Strengths Use	.010	.002	.552***
Age	-.528	.585	-.080
Gender	1.286	1.304	.085
Education Level	1.193	.382	.265**

*$p < .05$. **$p < .01$. ***$p < .001$.

Relationship Between Optimal Strengths Use and Positive Emotions

Regression/Research Question #4: A regression analysis was performed with optimal character strengths use as the predictor variable (with age, gender, and education level as covariates) and positive emotions as the criterion variable. Optimal strengths use, age, gender, and education level accounted for 33.7% of variance in positive emotion scores (F (1, 99) = 12.056; $p < .001$). Greater optimal usage of character strengths was a statistically significant predictor of higher positive emotions scores, which indicated greater frequency of experiencing positive emotions ($\beta = .601$; t (99) = 6.733; $p < .001$). The slope was .001 and the intercept was 1.672. The null hypothesis was rejected. Age, gender, and education level were not found to be significant predictors of positive emotions. See Table 10.

Table 10

Descriptive Statistics for Optimal Strengths Use, and Positive Emotions (n=100)

	B	*SE B*	β
Optimal Strengths Use	.001	.000	.601***
Age	-.034	.064	-.046
Gender	.073	.142	.044
Education Level	.023	.042	.046

*$p < .05$. **$p < .01$. ***$p < .001$.

Positive Emotions as Mediator of Optimal Strengths Use and Health Behaviors

Research Question #5: The positive emotions variable was evaluated as a potential mediator between the optimal use of character strengths and health behaviors. Multiple regression analyses were conducted to assess each component of the proposed

mediation model. First, it was found that optimal strengths use, X, was positively associated with health behaviors, Y, (F(1, 98) = 31.174; R^2 = .241; b = .491; t (98) = .491; p < .001). Step 1 of Baron and Kenny (1986) was satisfied. It was also found that optimal strengths use, X, was positively related to positive emotions, M, (F(1, 98) = 48.454; R^2 = .331; b = .0011; t (98) = 6.961; p < .001), which satisfied Step 2. Results indicated that positive emotions, M, was positively associated with health behaviors, Y, when optimal strengths use, X, was controlled for (F(2, 97) = 31.399; R^2 = .393; b = 4.317; t (97) = 4.923; p < .001), which satisfied Step 3. Lastly, optimal strengths use remained positively associated with health behaviors when positive emotions was controlled for (F(2, 97) = 31.399; R^2 = .393; b = .0038; t (97) = 2.249; p < .05), which did not satisfy complete mediation in Step 4. This indicated partial mediation, and Hayes' (2019) PROCESS method bootstrapping macro (version 3.2.01) was implemented. In the present study, the 95% confidence interval of the indirect effects was obtained with 10,000 bootstrap resamples. Indirect effect results of the mediation analysis confirmed that positive emotions exert a significant partial mediating role in the relation between optimal strengths use and health behaviors (b =.0048; p < .05; CI = .0027 to .0070). Percent mediation was calculated to determine the size of the mediation effect. The mediator, positive emotions, accounted for roughly half of the total effect of optimal strengths use on health behaviors, P_M = .53. See Table 11 and Figure 2 for results.

Table 11

Descriptive Statistics for Mediation Analysis

Path	Effect	*F(df)*	R^2	*b*	*SE*	*t*	*p*
a (Step 2)	Opt Str → Pos Emot	48.454 (1, 98)	.3308	.0011	.0002	6.961	.0001
b (Step 3)	Pos Emot → Health Bx (when Opt Str controlled for)	31.399 (2, 97)	.393	4.3174	.8771	4.9227	.0001
c (Step 1)	Opt Str → Health Bx	31.174 (1, 98)	.241	.009	.002	.491	.0001
c' (Step 4)	Opt Str → Health Bx (when Pos Emot controlled for)	31.399 (2, 97)	.393	.0038	.0017	2.249	.0268

Note: Indirect effect (*ab*): *b* = .0048. *SE* = .0011. *CI (95%)* = .0027 to .007.

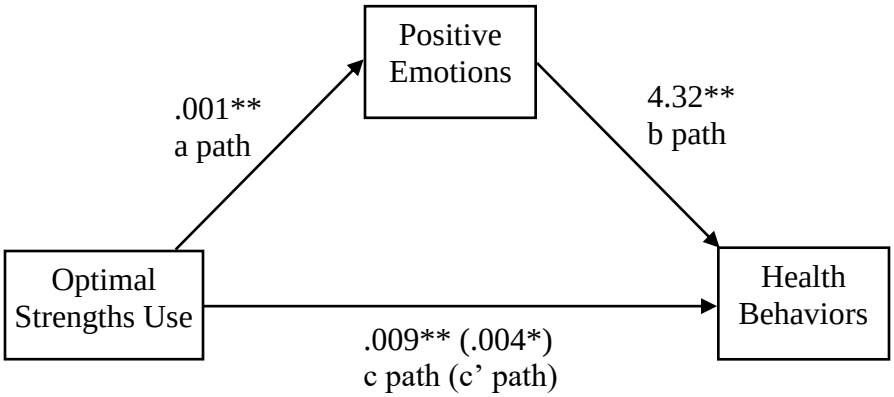

Figure 2. Indirect effect of Optimal Strengths Use on Health Behaviors through Positive Emotions. Note: * $p < .05$, ** $p < .001$

Regression Analyses Combined

In subsequent Research Questions #6-13, I originally proposed the underuse of strengths to be regressed on outcome measures separately than the overuse of strengths. Then, attempts were made to include underuse, optimal use, and overuse into the regression models together to understand their unique contributory factors when controlling for each other. Output errors led to further conversation with the OUOU test developers to gain clarity on the mathematical discrepancies. It was collaboratively decided that I would regress optimal strengths use on its own, as in Research Questions #1-4 above, and that the underuse and overuse of strengths, rather than be regressed in separate models as was originally proposed in Research Questions #6-13, would both be regressed together in the models so their unique contributions toward the outcome variables could be evaluated while the other was controlled for. Both underuse and overuse qualitatively represent the "negative" part of the equation when it comes to character strengths use, whereby optimal strengths use represents the "positive". The three uses sum up to a finite number of possibilities (100%), and as such it was decided to regress optimal use separately, and underuse and overuse together.

Relationship Between Strengths Underuse and Overuse and Physical Health

Regressions/Research Questions #6 & #10: A regression analysis was performed with the underuse and overuse of character strengths use as the predictor variables (with age, gender, and education level as covariates) and global physical health as the criterion variable. Strengths underuse, strengths overuse, age, gender, and education level accounted for 26.8% of variance in physical health scores (F (1, 99) = 6.892; $p < .001$).

Underusing character strengths was a statistically significant predictor of lower physical health scores, which indicated less physical health (β = -.216; t (99) = -2.362; p < .05). The slope was -.001 and the intercept was 10.321. Likewise, overusing character strengths was also a statistically significant predictor of lower physical health scores, which indicated less physical health (β = -.451; t (99) = -4.804; p < .001). The slope was -.003 and the intercept was 10.321. The null hypotheses of Research Questions #6 and #10 were rejected.

Age was another statistically significant predictor variable in the model. Higher age was a statistically significant predictor of lower physical health scores, which indicated less physical health (β = -.307; t (99) = -3.278; p < .01). The slope was -.383 and the intercept was 10.321. Gender and education level were not found to be significant predictors of global physical health in this model. See Table 12.

Table 12

Descriptive Statistics for Strengths Underuse and Overuse, and Global Physical Health (n=100)

	B	*SE B*	β
Strengths Underuse	-.001	.000	-.216*
Strengths Overuse	-.003	.001	-.451***
Age	-.383	.117	-.307**
Gender	.358	.259	.125
Education Level	.030	.076	.036

*p < .05. **p < .01. ***p < .001.

Relationship Between Strengths Underuse and Overuse and Mental Health

Regressions/Research Questions #7 & #11: A regression analysis was performed with the underuse and overuse of character strengths use as the predictor variables (with age, gender, and education level as covariates) and global mental health as the criterion variable. Strengths underuse, strengths overuse, age, gender, and education level accounted for 27.5% of variance in mental health scores (F (1, 99) = 7.136; $p < .001$). Underusing of character strengths was a statistically significant predictor of lower mental health scores, which indicated less mental health (β = -.494; t (99) = -5.439; $p < .001$). The slope was -.003 and the intercept was 8.392. The null hypothesis of Research Question #7 was rejected. Overuse of character strengths was not a statistically significant predictor of mental health scores in this model. The null hypothesis of Research Question #11 was not rejected.

Gender was another statistically significant predictor variable in the model. Male gender was a statistically significant predictor of greater mental health scores, which indicated greater mental health (β = .182; t (99) = 2.033; $p < .05$). The slope was .762 and the intercept was 8.392. Age and education level were not found to be significant predictors of global mental health in this model. See Table 13.

Table 13

Descriptive Statistics for Strengths Underuse and Overuse, and Global Mental Health (n=100)

	B	*SE B*	*β*
Strengths Underuse	-.003	.001	-.494***
Strengths Overuse	-.001	.001	-.092
Age	.037	.170	.020
Gender	.762	.375	.182*
Education Level	-.042	.110	-.034

*$p < .05$. **$p < .01$. ***$p < .001$.

Relationship Between Strengths Underuse and Overuse and Health Behaviors

Regressions/Research Questions #8 & #12: A regression analysis was performed with the underuse and overuse of character strengths use as the predictor variables (with age, gender, and education level as covariates) and health behaviors as the criterion variable. Strengths underuse, strengths overuse, age, gender, and education level accounted for 32.8% of variance in health behavior scores (F (1, 99) = 9.161; $p < .001$). Underusing character strengths was a statistically significant predictor of lower health behavior scores, which indicated less frequent engagement in health-promoting behaviors (β = -.455; t (99) = -5.204; $p < .001$). The slope was -.011 and the intercept was 38.333. Likewise, overusing character strengths was also a statistically significant predictor of lower health behavior scores, which indicated less frequent engagement in health-promoting behaviors (β = -.250; t (99) = -2.779; $p < .01$). The slope was -.008 and the

intercept was 38.333. The null hypotheses of Research Questions #8 and #12 were rejected.

Education level was another statistically significant predictor variable in the model. Higher education level was a statistically significant predictor of greater health behavior scores, which indicated more frequent engagement in health-promoting behaviors ($\beta = .260$; $t\ (99) = 3.045$; $p < .01$). The slope was 1.167 and the intercept was 38.333. Age and gender were not found to be significant predictors of health behaviors in this model. See Table 14.

Table 14

Descriptive Statistics for Strengths Underuse and Overuse, and Health Behaviors (n=100)

	B	*SE B*	β
Strengths Underuse	-.011	.002	-.455***
Strengths Overuse	-.008	.003	-.250**
Age	-.461	.590	-.070
Gender	1.309	1.306	.087
Education Level	1.167	.383	.260**

*$p < .05$. **$p < .01$. ***$p < .001$.

Relationship Between Strengths Underuse and Overuse and Negative Emotions

Regressions/Research Questions #9 & #13: A regression analysis was performed with the underuse and overuse of character strengths as the predictor variables (with age, gender, and education level as covariates) and negative emotions as the criterion variable. Strengths underuse, strengths overuse, age, gender, and education level accounted for

46.8% of variance in negative emotion scores (F (1, 99) = 16.559; $p < .001$). Underusing character strengths was a statistically significant predictor of higher negative emotion scores, which indicated more frequent experiencing of negative emotions ($\beta = .509$; t (99) = 6.540; $p < .001$). The slope was .001 and the intercept was .379. Likewise, overusing character strengths was also a statistically significant predictor of greater negative emotion scores, which indicated more frequent experiencing of negative emotions ($\beta = .321$; t (99) = 4.006; $p < .001$). The slope was .001 and the intercept was .379. The null hypotheses of Research Questions #9 and #13 were rejected. Age, gender, and education level were not found to be statistically significant predictors of negative emotions in this model. See Table 15.

Table 15

Descriptive Statistics for Strengths Underuse and Overuse, and Negative Emotions (n=100)

	B	*SE B*	β
Strengths Underuse	.001	.000	.509***
Strengths Overuse	.001	.000	.321***
Age	-.053	.063	-.068
Gender	-.038	.138	-.021
Education Level	.065	.041	.121

*$p < .05$. **$p < .01$. ***$p < .001$.

Summary

In Chapter 4, I discussed data collection, demographics, data analyses, and results of the study. Optimal use of character strengths was shown to predict better outcomes of

physical health, mental health, health behaviors, and positive emotions. The underuse and overuse of character strengths uniquely predicted poorer outcomes of physical health, health behaviors, and negative emotions. In the case of mental health, underuse of strengths predicted poorer mental health, while overuse was not significant in this model. In mediation analysis, positive emotions were found to explain roughly 50% of the relationship between optimal strengths use and health behaviors. In Chapter 5, interpretations of the findings, limitations of the study, recommendations for further research, and implications of the study will be discussed.

Chapter 5: Discussion

Introduction

The relationship between adult character strength usage and physical and mental health was investigated in this study. Previous character strengths research had predominately examined outcomes based on monotonic character strengths use. The delineation of the underuse, overuse, and optimal use of character strengths has recently emerged in research to better understand the ways in which strengths are being used and how each category of usage is associated with varying outcomes (Freidlin et al., 2017; Littman-Ovadia & Freidlin, in press).

Research has established that the monotonic use of character strengths is associated with better health outcomes. Recent research on the underuse, overuse, and optimal use concept has contributed to the character strengths literature, with preliminary support that optimal strengths use is associated with positive outcomes while underuse and overuse are associated with more negative outcomes (Freidlin et al., 2017; Littman-Ovadia & Freidlin, in press). I sought to investigate physical and mental health outcomes from this newly developed perspective on character strengths to identify if there are health benefits to predominately using strengths in an aligned, balanced way. Additionally, I investigated if the underuse and overuse of strengths contributed to worse health outcomes.

Based on the results of the study, the null hypotheses were rejected on all but one research question. The optimal use of character strengths was predictive of better physical health, better mental health, more frequent health behaviors, and more frequent

positive emotions. The underuse of character strengths was predictive of worse physical health, worse mental health, less frequent health behaviors, and more frequent negative emotions. The overuse of character strengths was predictive of worse physical health, less frequent health behaviors, and more frequent negative emotions. Overuse of character strengths was not found to be predictive of worse mental health as hypothesized, and therefore the results of this research question failed to reject the null hypothesis. Finally, positive emotions were found to mediate 53% of the relationship between optimal use of character strengths and health behaviors.

Interpretation of Findings

A sample of 100 adults from the United States from the AMT laborer pool completed a demographic survey, the OUOU, the PROMIS Global Scale, the WBI, and the mDES. I hypothesized that optimal character strengths use would predict better outcomes on all measures, while the underuse and overuse of strengths were hypothesized to predict worse outcomes on all measures. I utilized bootstrapping to test my proposed mediation hypothesis that positive emotions may partially explain the relationship between optimal strengths use and improved health behaviors, which was confirmed. Additionally, 11 out of the 12 findings were confirmed to be significant.

Findings and the Literature

Optimal character strengths use was associated with better physical health, better mental health, more frequent health behaviors, and more frequent positive emotions. These findings confirm the postulation made by Peterson and Seligman (2004) that character strengths would be associated with not only mental health, but physical health

as well. Specific to the optimal use delineation of character strengths, these findings confirm affirmative correlations that Freidlin et al. (2017) and Littman-Ovadia and Freidlin (in press) found between optimal character strengths use and flourishing and life satisfaction, as well as inverse correlations with depression. The findings from the current study further extend the knowledge on optimal strengths use and factors of overall well-being. In this study, predictive regression models were utilized to better understand the unique contribution that optimal strengths use makes on health outcomes. The consistent predictive utility that optimal strengths use was shown to have across these global scores of physical health, mental health, health behaviors, and positive emotions collectively highlight the importance of this optimal use delineation, as compared to monotonic strengths use. These affirmatory results were expected, based on previous research findings of character strengths being associated with cardio-respiratory fitness, strengths, flexibility, and coordination (Proyer at al., 2013), lower body mass index (Hintansten et al., 2012), and resilience (Wood et al., 2011). These points are further elucidated by my subsequent findings with underuse and overuse of strengths outlined below.

The underuse of character strengths was significantly predictive of worse physical health, worse mental health, less frequent health behaviors, and more frequent negative emotions. These results also confirm findings from Freidlin et al. (2017) and Littman-Ovadia and Freidlin (in press), who showed that the underuse of character strengths was significantly correlated with depression, and inversely correlated with flourishing and life satisfaction. While I did not explore depression as a variable in this study, I did evaluate poor global mental health and negative emotions as variables and conceptually confirm

the findings of depressive tendencies by Freidlin et al. (2017). Wood et al. (2011) found an association between decreased strengths use and lower vitality and higher stress. Additionally, Keyes (2002) defined languishing as a dormant-like state, which Freidlin et al. (2017) conceptualized as a representation of underused character strengths. In light of these examples, the present study's findings for the underuse of strengths predicting worse physical health, worse mental health, less frequent health behaviors, and more frequent negative emotions met my expectations to have confirmed such previous research, and did so.

The overuse of character strengths was significantly predictive of worse physical health, less frequent health behaviors, and more frequent negative emotions. Overuse of character strengths was not found to be significantly predictive of worse mental health as hypothesized. Less research is available on the overuse of character strengths, because this concept was not present when viewing character strengths through a monotonic lens where "more" of a given strength was understood to be representative of a more highly ranked strength, rather than conceptualized as a possibly overused strength. Based on findings from Freidlin et al. (2017) and Littman-Ovadia and Freidlin (in press) where the overuse of strengths was correlated with poorer flourishing, poorer life satisfaction, and increased depression, it was expected that the overuse of character strengths would predict worse physical health, worse mental health, less frequent health behaviors, and more frequent negative emotions. Expected findings were confirmed with the exception of the mental health variable. The overuse of strengths was expected to predict worse mental health as the underuse of strengths did, yet this was not the case as the overuse of

character strengths did not significantly predict poorer mental health. This finding is interesting considering the overuse of strengths was predictive of more frequent negative emotions. I did not expect this differentiation but it is partially substantiated by the evaluation of Littman-Ovadia and Freidlin (in press), who noted the differences between the underuse and overuse of character strengths. They found that underuse was correlated significantly higher, compared to overuse, with flourishing, life satisfaction, and depression.

Findings and the Theoretical Framework

Positive emotions were found to partially mediate the relationship between optimal strengths use and health behaviors, confirming that hypothesis within this study. Based on the assumption that optimal strengths use would be predictive of both positive emotions and more frequent health behaviors, and that previous research has shown that positive emotions precede health-promoting behaviors, the confirmed mediating effect of positive emotions was expected. The new variable that had not previously been explored within this relationship is the specific *optimal* use of character strengths, as a construct differentiated from one-dimensional character strengths use. Through the bootstrapped mediation results in this study, the optimal use of character strengths was calculated to explain 47% of its predictive utility, independent of positive emotions, regarding the frequency of health behaviors.

The mediation results in this study therefore credited 53% of the relationship between optimal strengths use and frequency of health behaviors to the frequency of experiencing positive emotions. This substantive finding supports previous research

showing that positive emotions can raise inclination for wellness behaviors (Fredrickson, 2013a). The upward spiral model of lifestyle change, as the theoretical framework of this study, is anchored by the concept that positive emotions trigger biological reward pathways in the brain. As further explained by the upward spiral model, this reward pathway can turn into a pattern of wanting more positive behaviors, while negative emotions can turn into a reward pathway for further negative behaviors (Fredrickson, 2013a). The present study confirmed the previous research on this theoretical framework in that the optimal use of strengths predicted more frequent positive emotions and more frequent health behaviors. Additionally, the underuse and overuse of strengths were both significantly predictive of less frequent health behaviors and more frequent negative emotions. These collective findings not only support the construct that positive emotions are associated with better health behaviors and outcomes, but also the notion that the optimal use of character strengths plays a preceding role in promoting these crucial positive emotions in the first place.

Limitations of the Study

The convenience sample with relatively small sample size was a limitation of this study in that it is not possible to accurately represent the United States adult population with 100 sampled individuals. I collected data cross-sectionally, therefore no longitudinal data was collected or analyzed in this study. The self-report nature of the surveys in this study, though common in collecting exploratory, subjective data, present validity limitations as well. Particularly where data points included self-reported physical and mental health measures rather than objective data from physical and mental assessments,

having subjective health data somewhat limits the scope of the conclusions reached. Also, the OUOU is a relatively new measure, having only been used in two previous studies and therefore may have some limitations.

Recommendations

This is the first study to look at the underuse, optimal use, and overuse of character strengths in terms of physical health and health behaviors. Subsequent studies with larger sample sizes may aim to replicate the findings of this study that the balanced use of character strengths significantly predicts physical health, mental health, health behaviors, and positive emotions. Likewise, the underuse and overuse of strengths showed significance to indicate sub-optimal functioning.

Subjective, self-reported measures were used to collect data on physical and mental health for the present study. Objective measures of physical health such as weight, body fat percentage, blood pressure, cholesterol, fasting glucose, and C-reactive protein in future studies would bolster the study design. Additionally, a thorough psychological assessment would be a more objective measure of mental health. Longitudinal data showing consistent prospective effects of strengths usage in relation to the variables would also further clarify the strength of the relationships between the study's variables.

To further support a recommendation suggested by Freidlin et al. (2017), future studies can continue to look at the underuse and overuse of strengths as a deviation from the optimal use of strengths, and address these deviations clinically perhaps without needing to give the individual a psychopathological label. Once continual evidence is founded within the construct of strengths underuse, optimal use, and overuse, it is

recommended to create and test interventions aimed at realigning an individual's strengths use profile to aim for balanced use of strengths. The discrepancy found in this study regarding the overuse of strengths not predicting poorer mental health although it was expected to is an area requiring further research. The present study did not confirm the previous two studies using the OUOU to test this hypothesis, although the variables were not matched identically, which likely contributed to the incongruency. Future research may aim to explore if the underuse of strengths may possibly be more detrimental to outcomes than the overuse of strengths. Finally, future research may aim to create a graphical representation of an individuals' profile of their underuse, optimal use, and overuse of strengths based on the OUOU, which may help them visually understand which strengths they may want to practice turning the volume up and down in certain contexts in order to achieve a sense of "golden mean" balance in their lives.

Implications

Character strengths research, being based on virtue and the "good life" proposed by Seligman and Csikszentmihalyi (2000) has positive societal implications that extend to the individual, the family, and even the community/society. The more recent research on character strengths usage, including the present study, took an already-impactful positive psychology concept of monotonic strength use and further developed it into something as descriptive as the underuse, optimal use, and overuse of strengths which yields something akin to a strengths report card. Such a barometer of individual relationships to each of the 24 character strengths allows for an intimately detailed space for targeted personal development and growth. While further research evidence needs to

continue to be made with the OUOU, implications of harnessing the potential power of such a relationship with an individual's strengths use may include one on one services aimed at improving physical and mental health via lifestyle and perspective changes. Groups of individuals could similarly benefit in a therapeutic or educational environment so long as they work on their own individualized strengths underuse, optimal use, and overuse profile. The goal of such interventions would be for individuals to use their character strengths in an optimal balanced way, as research from this study suggests is predictive of more positive and healthy outcomes.

Positive emotions are at the heart of the upward spiral model of lifestyle change, creating more sustained positive lifestyle adaptations (Fredrickson, 2013a). Through this theoretical lens, positive emotions are a catalyst to begin the momentum which is then associated with positive outcomes. I ultimately asked the question, can optimized character strengths use help achieve these positive emotions in the first place? The optimal use of character strengths is now gaining more research evidence to support the notion that the balanced use of character strengths is predictive of not only positive emotions, but also improved physical and mental health, and health behaviors. Findings from the present study reciprocally support the theoretical framework of the upward spiral model of lifestyle change. Furthermore, there may be future clinical significance in viewing the balanced use of character strengths as a precursor to positive emotions, to help onboard an individual onto the upward spiral in the first place.

In practice, findings from the present study may support behavioral modification interventions. Change can be difficult for some individuals, and even more so in the

presence of negative emotions. Findings from the present study contributed the perspective that the optimal use of strengths predicts positive emotions and the underuse/overuse of strengths predicts negative emotions. With further research, the optimal use of strengths may emerge as a clinical target at which interventions can be aimed in order to first increase positive emotions in a client. Meeting this prerequisite of the upward spiral model of lifestyle change, the biological mechanisms associated with positive emotions/behavioral modification are theorized to activate, and a client would then be expected to sustain the positive upswing. As established in research, obesity rates are climbing and while individuals are aware that diet and exercise are important, there may be a behavioral factor preventing these choices and commitments from being made (CDC, 2014; 2017). A novel approach with these individuals may focus less on the direct behavioral lifestyle component and more on their frequency of positive emotions. In a similar fashion within psychopathology, character strengths interventions developed in the future may allow for a change in perspective with how an individual, and the practitioner, views mental health. A positive psychology approach focused more on the status of an individual's unbalanced character strengths use profile and less on the deficits-approach of traditional diagnoses may shift the therapeutic target toward optimizing an individual's strengths usage profile and increasing their experience of positive emotions, rather than feeling as though there is something broken that needs to be fixed. With more research in the coming years, practitioners may begin to have clinical conversations in both physical health and mental health environments around the

psychoeducation and implications of character strengths alignment and its role in in improved outcomes.

Conclusion

A sample of United States adults were surveyed to better understand the relationships between character strengths usage and health outcomes. It was hypothesized that the optimal use of character strengths would predict better physical health, better mental health, more frequent health behaviors, and more frequent positive emotions. It was also hypothesized that the underuse and overuse of character strengths would predict worse physical health, worse mental health, less frequent health behaviors, and more frequent negative emotions. Lastly, it was hypothesized that positive emotions would at least partially mediate the relationship between optimal strengths use and health behaviors. The OUOU was used to assess the underuse, optimal use, and overuse of character strengths, the PROMIS Global Scale evaluated physical and mental health, the WBI measured frequency of engaging in health-promoting behaviors, and the mDES determined the frequency of experiencing both positive and negative emotions. Twelve out of the thirteen hypotheses were confirmed. The exception was that the overuse of character strengths was hypothesized to predict poor mental health, though this was not found to be true in this study.

The results I obtained could potentially benefit medical and mental health professionals in educational, research, and clinical roles as it validates the strengths-based psycho-emotional underpinning of not just mental health, but of physical health as well. While a single study is by no means conclusive, the affirmative contribution this study

makes to the developing field of character strengths research further justifies the need for future studies on the underuse, optimal use, and overuse of character strengths. The findings of this study can lead to an enhanced understanding of how physical health and mental health can be approached together in a health promotional effort within the field of health psychology.

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Appendix A: OUOU Sample

Copy of Overuse Underuse Optimal-Use (OUOU) Sample Survey Questions

Overuse, Underuse, Optimal Use Survey

Consider all the situations and interactions in your life. For each item, indicate the extent to which each option applies to you (across all time, situations and relationships in your life), out of 100%.

For example: *How much do you eat?*

If you would like to indicate that 20% of the time (or of your meals) you remain hungry/do not eat enough, 70% of the time (or of your meals) you eat just enough, and 10% of the time you eat too much, your answers will look as follows:

(This is an example, you do not need to answer this question, but please carefully examine the relationship between the statement above, and the format of the answer below.)

Question	**Percentage (total must equal 100%)**
Too little, not enough, remain hungry	20%
Just enough, do not feel hungry or too full after a meal	70%
Too much, feel too full or even sick	10%
Total (THREE items TOGETHER must total 100%)	**100%**

1. **Consider all the situations and interactions in your life. For each item, indicate the extent to which each option applies to you (across all time, situations and relationships in your life), out of 100%.**

In reflecting upon yourself, certain items may appear less desirable. Please answer honestly, as our goal is to understand both positive and negative aspects of human character.

Considering your entire life (time, people, places, etc.), to what extent to do you act according to the following descriptions (out of 100%)?

Question	**Percentage (total must equal 100%)**
I am uncreative or unimaginative, not coming up with unique ideas.	
I am creative, conceptualizing something useful, coming up with useful ideas.	
I am creative without being useful; or I come up with solutions that don't work or are unnecessary; or I overwhelm people with too many ideas.	
Total (THREE items TOGETHER must total 100%)	**100%**

2. **Consider all the situations and interactions in your life. For each item, indicate the extent to which each option applies to you (across all time, situations and relationships in your life), out of 100%.**

In reflecting upon yourself, certain items may appear less desirable. Please answer honestly, as our goal is to understand both positive and negative aspects of human character.

Considering your entire life (time, people, places, etc.), to what extent to do you act according to the following descriptions (out of 100%)?

Question	**Percentage (total must equal 100%)**
I quickly become disinterested in new experiences.	
I seek out situations in which I gain new experiences without getting in my own or others' way.	
I seek out new experiences regardless of the consequences to myself or others and it gets in my own or others' way (e.g. privacy).	
Total (THREE items TOGETHER must total 100%)	**100%**

Appendix B: PROMIS Global Scale

Copy of PROMIS Global Scale Measure

Please respond to each question or statement by marking one box per row.

	Excellent	Very Good	Good	Fair	Poor
In general, would you say your health is……	□ **5**	□ **4**	□ **3**	□ **2**	□ **1**
In general, would you say your quality of life is……	□ **5**	□ **4**	□ **3**	□ **2**	□ **1**
In general, how would you rate your physical health?	□ **5**	□ **4**	□ **3**	□ **2**	□ **1**
In general, how would you rate your mental health, including your mood and your ability to think?	□ **5**	□ **4**	□ **3**	□ **2**	□ **1**
In general, how would you rate your satisfaction with your social activities and relationships?	□ **5**	□ **4**	□ **3**	□ **2**	□ **1**
In general, please rate how well you carry out your usual social activities and roles. (This includes activities at home, at work and in your community, and responsibilities as a parent, child, spouse, employee, friend, etc.)	□ **5**	□ **4**	□ **3**	□ **2**	□ **1**
	Completely	**Mostly**	**Moderately**	**A little**	**Not at all**
To what extent are you able to carry out your everyday physical activities such as walking, climbing stairs, carrying groceries, or moving a chair?	□ **5**	□ **4**	□ **3**	□ **2**	□ **1**

In the past 7 days….	Never	Rarely	Sometimes	Often	Always
How often have you been bothered by emotional problems such as feeling anxious, depressed or irritable?	□ 5	□ 4	□ 3	□ 2	□ 1

	None	Mild	Moderate	Severe	Very severe
How would you rate your fatigue on average?	□ 5	□ 4	□ 3	□ 2	□ 1

How would you rate your pain on average?	□ 0 No pain	□ 1	□ 2	□ 3	□ 4	□ 5	□ 6	□ 7	□ 8	□ 9	□ 10 Worst pain imaginable

Appendix C: WBI

Copy of Wellness Behaviors Inventory (WBI) Measure

Please indicate approximately how often you currently perform the behaviors listed below by checking the appropriate box for each item. Think about how often you do these things in general, that is over the past 3 months.

	Less than once a week or never	One day a week	2-3 days a week	4-5 days a week	Every day of the week
1. I eat breakfast.					
2. I get a good night's sleep, for example, uninterrupted, restful sleep.					
3. I drink 3 or more caffeinated beverages, such as coffee, tea, or colas.					
4. I exercise for 20 continuous minutes or more, to the point of perspiration.					
5. I eat at least 3 meals a day.					
6. I take time to relax.					
7. I eat fresh fruits and/or vegetables.					
8. I walk as much as possible, for example, I take the stairs not the elevator, etc.					
9. I take vitamins.					
10. I eat junk foods, such as chips, candy bars, French fries, etc.					
11. I eat healthy, well-balanced meals.					
12. I take natural supplements, such as garlic pills, Echinacea, herbals, etc.					

Appendix D: mDES

Copy of modified Differential Emotions Scale (mDES) Measure

Fredrickson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. R. (2003). What good are positive emotions in crisis? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology*, 84(2), 365-376. doi:10.1037/0022-3514.84.2.365

Directions: Please think back to how you felt these past TWO WEEKS, and rate how often you experienced the following emotions.

MODIFIED DIFFERENTIAL EMOTIONS SCALE (MDES)

0 Not at all	1 Hardly	2 Some of the time	3 Often	4 Most of the time

Rating	Feelings these past TWO weeks
	I felt amused, fun-loving, silly.
	I felt angry, irritated, annoyed.
	I felt ashamed, humiliated, disgraced.
	I felt awe, wonder, amazement.
	I felt scared, fearful, afraid.
	I felt content, serene, peaceful.
	I felt disgust, distaste, revulsion.
	I felt embarrassed, self-conscious, blushing.
	I felt glad, happy, joyful.
	I felt grateful, appreciative, thankful.
	I felt hopeful, optimistic, encouraged.
	I felt sexual, desiring, flirtatious.
	I felt interested, alert, curious.
	I felt love, closeness, trust.
	I felt proud, confident, self-assured.
	I felt repentant, guilty, blameworthy.
	I felt sad, downhearted, unhappy.
	I felt contemptuous, scornful, disdainful.
	I felt sympathy, concern, compassion.
	I felt surprised, amazed, astonished.

Appendix E: Upward Spiral Model of Lifestyle Change Figure Reprint Permission

Copy of Permission Included in PDF of Chapter

From Barbara L. Fredrickson, Positive Emotions Broaden and Build,

In Patricia Devine, and Ashby Plant, editors: *Advances in Experimental Social Psychology,* Vol. 47, Burlington: Academic Press, 2013, pp. 1-53.

ISBN: 978-0-12-407236-7

Appendix F: VIA Classification Table Reprint Permission

Copy of Permission Email

Hello Angela,

Yes, you have permission to reprint the VIA Classification. Please include this copyright notice below the table:

Appendix G: Overuse Underuse Optimal Use Table Reprint Permission

Copy of Permission Included in Text (p. 199)

Niemiec, R. M. (2014). *Mindfulness and character strengths: A practical guide to flourishing.* Boston, MA: Hogrefe Publishing.

Appendix H: OUOU Instrument Permission

Email Correspondence Between VIA Institute and Angela Bergen

Regarding use of OUOU

Dear Angela,

We are very pleased to provide permission to use the VIA Surveys in your research project, thereby expanding the knowledge base on the VIA Classification of Character Strengths and Virtues.

*If the participants are under the age of 13, they will need to have a parent or guardian register them on the website in order to take the survey.

If you would like to conduct the survey using another research software, such as Qualtrics, we can provide you with the survey questions.

We very much want to retain the scientific integrity and reputation of the VIA Survey of Character, and so request that you limit your application and interpretation of results to that which is provided by VIA and otherwise is scientifically based. Please note the term VIA is no longer an acronym for Values in Action. In any written communications please avoid the latter term except as a historical reference. In your documents, the model of 24 strengths and 6 virtues that underlies the VIA Inventory of Strengths and VIA Youth Inventory is officially called the VIA Classification of Strengths and Virtues. Please use this phrase when referring to the model.

The VIA Survey, in its entirety, should not be published with your research analysis/dissertation.

Finally, in exchange for providing this free service, VIA requests that you share your research results with us. Please do so by e-mailing me a report, which I shall share with the VIA staff.

Again, thank you for your interest in expanding the body of scientific knowledge on character strengths and for including the VIA Survey on Character in your work. We look forward to learning of your results and wish you good luck in conducting your study. Don't hesitate to get in touch if you have any questions or concerns.

Appendix I: WBI Instrument Permission

Email Correspondence Between Dr. Sirois and Angela Bergen

Regarding use of WBI

Dear Angela,

Many thanks for your interest in the WBI. I am happy to share the scale and manual for use in your research - see attached pdf file.