2014

Inspiring Change: Exercise Self-Efficacy, Dispositional Optimism, and Perceived Stress in College Seniors

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Abstract

Prohealth competencies, positive outcome expectancies, and adaptive stress appraisals have profound implications for the real-world transition of college seniors—a population for which engagement in physical activity reflects a preeminent concern. Prior studies on exercise self-efficacy (ESE), dispositional optimism (DO), perceived stress (PS), and physical activity have yielded inconclusive evidence of the emergent psychosocial challenges encountered during the final year of the college experience. Using a triadic framework of self-efficacy, attribution, and cognitive appraisal theories, this cross-sectional, quantitative study was conducted using a web survey to examine (a) the impact of physical activity level on ESE, DO, and PS; (b) the relationships that exist between ESE, DO, and PS; and (c) whether DO, PS, and sex predict ESE in a sample of 138 college seniors. The Barriers Self-Efficacy Scale, Revised Life Orientation Test, Perceived Stress Scale, and Stages of Exercise Change Questionnaire were used to assess the respective lines of inquiry. Between-groups analysis of variance, correlation, and standard multiple regression analyses were conducted to test each respective hypothesis. Results indicated (a) significant mean differences in ESE, DO, and PS for exercise maintainers; (b) large intercorrelations among ESE, DO, and PS; and (c) PS as the most significant correlate and the strongest predictor of ESE. Findings can be used to frame the college years as a transformative experience for indoctrinating the competency beliefs that underpin leadership potentials, internalizing perceived controllability over objectives, and engendering challenge-approach orientations—prerequisites for real-world adaptation and potential building blocks for positive social change.

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Acknowledgments

The following body of work would not have been possible without the unending support of several key people who have touched both my personal and academic worlds. I thank my mother, father, and brother who believed in my motivation to undertake the many challenges encountered within the past four years. Thank you for your capacity to embrace the seemingly endless process with me—albeit from a distance—and to endure hearing the words “I’m almost done”, ad nauseum.

In addition, a heartfelt thanks to Dr. Kimberley Cox and Dr. William Disch for their collective patience, guidance, and support throughout the complex twists and turns of the dissertation journey, and a special thanks to Dr. Tom Diebold for his rigorous review of my manuscript. Your respective critical feedback was essential to achieving a significant end result. It is my hope that this research not only extends the current body of evidence, but that it makes each of you proud to have played such an integral part in the process of bringing these findings to light.

Perhaps no one has been more pivotal in the success of this endeavor than Renée, whose unconditional love and support have persisted—without hesitation or interruption—despite the mental and emotional rigors of the journey. Your belief in me—past, present, and future—will never be taken for granted. The words “thank you” could never convey the degree of gratitude that I have for your enduring belief in me.

Table of Contents

List of Tables

Chapter 1: Introduction to the Study

The senior year of college represents a critical biopsychosocial juncture in human growth and development. At the latter end of young adulthood, biological changes often stabilize while psychosocial exploration is driven by continuous exposure to the external world (Erikson, 1963, 1968). Despite Cohen's (2009) account of the college years as a period of enlightenment, the range of vocational (Wood, 2004), economic (Norvilitiset al., 2006), and contextual challenges associated with the transition to postgraduate life has implications for acute psychological stress-related impacts. While the college experience serves to establish a foundation for vocational purpose (Flowers, 2002), flawed health beliefs (Bylund, Imes, & Baxter, 2005), career indecision (Tien, Lin, & Chen, 2005), and role identity confusion (Barnett, Gareis, James, & Steele, 2001) reflect but just a few of the emergent concerns experienced by college seniors.

Beyond these challenges, researchers have revealed a growing problem in the college health domain: In general, college students in the United States fail to engage in the level of physical activity prescribed by governing health authorities (American College Health Association [ACHA], 2008; United States Department of Health and Human Services [USDHHS], 2008). When compounded by increased exposure to the myriad psychosocial stressors commonly associated with young adulthood, inattention to physical health could have deleterious impacts on global well-being. Given the far-reaching psychophysiological impact of physical activity reported in the literature (see Downs & Ashton, 2011; Tetlie, Eik-Nes, Palmstierna, Callaghan, & Nøttestad, 2008), perceived self-efficacy for exercise ability could have a significant positive influence on

perceived controllability over outcomes and stress perception—thus, optimizing the capacity of college seniors to approach postgraduation challenges.

It remains open to debate whether enhanced senior-year stress levels could negatively affect stable characterological traits such as optimism—a personality attribute that has been directly linked to academic performance (Bressler, Bressler, & Bressler, 2010) and one that presumably underpins postgraduation goal attainment. Such perspectives have implications for whether the adoption of prohealth values play an integral role in the ability of students to (a) adhere to prohealth practices, (b) remain optimistic in the face of overwhelmingly high levels of psychosocial challenge, and (c) and can potentiate stress resilience. In the current study, these perspectives compelled me to examine exercise self-efficacy (ESE), dispositional optimism (DO), and perceived stress (PS) when experienced through the lens of college seniors.

The well-documented positive impact of physical activity on stress level (Collins et al., 2009), executive functioning abilities (Davis et al., 2011), and self-concept (Lamb & Gulliford, 2011; Stoll & Alfermann, 2002) has potential implications for how individuals attribute outcomes and regulate stress perception. For college students, researchers have shown that a range of physical, cognitive, and social expectancies could significantly impact behavioral outcomes (see Taber, Meischke, & Maciejewski, 2010). When extending this research to the college senior cohort, the psychosocial rigors of the pregraduation period have implications for stressors that negatively impact perceived controllability over specific aspects of health—potentially impacting the level of self-determination (Deci & Ryan, 1985, 2000) necessary to adopt prohealth behavior.

Finally, the extent to which college seniors exhibit perceived competency for health behaviors, internalize controllability over outcomes, and formulate adaptive appraisals of the stress stimulus have profound implications for future social change agency. As students demonstrate an enhanced capacity for self-regulated health behavior (i.e., ESE), those competency and mastery skills may be generalized to self-determined leadership potentials. In addition, as students enhance their perceived controllability over future outcomes (i.e., DO), bias may be reduced and a universal respect for individual differences may be embraced. Further, as students engender approach versus avoidance-oriented coping styles (i.e., PS), they are presumably more willing to undertake the challenges associated with specific objectives and optimize their social change efficacy.

The following sections of this chapter include summaries of the extant literature that provide an overview of ESE, DO, PS, and physical activity level as they relate to college seniors. In the problem statement, I highlight the relevant gaps in the literature regarding the respective health competencies, outcome expectancies, and stress appraisals of college seniors: (a) whether differences in ESE, DO, and PS exist in relation to current physical activity level; (b) whether relationships exist between ESE, DO, and PS; and (c) whether DO, PS, and sex predict ESE. Overall, I examined factors related to the salient attitudes, beliefs, and perceptions that emerged during what Henscheid (2008) described as a "critical transition point" (p. 79, para. 1) in the path of human development, and that ultimately serve to sustain health and subjective well-being in postgraduation life.

Background

As well-documented constructs in the extant literature, ESE, DO, and PS have relevance to the young adult population given the significance of health competencies, outcome expectancies, and psychosocial stress appraisal during adaptation to adulthood. In college students, ESE has been positively correlated to exercise frequency (Hutchins, Drolet, & Ogletree, 2010), with additional evidence linking exercise-induced stress reduction (Scotti, Joseph, Haines, Lanham, & Jacoby, 2008) and enhanced subjective well-being (Edwards, 2006) to improved academic performance and adaptive career choice making. Similarly, Bui, Kemp, and Howlett (2011) observed the mediative influence of ESE on health consciousness and general prohealth decision-making.

With regard to the behavior change process, Leenders, Silver, White, Buckworth, and Sherman (2002) observed the differential impacts of physical activity levels on ESE, with one-third of college students failing to participate in vigorous exercise 3 or more days per week. Such findings were later corroborated in a study conducted by Keating et al. (2009), with evidence revealing markedly higher ESE in frequent versus infrequent exercisers—findings that are suggestive of competence as a predictor of behavioral maintenance. Similarly, Choi (2005) noted the predictive utility of self-efficacy and self-concept in college academic performance. Further, findings reported by Sidman et al. (2009) revealed ESE to be significantly predictive of the emotional, intellectual, physical, and spiritual correlates of DO, further underscoring the presumed mind-body link between DO and ESE.

Given the well-established association between self-efficacy and optimism (Li & Wu, 2008), competency beliefs, perceived controllability, and challenge appraisals have

presumed linkages to health decision-making outcomes. In a meta-analysis conducted by Rasmussen, Scheier, and Greenhouse (2009) that was designed to examine the association between physical health attributes and DO, results showed DO to have predictive utility for mortality, survival, and cardiovascular health. Similarly, Posadzki, Stockl, Musonda, and Tsouroufli (2010) purported that ESE and DO are fundamental to nurturing positive health attitudes and behaviors.

Further, DO has been shown to differentially impact college students across the cultural divide. In a cross-cultural study that evaluated DO in American and Jordanian college students, Khallad (2010) found DO to be higher in American versus Jordanian students. Similarly, Cardinal, Tuominen, and Rintala (2004) observed higher self-reported barrier efficacy to physical activity level in American students than Finnish students, with marked intergroup differences observed in exercise behavior, decisional balance, self-efficacy, and the temptation to decrease exercise frequency.

Finally, the insidious impact of psychological stress on chronic illness (Haque et al., 2011), mental status (Lincoln, Peter, Schafer, & Moritz, 2009), student retention rates (Robotham & Julian, 2006), and academic achievement (Murff, 2005) has implications for student quality of life. Similarly, emancipation from parents, during the college years, can induce stress-related impacts on personal organization and financial independence (Hicks & Heastlie, 2008). In addition, social interaction, self-concept, and stress sensitivity have been linked to the factors that support successful assimilation into the college milieu (Friedlander, Reid, Shupak, & Cribbie, 2007). With research conducted by Krypel and Henderson-King (2010) revealing linkages between optimism, coping style,

and perceived stress, the need to adhere to academic standards (Baer, 2011), establish adaptive social interactions (Lopez, Fons-Scheyd, Morúa, & Chaliman, 2006), and establish a social identity (Fischer & Mccown, 2007) reflect preeminent psychosocial stressors for students as they progress through the college experience.

The aforementioned points provided the impetus for me to examine the impact of current physical activity level on ESE, DO, and PS; whether relationships exist between ESE, DO, and PS; and whether DO, PS, and sex predict ESE for college seniors. These inquiries not only underscore the importance of examining the beliefs, values, and attitudes of college seniors, but in how such ideals serve to promote adaptive perceptions and behaviors that have generalizability to health and well-being across the life span.

Problem Statement

Given the transitional nature of young adulthood, the fact that most United States college students fail to engage in recommended levels of physical activity (ACHA, 2008) illuminates a biopsychosocially complex health problem. As reflected in current college health epidemiology research, approximately 60% of all college students neglect to engage in moderate to vigorous levels of physical activity on a minimum of 3 days per week (ACHA, 2008; USDHHS, 2008)—findings that have implications for the competency and mastery skills that underpin ESE. In addition, optimism has been inextricably linked to the health behavior (Dosedlova, Klimusova, Slovackova, & Kebza, 2011), academic performance (Bressler, Bressler, & Bressler, 2010), and stress coping style (Krypel & Henderson-King, 2010) of college students—findings that have implications for the controllability perceptions that underpin DO.

Further, the challenges of resource limitations (Yang & Gysbers, 2007), financial burden (Rothstein & Rouse, 2011), career uncertainty (Tien et al., 2005), job market instability (Kahn, 2007), and identity confusion (Barnett et al., 2001) experienced by young adults could presumably influence coping appraisal skills and stress regulation capacities during the pregraduation period—a view that has implications for the impact of PS in the lives of college seniors. Here, the range of maladaptive psychosocial coping responses employed by first-year college students (see Jeong, Mallinckrodt, Baldwin, & Brandt, 2011; Read, Colder, Merrill et al., 2012; Read, Wardell, Vermont et al., 2012) and the cumulative impact of poor health choices over the span of the college years (Emmons, 2007) have deleterious implications for future health and well-being.

With significant disparities in college-age exercise motivation existing between the sexes (see Carroll & Lanza, 2010; Egli, Bland, Melton, & Czech, 2011; Kilpatrick, Hebert, & Bartholomew, 2005)—specifically, that males and females express differential barrier perceptions, behavior change capacities, and general reasons for their choice to engage or not engage in exercise—there is an ever-expanding body of evidence that elucidates exercise behavior to be dramatically influenced by mastery competencies (i.e., ESE), outcome expectancies (i.e., DO), and appraisal perceptions (i.e., PS). While researchers highlight the relevance of ESE, DO, and PS in the general college setting, there are gaps in the literature regarding how the variables of interest specifically correspond to the unique self-perceptions held during the final year of college. As such, these gaps guided my inquiry on whether college seniors (a) experience a sense of competence about their ability to engage in and maintain sustained patterns of exercise

behavior, (b) negotiate future outcome expectancies, and (c) engender adaptive stress appraisals while on the verge of a significant life transition.

In summary, I undertook three primary objectives in the current study: (a) to examine the impact of current physical activity level on ESE, DO, and PS; (b) to examine whether relationships exist between ESE, DO, and PS; and (c) to examine whether DO, PS, and sex have predictive utility for ESE. While researchers have extensively documented the emergent biopsychosocial factors related to college entry (see Economos, Hildebrandt, & Hyatt, 2008; Kasparek, Corwin, Valois, Sargent, & Morris, 2008), in the current study, I highlighted the extent to which health competencies, outcome expectancies, and coping appraisals were not only integral to the mediation of senior-year challenges, but promoted an ideological basis for the adoption of prohealth lifestyles in later adulthood.

Purpose of the Study

The purpose of the current study was to quantitatively investigate the factors that underlie the documented lack of engagement in physical exercise observed across the college populace (ACHA, 2008) and their implications during the final stage of the college experience. First, I evaluated differences in ESE, DO, and PS in relation to current physical activity level—a critical inquiry given the combined prevalence of health inattention and psychosocial stress experienced by college students nationwide (see ACHA, 2008; USDHHS, 2008; Welle & Graf, 2011). Secondly, I sought to confirm the strength, direction, and significance of the relationships between ESE, DO, and PS. Finally, I investigated whether DO, PS, and sex have predictive utility for ESE. For

college seniors, the presumed value of health self-efficacy (Jackson, Tucker, & Herman, 2007), the benefits of positive outcome expectancies (Bruininks, Crowell, & Howington, 2006), and the impact of adaptive stress perception on global well-being (Moeini et al., 2008) had significant implications for the postgraduation transition and beyond.

Theoretical Framework

In this study, I aligned three well-documented psychological theories that served to establish a central theoretical model (Garrin, 2013). In an effort to examine the impact of self-efficacy on health behavior choices, self-efficacy theory (SET; Bandura, 1997) highlighted the linkages between competence, mastery, and exercise adherence. In addition, attribution theory (ATT; Weiner, 1974, 1986) elucidated how perceptions of perceived stability, locus of control, and controllability mediate outcome expectancies. Further, cognitive appraisal theory (CAT; Lazarus, 1991) was used to explain the factors that influence the adoption of approach versus avoidance coping styles. As such, these theories constituted a triadic model for examining the health behaviors of college seniors.

In addition, I referenced various secondary theories in support of the applicability of SET, ATT, and CAT to the current research hypotheses. Self-determination theory (Deci & Ryan, 1985, 2000) corresponded to how intrinsic traits (i.e., competence, autonomy, and relatedness) underpin ESE and physical activity level. Social learning theory (see Bandura, 1977; Miller & Dollard, 1941), social cognitive theory (Bandura, 1985), and social comparison theory (Festinger, 1954) corresponded to the impact of social experience on perception and learned behavior. Further, the theory of planned behavior (Azjen, 1991) highlighted the gaps between intention and behavior, whereas

constructs such as self-validation (Horcajo, Petty, & Briñol, 2010) and cognitive dissonance (Festinger, 1957) reflected the respective influence of social observation and internal conflict states on health belief formation.

In conjunction with these primary and secondary theories, I employed the transtheoretical model of behavior change (TTM; Prochaska & DiClemente, 1983) to assess the impact of current physical activity level on ESE, DO, and PS. Finally, I frequently cite references to the biopsychosocial model (Engel, 1977) throughout this document to guide discussion on the physiological, cognitive, affective, and contextual factors associated with ESE, DO, and PS as they correspond to the lives of college seniors.

Theoretical Synthesis

To most effectively investigate the psychosocial phenomena that underpin the variables of interest, SET, ATT, and CAT comprised the central framework for the current study. The applicability of these theories to the current lines of inquiry was evinced in how competencies, expectancies, and appraisals explained the differences, associations, and predictions that drove the three respective research hypotheses. As a theoretical framework, the alignment of SET, ATT, and CAT represents a synergistic constellation of perceptions, attitudes, and beliefs (Garrin, 2013)—a triadic framework that supported inquiries into the health beliefs, outcome expectancies, and stress perceptions of college seniors, and their potential implications for postcollege health and well-being.

Research Questions and Hypotheses

To optimally investigate the current lines of inquiry, I posed nine research questions that highlighted the relevance of ESE, DO, and PS in the lives of college seniors:

RQ1: Do mean exercise self-efficacy scores significantly differ by physical activity level in college seniors?

$H_0$1: There are no significant mean differences in exercise self-efficacy scores by physical activity level in college seniors.

$H_1$1: There are significant mean differences in exercise self-efficacy scores by physical activity level in college seniors.

RQ2: Do mean dispositional optimism scores significantly differ by physical activity level in college seniors?

$H_0$2: There are no significant mean differences in dispositional optimism scores by physical activity level in college seniors.

$H_1$2: There are significant mean differences in dispositional optimism scores by physical activity level in college seniors.

RQ3: Do mean perceived stress scores significantly differ by physical activity level in college seniors?

$H_0$3: There are no significant mean differences in perceived stress scores by physical activity level in college seniors.

$H_1$3: There are significant mean differences in perceived stress scores by physical activity level in college seniors.

RQ4: Is there a statistically significant relationship between mean exercise self-efficacy and dispositional optimism scores in college seniors?

$H_0$4: There is no statistically significant relationship between mean exercise self-efficacy and dispositional optimism scores in college seniors.

$H_1$4: There is a statistically significant relationship between mean exercise self-efficacy and dispositional optimism scores in college seniors.

RQ5: Is there a statistically significant relationship between mean dispositional optimism and perceived stress scores in college seniors?

$H_0$5: There is no statistically significant relationship between mean dispositional optimism and perceived stress scores in college seniors.

$H_1$5: There is a statistically significant relationship between mean dispositional optimism and perceived stress scores in college seniors.

RQ6: Is there a statistically significant relationship between mean exercise self-efficacy and perceived stress scores in college seniors?

$H_0$6: There is no statistically significant relationship between mean exercise self-efficacy and perceived stress scores in college seniors.

$H_1$6: There is a statistically significant relationship between mean exercise self-efficacy and perceived stress scores in college seniors.

RQ7: Do dispositional optimism scores predict exercise self-efficacy scores while controlling for perceived stress scores and sex in college seniors?

$H_0$7: Dispositional optimism scores do not predict exercise self-efficacy scores while controlling for perceived stress scores and sex in college seniors.

$H_1$7: Dispositional optimism scores predict exercise self-efficacy scores while controlling for perceived stress scores and sex in college seniors.

RQ8: Do perceived stress scores predict exercise self-efficacy scores while controlling for dispositional optimism scores and sex in college seniors?

$H_0$8: Perceived stress scores do not predict exercise self-efficacy scores while controlling for dispositional optimism scores and sex in college seniors.

$H_1$8: Perceived stress scores predict exercise self-efficacy scores while controlling for dispositional optimism scores and sex in college seniors.

RQ9: Does sex predict exercise self-efficacy scores while controlling for dispositional optimism and perceived stress scores in college seniors?

$H_0$9: Sex does not predict exercise self-efficacy scores while controlling for dispositional optimism and perceived stress scores in college seniors.

$H_1$9: Sex predicts exercise self-efficacy scores while controlling for dispositional optimism and perceived stress scores in college seniors.

Nature of the Study

This quantitative study was based on a cross-sectional, descriptive design. I employed a web-based survey method to examine (a) the impact of current physical activity level on ESE, DO, and PS; (b) whether relationships exist between ESE, DO, and PS; and (c) whether DO, PS, and sex have predictive utility for ESE. Participants completed a sociodemographic questionnaire (SDQ; Garrin, 2012) that gathered data specific to age, sex, ethnicity, student status, athletic status, residential placement, and major area of study. In the current study, the Stage of Exercise Change Questionnaire

(SECQ; Marcus, Selby, Niaura, & Rossi, 1992; Norman, Benisovich, Nigg, & Rossi, 1998) measured current level of physical activity, the Barrier Self-Efficacy Scale (BARSE; McAuley, 1992) measured ESE, the revised Life Orientation Test (LOT-R; Scheier, Carver, & Bridges, 1994) measured DO, and the 10-item Perceived Stress Scale (PSS-10; Cohen & Williamson, 1988) measured PS.

In addition, I collected data via a web link that facilitated web survey accessibility for all participants. Data analysis was conducted via SPSS Statistics Standard version 21.0 (International Business Machines [IBM], 2013) via three primary statistical analyses: a one-way between-groups analysis of variance (ANOVA) to compare mean differences in ESE, DO, and PS by current physical activity level; multiple bivariate correlation analyses to evaluate strength, direction, and significance of relationships between ESE, DO, and PS; and standard multiple regression modeling that tested whether DO, PS, and sex have predictive utility for ESE.

Definitions

College senior: A college senior was defined as a matriculated, fourth-year student at the time of survey participation. By adhering to this definition, control was exercised over factors related to the perceptions, beliefs, and attitudes inherent to the pregraduation period.

Current level of physical activity: The precontemplation, contemplation, preparation, action, and maintenance stages of the TTM (Prochaska & DiClemente, 1983) represented the discrete physical activity levels reported by participants. The specific stages of the TMM are explained in comprehensive detail in Chapter 2.

Dispositional optimism: Unlike situational (i.e., contextual) optimism, dispositional optimism is stable, trait-specific, and guided by a sense of personal agency (Snyder, 1994). Such traits have been shown to promote the generalized expectancy of positive versus negative outcomes across various life domains (Carver & Scheier, 1981; Gallagher & Lopez, 2009) and a hopeful attitude (Vaughn, 2000).

Exercise self-efficacy: Bandura (1997) described self-efficacy as the perceived competence to adhere to the behaviors that promote goal attainment. As such, exercise self-efficacy reflects the level of confidence that individuals experience in their ability to engage in exercise—despite the existence of various barriers to adherence (Fletcher & Banasik, 2001).

Perceived stress: Lazarus (1991) described stress perception as the cognitive interpretation of the stress stimulus. Such assessments allow individuals to evaluate the emotional impact of the stressor, which results in a positive or negative stress response (Lazarus, 1991). Therefore, the capacity for individuals to make accurate judgments about stressors can significantly impact the perceived manageability of the stressor (Smith & Kirby, 2000).

Assumptions

Current research on college exercise behavior reflects a general lack of regard for physical fitness. Given the physical activity benchmark established by the American College of Sports Medicine (ACSM, 2000) of 30 minutes per session on 4 to 7 days per week, Deng, Castelli, Castro-Pinero, and Guan (2011) asserted that such recommendations are adhered to by only one-third of all university-level students. As

such, the failure of college students to engage in recommended levels of physical activity evokes two plausible assumptions about health behavior in the college domain: a) context-specific psychosocial barriers preclude the ability of students to attend to their health needs and b) deficits in exercise motivation is the result of a failure to adopt exercise behavior as a prohealth value.

In addition, Digdon and Howell (2008) purported that college students who have a propensity toward eveningness are more apt to experience self-regulatory challenges (e.g., discipline, procrastination) than those who are morning-oriented—findings that perhaps highlight the intersection between sleep cycle, scheduling, productivity, and resultant stress. Further, evidence shows that a confluence of perceptual factors related to fear, anxiety, and an evolving self-concept challenge identity formation during young adulthood (Barnett et al., 2001). Such findings support the general assumption that factors associated with identity formation can potentially (a) inhibit prohealth behavior, (b) challenge optimism, and (c) induce stress.

With regard to the social cognitive foundations that underpin ESE, Bandura (1977, 1986) suggested that individuals learn through direct observation; therefore, it was assumed that ESE is impacted by peer influence. However, despite the educational value of social observation, learning does not necessarily result in behavior change (Bandura, 1977, 1986). Given the idea that behavior must be continually reinforced in order to achieve adequate levels of conditioning (Bandura, 1969), it was assumed that exercise behavior must be routinized in order to experience resultant self-efficacy.

Despite the physiological benefits of structured diet and routine exercise (Kreider et al., 2011), a fundamental assumption of the current study was underpinned by the timeworn nature versus nurture argument. While many individuals make concerted efforts to monitor diet and engage in routine exercise, many other individuals are perhaps physically fit regardless of overt attempts to maintain physical fitness. Here, routine exercise engagement may not be viewed as essential to health maintenance; such individuals may attribute their good physical condition to heritability factors. Similarly, while a percentage of students may have been exposed to prohealth environments throughout their development, physical exercise might represent an unfamiliar concept for many others. This disparity underscores the assumption that some individuals expediently adopt prohealth behavior, while others endure a series of progressions and regressions across the behavior change continuum (Prochaska, DiClemente, & Norcross, 1992).

Similar to other aspects of cognitive functioning, it was additionally assumed that stress could play a mediative role in exercise adherence. In his discussion on the determinants of self-efficacy, Bandura (1993) maintained the idea that a triad of personal, contextual, and behavioral factors can significantly influence self-efficacy perceptions and, presumably, exercise motivation for students. Given Bandura's (1993) position on social cognition, it was assumed that mastery perception, social supports, and the extent to which exercise behavior is routinized could dramatically impact ESE in college students.

Scope and Delimitations

From a macro perspective, sedentarism, obesity, and weight-related health issues are of increasing epidemiological concern, with current statistics revealing the upward trajectory of global obesity (World Health Organization [WHO], 2013). When the focus is narrowed to college seniors who experience the mounting pressures inherent to the final year of university life, feeling self-efficacious about the ability to adhere to good health practices becomes increasingly important for purposes of subjective well-being and quality of life. Given the idea that health priorities change with advancing age (Chao, Foy, & Farmer, 2000), the adoption of prohealth behavior during the college years could indoctrinate the prohealth attitudes and values that have significance through the later stages of development—a view that fundamentally contributed to my rationale for the current study.

Further, there perhaps exists a significant potential for constructs such as ESE, DO, and PS to be generalized beyond the college milieu to the greater population, with applicability to subsequent phases of development that punctuate the life span. Arnett's (2000) assertion that emerging adulthood represents a period of identity exploration and discovery suggests that young adults in general—both college students and individuals who chose nonacademic pursuits—may possibly experience similar developmental challenges related to self-esteem, self-concept, and identity formation. In this respect, it may be the biopsychosocial point in maturation—not necessarily the educational or vocational pursuit—that underpins such challenges. However, idiosyncratic attributes associated with the young adult stage of human development could have been reflected in

the attitudes, beliefs, and perceptions that emerged in survey responses, thus limiting the generalizability of findings to the greater populace.

Limitations

There were several potential limitations to research outcomes in the current study. First, I did not design the current study to control for extraneous confounds such as amotivation and health inattentiveness that could potentially lead to low ESE in otherwise optimistic individuals. In addition, Brisswalter, Collardeau, and René (2002) found physical activity to be associated with enhanced psychological functioning in some individuals; however, the idea that exercise represents only one prohealth and stress management modality in an increasingly vast array of health and wellness options suggests that exercise may not be the prohealth option of choice for specific participants.

In the current study, an additional concern pertained to the timing of the survey. Given the impossibility of determining the duration of the data collection phase, and the possibility of data collection spanning multiple semesters, fluctuations in student attendance (i.e., participant availability) could impact participant response. In addition, it was plausible that some students may experience differential tendencies to respond to surveys during periods of higher or lower student matriculation. In addition, academic factors (i.e., exams and pregraduation responsibilities) could mediate the time of response; similarly, weather could have an extraneous impact on self-perceptions related to ESE, DO, and PS. The aforementioned factors could potentially impact response rate, response bias, and, thus, the validity of findings.

The use of a web-based survey design reflected another potential limitation of the current study. In college health behavior research, web-based surveys have demonstrated proven efficacy as viable data collection modalities across various lines of inquiry, including but not limited to studies that examined alcohol consumption (White, Jamieson-Drake, & Swartzwelder, 2002), smoking behavior (D'Abundo, Marinaro, & Fiala, 2009; Morrell, Cohen, Bacchi, & West, 2005), and HIV testing intentions (Hou & Wisenbaker, 2005). However, the differences in response rates and participant satisfaction between web and paper surveys are well-documented (Carini, Hayek, Kuh, Kennedy, & Ouimet, 2003; Porter & Whitcomb, 2007). Similarly, Dillman (2000) noted several limitations of online surveys, including but not limited to the consistent visual presentation of the survey across all system platforms and the idea that the choice of non-response might be made more expediently than with paper survey respondents.

In the current study, I measured subjective perceptions (e.g., individual beliefs) about health self-efficacy, outcome expectancies, and psychosocial stressors—not observable, quantifiable measures of real outcomes. Therefore, it was necessary to proceed with caution when considering the myriad psychosocial factors that could potentially mediate participant perceptions. Lastly, while the extant literature reveals adequate levels of reliability and validity for the various measures employed in the current study, it is unknown whether the variables of interest contained covert attributes that emerged within the context of survey responses; if so, the measures could have failed to capture the characteristics that were intended for analysis. While all of these factors have relevance to the integrity of the current research, the perceptual lens through which

college seniors make discerning choices is perhaps mediated by the many challenges associated with the final culmination of the college experience.

Significance of the Study

The overarching importance of maintaining an active, prohealth lifestyle is evinced in current worldwide epidemiology statistics that reflect the staggering prevalence of disease chronicity and co-morbid health conditions (WHO, 2013). The extent to which individuals routinely engage in physical activity has global implications in their ability to adapt, survive, and thrive across the life span. For college seniors, daily life stressors—from academic performance to preoccupation about employment prospects—can impact perceived controllability over exercise adherence. With a three-fold increase in the global obesity prevalence observed over the past quarter century (WHO, 2013), the proposed linkages between health self-efficacy, outcome expectancies, stress perception, and physical activity elucidate a biopsychosocial interconnectivity—further bridging the mind-body gap.

The significance of sedentarism in the college environment has fundamental implications for the health beliefs of college students. Given the idea that perceived susceptibility to health risks mediate prohealth behavior (Rosenstock et al., 1988), flawed perceptions of health risk susceptibility might underpin the lack of exigent attention to physical exercise and related health behaviors. Similarly, the perceived severity and potential consequences of health risks play an integral role in health behavior (Rosenstock et al., 1988), findings corroborated by Courneya and Hellsten (2001) who

observed a direct relationship between perceived severity and response efficacy for health risks in college students.

While constructs such as ESE, DO, and PS are by no means unique to college seniors, they perhaps adopt a unique significance given the intersection between intention and behavior. The perceived barriers to prohealth behavior are often impacted by perceived self-efficacy, response efficacy, control, and threat (Rippetoe & Rogers, 1987; Rosenstock et al., 1988). Similarly, the perceived benefits of prohealth behavior are often mediated by social psychological experience (Rosenstock et al., 1988). Deshpande, Basil, and Basil (2009) maintained that while dietary preferences emerge in the early stages of development when under parental supervision, the sense of autonomy and independence associated with college life could impede prohealth behaviors. These points underscore the critical need to acknowledge the myriad factors that inhibit the prohealth intentions and, ultimately, behavioral outcomes in college seniors.

Further, the choice of college students to engage in prohealth behavior may involve a cost-benefit analysis. In their study that assessed the perceived benefits and barriers to exercise in undergraduate students (n = 147), Grubbs and Carter (2002) observed exercise benefits to be most frequently correlated to physical appearance and physical performance needs; barriers were most frequently correlated to concerns surrounding energy exertion and scheduling. When applying this research to the senior year of college, such findings have significant implications perceptions of prioritization and self-responsibility. Interpolating Maslow (1954; 1970), if the basic needs of students are being met, self-actualizing endeavors such as health self-efficacy may or may not be

perceived as a priority. Despite the idea that individuals possess the ability to choose and ultimately assume the consequences of their behaviors (Rogers, 1961), perception is presumed to dynamically reinforce the behaviors exhibited by college seniors.

Given the transformative potential for college seniors to act as educators, reformers, and innovators, the lines of inquiry examined in the current study reflect potential precursors for positive social change agency. From a health education perspective, individuals who possess high ESE presumably possess the competency and mastery skills that underpin leadership orientations. In addition, individuals who posses high DO might experience the level of perceived controllability that drives approach orientations to challenge—enabling such individuals to become advocacy resources, coalition developers, and effetcive facilitators of change objectives. Finally, individuals who engender adaptive stress appraisals may be inspired by perceived challenge; more motivated to seek, rather than avoid, social change initiatives; and more apt to see objectives through to fruition. The conceptual intersection of ESE, DO, and PS is not only reflective of the biopsychosocial challenges experienced during the young adult stage of human development, but exemplifies how such challenges serve to reinforce prohealth values, outcome expectancies, and adaptive appraisals far beyond graduation.

Summary

As observed in the previous chapter sections, college seniors stand at what could be described as a metaphorical crossroads—a developmental stage punctuated by the need to balance biological, cognitive, and affective health despite exposure to novel psychosocial stress (Welle & Graf, 2011). Given the inherent challenges in this stage of

development, evidence shows that future vocational concerns reflect only one of many preoccupations experienced by college seniors (Taub, Servaty-Seib, & Cousins, 2006) during a time when maladaptive health perceptions (Bylund et al., 2005), career indecision (Tien et al., 2005), spiritual exploration (Fisler et al., 2009), and role identity confusion (Barnett et al., 2001) prevail.

As senior-year events challenge the capacity of students to maintain good health, maintain optimistic dispositions, and employ adaptive coping responses to psychosocial stress, it stands to reason that health competencies, outcome expectancies, and adaptive stress perceptions could be significantly impacted. While the precarious developmental intersection encountered by college seniors underscores the significance of the research problem, the adoption of good health practices could potentially influence the extent to which students (a) feel efficacious about exercise abilities, (b) are optimistic about future outcomes, and (c) are able to regulate stress perceptions. In the current study, the aforementioned perspectives warranted an examination of the variables of interest as they related to the final year of college life.

Chapter 2 provides an in-depth view on the relevance of ESE, DO, and PS to the lives of college seniors. First, an inquiry into the theoretical foundations of self-efficacy (Bandura, 1997), attribution (Weiner, 1974, 1986), and cognitive appraisal (Lazarus, 1991) elucidates how the variables of interest manifest in the behaviors of college seniors. In addition, the inclusion of various secondary theories supports the relevance of social cognition (Bandura, 1977, 1985), behavioral intention (Azjen, 1991), social comparison (Festinger, 1954), self-validation (Horcajo, Petty, & Briñol, 2010), and

cognitive dissonance (Festinger, 1957) to the health motivation and behavioral choices of college students. Subsequently, I apply the transtheoretical model of behavior change (TTM; Prochaska & DiClemente, 1983) to explain the barriers and facilitators that mediate current level of physical activity. Finally, Chapter 2 concludes with an exhaustive review of the literature as it relates to the multidimensional impact of ESE, DO, and PS on the lives of college seniors, with implications for health and wellness beyond the walls of academia.

In Chapter 3, I provide the rationale and methodological design for the current study, including a detailed overview of the population under analysis, sampling procedures, and processes specific to recruitment, data collection, power analysis, and the operationalization of constructs. Further, I examine potential threats to external, internal, and construct validity, and the implications for the future replication of the current findings. Finally, I discuss ethical considerations, measures taken to prevent ethical conflict within the current study, and the critical importance of safeguarding participants from undue harm.

In Chapter 4, I provide comprehensive detail on descriptive statistics, scale reliability for the psychometric instruments employed in the current research, and the statistical analyses that yielded the current findings. In Chapter 5, I provide an overarching summary of the current study, including an analysis and interpretation of the findings, an overview of the limitations that impacted the findings, recommendations for future research, and a discussion that highlights how the results of the current study could

have far-reaching social change implications for a population on the verge of significant transition.

Chapter 2: Literature Review

The fact that most college students in the United States neglect to exercise in accordance with recommended levels of physical activity (see ACHA, 2008; USDHHS, 2008) reflects an increasingly complex health problem among young adults. Despite new and effective advancements in progressive, technology-based exercise modalities geared toward the young adult population (see Magoc, Tomaka, & Bridges-Arzaga, 2011; Warburton et al., 2007), two-thirds of students fail to partake in routine, moderate-to-vigorous physical exercise on at least three days per week (ACHA, 2008). In addition, nearly one-quarter of exercising students fail to reach the moderate-intensity exercise threshold (Egli et al., 2011).

With the gross lack of physical inactivity observed across the American adult populace reaching epidemic proportions (Chakravarthy & Booth, 2004), such statistics invoke fundamentally important questions that underscored the objectives of this study: (a) to examine current physical activity level impacts ESE, DO, and PS; (b) to examine whether relationships exist between ESE, DO, and PS; and (c) to examine whether DO, PS, and sex have predictive utility for ESE in college seniors. With a significant percentage of the current literature reflecting the overarching, positive impact of exercise on global well-being across various populations (see Abbas, Abbasi, Vahidi, Najafipoor, & Farshi, 2011; Kelley, Kelley, Hootman, & Jones, 2010; Norman, Sherburn, Osborne, & Galea, 2010; Windle, Hughes, Linck, Russell, & Woods, 2010), I conducted the current study to examine the relevance of health competencies, future outcome expectancies, and stress perceptions through the worldview of college seniors.

In the following chapter, I provide an overview of the search strategy employed in the review of the extant literature. In addition, I highlight the theoretical framework associated with the variables of interest. Further, I offer an exhaustive literature review of the body of evidence for ESE, DO, PS and relevant constructs. Finally, I conclude the chapter with an overview of the various gaps in the literature related to the variables of interest, emphasizing the critical nature of such research to the global well-being of college seniors.

Literature Search Strategy

In this review, I employed a comprehensive literature search strategy by choosing filters that exclusively selected peer-reviewed journals, books, and government documents derived from multiple databases—primarily Education Research Complete, Education Resources Information Center (ERIC), PsycARTICLES, PsycBOOKS, PsycEXTRA, PsycINFO, and SOCIndex. As encouraged by Harvard (2007), the peer-reviewed articles referenced in this study were empirical journal articles that published controlled trials, systematic reviews, and meta-analyses. Key terms that I employed in this search were *barriers, college, dispositional optimism, exercise, health beliefs, physical activity, self-efficacy, senior, stage of change, stress, student, transtheoretical model*, and *university*. In addition, government agencies such as the World Health Organization were cited for the use of global and domestic epidemiological statistics.

In addition, I used a date range of 2003-2013 to select empirical literature—a strategy that yielded an array of population parameters (e.g., sample sizes, effect sizes, statistical power, analysis type) that provided scientific breadth to the current study. In

addition, search parameters that dated back to the early to mid 20th century were typically employed to gather material associated with theoretical perspectives—a strategy that provided a historical timetable for connecting specific theories to the variables of interest.

Theoretical Framework

In the following theoretical review, I highlight the triadic framework employed in the current study: SET (Bandura, 1997), ATT (Weiner, 1986, 1992), and CAT (Lazarus, 1991). In addition, several secondary theories were cited to emphasize the relevance of SET, ATT, and CAT in explaining the beliefs, attitudes, and perceptions that influence health behavior in college seniors.

Self-Efficacy Theory (SET)

Advancing the early social learning work of Miller and Dollard (1941), Bandura (1997) established SET in an effort to examine the factors that mediated behavioral competency and mastery. A fundamental implication in this research was the idea that some individuals exhibited a greater potential for the adoption of specific behaviors than others (Bandura, 1997), with health beliefs (Rosenstock et al., 1988), planning behavior (Luszczynska, Schwarzer, Lippke, & Mazurkiewicz, 2011), and self-concept (Hughes, Galbraith, & White, 2011) cited as the primary determinants of behavioral self-efficacy. For college students, current evidence shows general self-efficacy to be significantly mediated by sociocultural factors (see Aguayo, Herman, Ojeda, & Flores, 2011; Cho, So, & Lee, 2009), parental influence (Brittian, Sanchez, & Sy, 2006), and adjustment (Chemers, Hu, & Garcia, 2001), and is closely linked to goal orientation (Hsieh, Sullivan, & Guerra, 2007). Given the presumed biopsychosocial changes that occur during the

freshman-to-senior year progression, responsivity to the aforementioned factors presumably changes throughout the course of development.

Given self-efficacy beliefs as a mechanism for the development of skill competencies, Bandura (1997) asserted that a lack of confidence might lead one to avoid task demands and, as a result, impose self-limitations on skill acquisition. As such, Bandura (1997) argued that direct observation in the social context might mediate the confidence to approach and ultimately master specific tasks. Similarly, evidence reveals that self-protective behaviors (e.g., self-handicapping) serve to safeguard perceptions of self-efficacy (Martin & Brawley, 2002). Bandura (1995, 1997) maintained that (a) self-regulation is critical to the adoption of prohealth behavior and (b) self-efficacy is underpinned by fundamental social cognitive and social learning attributes. For college students, health self-efficacy is presumably mediated by social norms, peer modeling, risk perceptions, and the perceived competency to master prohealth behaviors.

Attribution Theory (ATT)

As Bandura (1997) noted the various factors that mediate self-efficacy, equally noteworthy are the variables that influence the perceived causality of behavior. In his mid-20th century research on causal attribution, Heider (1944) postulated the idea that the intentions, sentiments, and motives of human behavior are caused by forces that are either within (i.e., internal) or beyond (i.e., external) the immediate control of individuals. Such a concept was extended by Rotter's (1954, 1966) early social learning research on locus of control—defined as the internalized or externalized perceptions of behavioral control.

Heider (1958) purported that humans are innately inclined to explain the reason for specific actions as a means of validating behavior; from a social psychological perspective, people tend to externalize—not internalize—causal explanations for their actions (Heider, 1958). Given the presumed role of locus of control in behavioral self-efficacy, it is perhaps prudent to consider whether college students causally attribute their health behavior to external influences (e.g., parents, peers, institution) or hold themselves personally accountable for their health choices.

Advancing the early work of Heider, Weiner established ATT (1974, 1986), which suggested that degree of stability, locus of control, and the perceived controllability over behavioral outcomes significantly influences the willingness to exert the effort required to attain goals. First, Weiner (1974, 1986) associated stability with future outcome expectancies; for college seniors, questions might pertain to the psychophysiological costs and benefits of engagement in routine exercise—in other words, whether the physical effort exerted during exercise will outweigh the psychological costs of engagement.

In addition, Weiner (1974, 1986) emphasized the influence of beliefs on causal explanations for behavior; for college seniors exposed to pregraduation psychosocial stressors, the perceptions that underpin causal attribution could be significantly skewed. Finally, Weiner (1974, 1986) asserted that perceived controllability over behavior could mediate the level of persistence required for goal attainment and, thus, can have a mediative influence on future outcome expectancies.

Cognitive Appraisal Theory (CAT)

Given the causal role of affect and cognition in stress perception, cognitive appraisal theory (CAT) is based on a two-phase, structural model that highlights the interactivity between stimulus perception and the psychological interpretation of the stressor (Lazarus, 1991). As maintained by Lazarus (1991), primary appraisal reflects the perceived impact of the stressor on personal well-being—underscoring the view that cognition precedes emotion (Lazarus, 1982). During this phase, individuals assess whether the stressor represents a congruent and relevant threat to their goals, needs, or state of general well-being (Smith & Kirby, 2009). By contrast, secondary appraisal represents an assessment of available coping resources that could potentially mediate the impact of stressor (Lazarus, 1991). Here, individuals may establish internalized or externalized perceptions of accountability—that is, a sense of whom or what (e.g., self, others, chance) is causally linked to the stressor (Lazarus, 1991).

Further, secondary appraisal is characterized by the application of problem-focused or emotion-focused coping styles—the tendency to alter the context or the feelings that are causally linked to the stressor, respectively (Smith & Kirby, 2009). Here, the perceived ability to alter the contextual or emotional attributes of the stressor significantly influences the overall appraisal of the stressful stimulus (Smith & Kirby, 2009). For college seniors, such a view is relevant given the factors that presumably mediate perceived control over reducing debt, establishing a career identity, and obtaining postgraduation employment. Early cognitive appraisal research found emotion-focused coping to be prevalent in health-related settings (Folkman & Lazarus, 1980), and showed coping style type to be largely dependent upon (a) the perceived availability of

coping resources and (b) the perceived risks of failing to cope successfully (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986).

Additionally noteworthy in Lazarus' (1991) model are the components of relation, motivation, and cognition. In the relational component, the transactional dynamism between the individual and the environment stimulates the emergence of emotions (Lazarus, 1991). For college seniors, stressors associated with the pregraduation period could catalyze negative arousal states, such as fear and anxiety specific to perceived challenges with finding a job, repaying debt, and establishing a personal and professional identity. Further, the motivational component represents an evaluation of how the stressful circumstance might impact perceived goal attainment abilities (Lazarus, 1991). For college seniors, the stress response may impact perceptions of goal achievability and, subsequently, the motivation required to continue goal pursuits. Finally, the cognitive component reflects the extent to which the stressor has relevance to life goals (Lazarus, 1991). Given the global impact of senior-year stress, students may adopt flawed perceptions of coping resources and, subsequently, a sense of indifference, ambivalence, or general lack of objectivity pertaining to the goal attainment process.

Secondary Theories

Self-determination theory. In the exercise domain, the impact of extrinsic motivation is reflected in the perceived role models, state-of-the-art equipment, and the myriad fitness-oriented media currently in ubiquity. Yet by contrast, exercise motivation can naturally emerge from within an individual (Boyd, Weinmann, & Yin, 2002). For many individuals, engagement in routine physical activity may promote a sense of self-

fulfillment that cannot be achieved via external stimuli. In accordance with this perspective, self-determination theory (see Deci & Ryan, 1985, 2000; Ryan & Deci, 2000) suggests that the motivation to progress toward a goal is dictated by internal, not external, drives.

Fundamentally, self-determination theory suggests that competence, relatedness, and autonomy needs must be satisfied in order to attain goals and optimize self-fulfillment potentials (see Deci, 1975; Edmunds, Ntoumanis, & Duda, 2006; Ryan & Deci, 2000). Evidence shows that individuals who routinely exercise despite the existence of daily life stressors are motivated by self-perceptions related to physical condition, strength, general interest, and enjoyment (Boyd et al., 2002; Puente & Anshel, 2010). The core constructs of self-determination theory are widely evidenced in exercise motivation research, with intrinsic exercise motivation observed to be differentially associated with age, sex, and ethnicity (Egli et al., 2011) and significantly associated with personality attributes (Lewis & Sutton, 2011), exercise identity (Vlachopoulos, Kaperoni, & Moustaka, 2011), and subjective norms (Hagger, Chatzisarantis, & Harris, 2006).

Theory of planned behavior. Given the psychosocial dynamics of the college milieu, it could be argued that behavioral intentions reflect the gap that exists between prohealth attitudes and the adoption of prohealth behavior. Evidence shows that individuals who intend to exercise generally demonstrate greater reliability in their exercise habits than those who lack such intentions (de Bruijn, 2011). As such, the theory of planned behavior (Ajzen, 1991) suggests that behavioral intentions are ultimately predicated on a combination of attitudes, perceived social norms, and perceived control

over the target behavior. Here, Garcia and Mann (2003) purported that social-cognitive models that include self-efficacy or perceived behavioral control as a primary component demonstrated an appreciable capacity for identifying health beliefs and health motivations.

An extension of the theory of reasoned action (see Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the theory of planned behavior highlights the associations between perceived behavioral control, self-efficacy, and outcome expectancies. For individuals, behavioral intentions are significantly influenced by the perceived ability to execute specific actions and the belief that desired outcomes will ultimately prevail (Ajzen, 1991). Such a concept is highly transferrable to exercise behavior in college students for whom exercise intentions may depend upon the perceived social norms and perceived controllability of health outcomes. Therefore, such outcomes may subsequently impact prohealth beliefs, positive outcome expectancies, and the adaptive appraisals of psychosocial stressors.

Social psychological theories. Finally, various social psychological theories elucidate the impact of environment on college health behavior. Bandura (1989) purported that social observation creates a template for adopting, applying, and subsequently modeling the behavior of others. As the basis of social cognitive theory (Bandura, 1989), this perspective stands in stark contrast to self-determination theory, which highlights internal stimuli as the primary mechanism for motivation (Deci & Ryan, 1985, 2000). Annesi (2004) observed a significant relationship between adherence to moderate-vigorous exercise intensity levels and the need for social reinforcement—

findings that have implications for a linkage between exercise adherence challenges and adequate social support. As maintained by Egli et al. (2011), sociodemographic characteristics significantly mediate exercise motivation in college students—highlighting the role of culture and social experience in the adoption and maintenance of prohealth behaviors.

The social microcosm reflected by the college milieu invokes the social comparison perspectives of Festinger (1954), who posited the tendency for humans to engage in a comparison of self to others is driven by an overarching need for self-evaluation. Mack (2003) found exercising college students to be rated significantly more favorably than their non-exercising peers—findings that underscore the presumed role of exercise identity in social modeling and prohealth behavior. By contrast, it might be presumed that interpersonal comparison functions as a driver of the maladaptive social perceptions that influence alcohol consumption (Novak & Crawford, 2001), perceived body image (Engeln-Maddox, R. (2005), social physique issues (McCreary & Saucier, 2007), and eating pathology (Lindner, Hughes, & Fahy, 2008) in college students.

Similarly, self-validation refers to the impact of influential messages—a phenomenon that Horcajo et al. (2010) suggested to be driven by favorable perceptions of the message source. Here, the omnipresence of infomercials and myriad prohealth media exemplifies the marked influence of contemporary health communications on health perceptions across various populations (see Blaine, & McElroy, 2002; Martin, Bhimy, & Agee, 2002; Tan, 2007). Finally, the act of neglecting socially accepted health practices might create an internal conflict between attitudes, beliefs, and actual behavior—

potentially resulting in cognitive dissonance (Festinger, 1957). Here, college seniors may possesses a greater likelihood of experiencing dissonant thoughts and emotions that could have deleterious impacts on the decision making and problem solving processes that promote best outcomes.

Conceptual Model

Transtheoretical Model (TTM)

What Armitage (2009) posited to be "the most dominant model of health behaviour change" (p. 195, abstract), the TTM (Prochaska & DiClemente, 1983) characterizes the adoption of human behavior as a sequential process that is mediated by readiness to transition to a subsequent stage of change. The TTM is characterized by five discrete stages that reflect states of change readiness and that mark the gradual progression toward the wholesale adoption of a target behavior: *precontemplation* (e.g., not yet acknowledging the need to change), *contemplation* (e.g., acknowledging the need for change), *preparation* (e.g., readying for the initiation of change), *action* (e.g., modifying behavior that reflects change), and *maintenance* (e.g., sustaining new, adaptive behavior patterns) (Prochaska & DiClemente, 1983).

Later in the development of the TTM, a sixth stage—*termination*—was established, which referred to the lack of temptation to revert to old behaviors (Prochaska et al., 1992). Yet, despite its common reference as a discrete stage, termination has been more accurately defined as the actual conclusion of the behavior change process (Prochaska et al., 1992). Therefore, only the precontemplation, contemplation,

preparation, action, and maintenance stages of change were employed as units of objective measurement in the current study.

By definition, *stage of change* represents the successive, stepwise series of transitions toward the adoption of a behavior (Prochaska & Velicier, 1997). However, Prochaska et al. (1992) suggested that the stages reflect a "spiral pattern of change" (p. 1104, para. 6) that generally lacks progressive linearity (Martin, Velicer, & Fava, 1996)—a description that implies the idea that progress toward the adoption of new behaviors does not occur without inevitable instances of regression to previous stages. In addition, Prochaska and Velicer (1997) defined change as the result of a progression through the behavior change stages that reflect increasing levels of decisional balance (i.e., costs/benefits of behavior change), self-efficacy (i.e., competence for behavior change), and temptation resistance (i.e., inhibiting of behavioral regression). Progression through the stages has implications for heightened self-awareness and global enhancements in self-concept across the behavior change continuum (Prochaska & Velicer, 1997). For purposes of the current study, stage of change was synonymous with current level of physical activity.

Contained within the aforementioned stages are what Prochaska and Velicer (1997) called processes—psychosocial phenomena such as consciousness raising, environmental reevaluation, self-reevaluation, self-liberation, helping relationships, reinforcement management, and stimulus control. These attributes reflect an ever-increasing awareness of the biopsychosocial costs and benefits of change, and have been shown to possess strong predictive utility as determinants of change in both clinical and

non-clinical domains (Prochaska et al., 1992). In his application of the TTM as a model in addiction treatment, Sutton (2001) observed the integrative utility of the TTM in the interdependence of the stages, processes, decisional balance, self-efficacy, and temptation resistance.

Given the longitudinal impact of health inattention throughout the college years, the often acute nature of senior-year psychosocial stress, and the idea that behavioral readiness is often mediated by interindividual differences (Nigg et al., 2011), it was presumed that some college seniors fluidly progress through the stages of change, while others may experience progressive-regressive behavioral patterning (Prochaska et al., 1992). Therefore, the highly individualized nature of the behavior change process is presumably further compounded by the biopsychosocially tumultuous developmental transition experienced by college seniors.

Literature Review Related to Key Variables

The Multidimensional Impact of Physical Exercise

Contemporary research on the universal impact of physical exercise continues to bridge the psychophysiological gap between mind and body. Current evidence has elucidated the widespread rehabilitative benefits of physical exercise across myriad epidemiological domains, including but not limited to cancer (Kirshbaum, 2007), cardiovascular disease (Hansen, Dendale, van Loon, & Meeusen, 2010), diabetes (Gulve, 2008), multiple sclerosis (Feinstein, 2011), Parkinson's disease (Cruise et al., 2011), and cerebrovascular accidents (Holmgren, Gosman-Hedström, Lindström, & Wester, 2010).

Beyond the well-documented physiological benefits of cardiovascular and resistance exercise (see O'Connor, Rousseau, & Maki, 2004; Oliveira, Galvão, & Rocha, 2008; Rendi, Szabo, Szabó, Velenczei, & Kovács, 2008), physical activity has been shown to positively impact global cognitive functioning (Brisswalter et al., 2002), and has proven to possess both relaxative and restorative properties (Plante, Cage, Clements, & Stover, 2006) that facilitate the slowing of age-related cognitive degeneration (Muscari et al., 2010), and that promote self-concept (Lindwall & Martin-Ginis, 2006), social self-perception (Hart, 2007), and affective responsivity to the exercise experience (Hallgren, Moss, & Gastin, 2010). The ever-increasing popularity of Eastern and holistic exercise modalities such as yoga (Ross & Thomas, 2010), tai chi (Taylor-Piliae, Haskell, Waters, & Froelicher, 2006), and qigong (Johansson, Hassmén, & Jouper, 2011) reflects the emergence of new and progressive pathways in contemporary exercise philosophy.

Given the impact of the exercise stimulus on catecholaminergic activity (see Christophe et al., 2004; Zouhal, Jacob, Delamarche, & Gratas-Delamarche, 2008), historical and contemporary perspectives in exercise research highlight the positive impact of physical activity on the physiological stress response. In early smoking cessation research, Tomkins (1968) observed the impact of increased catecholaminergic activity on affect, with dopamine and norepinephrine activation linked to generalized enhancements in mood, disposition, and emotional perception. In later studies that examined the impact of affective and cognitive messaging on attitude and disposition, evidence showed the appreciable impact of such messages on exercise motivation (Conner, Rhodes, Morris, McEachan, & Lawton, 2011). Thome and Espelage (2004)

noted the meditative role of exercise on the emotional perceptions that are often associated with the young adult stage of development—findings that have clear relevance to the college setting.

Further highlighting the multifunctionality of physical activity (Perna & Monto, 2006), routine exercise engagement has demonstrated efficacy as a viable stress management modality. Given the need for coping strategies designed to counter the cognitive and emotional rigors of daily life, regular exercise has been shown to have ameliorative effects on stress factors such as blood pressure response (Hamer, Taylor, & Steptoe, 2006), situational anxiety (Wipfli, Rethorst, & Landers, 2008), and metabolic dysregulation (Tsatsoulis & Fountoulakis, 2006). Beyond its vital role in energy balance (Loucks, 2004), exercise has been shown to dramatically reduce the psychological cravings, withdrawal symptoms, and negative affect associated with stress-induced cigarette smoking behavior (Taylor, Ussher, & Faulkner, 2007) and alcohol consumption (Brown et al., 2009)—behaviors that are prevalent in the college setting.

Beyond the widely-documented ameliorative effects of exercise on transient stress in the college population (Nguyen-Michel, Unger, Hamilton, & Spruijt-Metz, 2006), additional evidence reveals the positive impact of routine exercise engagement on various psychosocial aspects of the college experience. Research has revealed the appreciable effect of exercise on domains such as grade point average (American College of Sports Medicine [ACSM], 2010), social physique perceptions (Chu, Bushman, & Woodard, 2008), retention rates (Sailors et al., 2010), and the regulation of alcohol consumption (Weinstock, 2010). Despite the link between high psychological distress in college

seniors and low postgraduate decisional self-efficacy (Yang & Gysbers, 2007), the appreciable impact of physical activity on higher-order cognitive functions (see Davis et al., 2011; Eggermont, Milberg, Lipsitz, Scherder, & Leveille, 2009; Hillman, Erickson, & Kramer, 2008; Tomporowski, 2008) underscores the impact of exercise adherence and its implications for optimism and coping abilities.

The potential emergence of eating disorders and body image maladaptations are well-documented phenomena in college health research (see Sides-Moore & Tochkov, 2011; Tozun et al., 2009), and have been linked to potential obesity and overweight issues in later adulthood (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). Evidence reveals routine exercise engagement in college students to be widely impacted by sleep pattern variability (Lund, Reider, Whiting, & Prichard, 2010), psychosocial adjustment (Pritchard, Wilson, & Yamnitz, 2007), and the extent to which physical self-perceptions are sanctified (i.e., the idea of the body as a temple [Mahoney et al., 2005]). Further, current evidence shows that exercise engagement, unlike sports participation, is a health-driven phenomenon (Kilpatrick et al., 2005)—findings that have implications for the critical importance of health education and awareness in the college population.

Current research in the college domain shows that most students lack the academic, financial, and psychosocial preparedness for college (Johnson, 2006). Such evidence leads to questions about the relationship between ill preparedness for the college experience and the health conceptions of college students; specifically, whether students are fundamentally prepared to remain accountable for their own health. Yet perhaps even more critically, research reveals an inverse relationship between academic level and

exercise tendencies, with college freshmen observed to be more likely to exercise than college seniors (Buckworth & Nigg, 2004). While evidence reveals causal linkages between exercise motivation and personality (Rhodes, Courneya, & Jones, 2002), attitude (Rhodes, & Courneya, 2003), and belief systems (Downs & Hausenblas, 2005), such findings underscore the critical importance of adopting exercise behavior as a core ideological value that should perhaps be indoctrinated and continually reinforced from the earliest stages of development.

As millions of individuals encounter challenges in exercise adherence, sedentarism has been identified as a modifiable health risk factor that has been shown to have dramatic negative impacts on health and well being across the lifespan (Warren et al., 2010). Statistics on sedentarism reported in the mid-1990s revealed that over 40% of Americans failed to engage in recommended levels of physical activity (National Center for Health Statistics, 1995; United States Department of Health and Human Services, 1996). These findings increased to 60% before the end of that decade (National Center for Chronic Disease Prevention and Health Promotion, 1999) establishing the basis for the current obesity pandemic that currently affects over one-third of Americans (United States Department of Health and Human Services, 2010). With ever-increasing sedentarism rates and approximately one-half of all new exercisers dropping out of programming within six months of participation (Fallon, Hausenblas, & Nigg, 2005), such findings not only have epidemiological implications, but raise questions about the biopsychosocial factors that underpin readiness for behavior change.

Exercise Self-Efficacy

The extent to which individuals experience general self-efficacy is presumed to have wide-ranging psychosocial impacts across the life span. In the college milieu, self-efficacy has been implicated in goal orientation (Hsieh, Sullivan, & Guerra, 2007), career directedness (Betz & Hackett, 2006), self-esteem (Moore, Mitchell, Bibeau, & Bartholomew, 2011), and overall academic performance (Choi, 2005), with locus of control cited as a primary determinant of the efficacy experience (see Roddenberry & Renk, 2010; Rotter, 1954). For the college student, self-efficacy for regulating alcohol intake (Lee, 2010), accessing health services (Roddenberry & Renk, 2010), and using contraceptives (Tung, Cook, & Lu, 2011) suggests the critical need for internalizing perceived controllability over behavior. For college seniors, the psychosocial stress factors that mediate the ability to make discerning prohealth behavior choices are presumed to play an integral role in the formation of future health behavior patterns.

As suggested by DiBonaventura and Chapman (2008), school, work, and family are psychosocial factors that commonly impede participation in routine exercise and potentially underpin ESE. In addition, Welch, Hulley, and Beauchamp (2010) noted a rebound effect that occurs during prolonged exposure to the exercise stimulus, during which affect and self-efficacy are observed to dramatically decline, and then trend positively. However, evidence shows that the self-efficacy response can be enhanced through formats such as self-monitoring (Anshel & Seipel, 2009). Given the presumed linkages between perfectionist aspirations and self-efficacy, a cross-sectional study conducted by Anshel and Seipel (2006) documented the perfectionist tendencies in

college students who regularly engage in aerobic and resistance training—findings that presumably link ESE to routinized exercise behavior.

Given its role in exercise motivation (McAuley & Blissmer, 2000), Wallace, Buckworth, Kirby, and Sherman (2000) described ESE as a fundamental component of exercise behavior. In addition, a cross-sectional, quasi-experimental study conducted by Sidman, D'Abundo, and Hritz (2009) revealed ESE to significantly predict cognitive, emotional, and physical wellness, but not social wellness. In a discussion on the association between ESE, sex, and sedentarism in college students, Pauline (2010) maintained that while higher exercise frequency and intensity were differentially associated with males and females, males were observed to engage in more frequent sedentary behaviors than females. Similarly, a quasi-experimental study conducted by Hutchins, Drolet, and Ogletree (2010) revealed a moderate positive correlation between exercise behavior and self-efficacy beliefs among male and female college students. Finally, changes in ESE have been shown to reflect in perceptions of personal achievement, vicarious experience, and subjective well-being (Jackson, 2010).

Dispositional Optimism

Given the meditative role of optimism in the susceptibility to diseases such as cancer (Allison, Guichard, Fung, & Gilain, 2003), cardiovascular disease (Giltay, Kamphuis, Kalmijn, Zitman, & Kromhout, 2006), and stroke incidence (Kim, Park, & Peterson, 2011), Mulkana and Hailey (2001) observed DO to be significantly associated with engagement in prohealth attitudes, beliefs, and behaviors, with optimistic

individuals reporting less stress when faced with adverse circumstances than pessimistic individuals (Scheier, Carver, & Bridges, 2001).

However, it should be emphasized that dispositional optimists tend to remain optimistic regardless of the circumstances at hand, whereas situational optimists may view the circumstances with less positivity, be less inclined to endure stressful circumstances, and, thus, abandon goal pursuits (Scheier et al., 2001). Beyond the various biopsychosocial factors that could potentially impact outcome expectancies, the extent to which individuals experience optimism is often contingent upon explanatory style—the manner via which optimistic beliefs are attributed and ultimately justified (Weiner, 1974).

The protective role of optimism in combating general life stress is well-documented in the extant literature. Peterson (2000) described DO as a stable, resilient trait that has been identified as a protective factor against warzone stress in military veterans (Thomas, Britt, Odle-Dusseau, & Bliese, 2011), post-treatment stress resilience in remitting cancer patients (Ah, Kang, & Carpenter, 2007), and in socioeconomically disenfranchised populations (Grote, Bledsoe, Larkin, Lemay, & Brown, 2007). Similarly, pain research conducted by Brenes, Rapp, Rejeski, and Miller (2002) revealed pessimism to be significantly correlated with decreased functionality in walking, lifting, and climbing tasks. In a meta-analysis of 50 studies (n = 11,269) employing various research methods (e.g., quasi-experimental, cross-sectional, prospective) that investigated the influence of DO on emotional coping, Nes and Segerstrom (2006) observed DO to be

significantly associated with approach-coping attributes (e.g., reduce, eliminate stress) and less associated with avoidance attributes (e.g., ignore, withdraw from stress).

In their examination of the influence of extrinsic factors on positivity, Carver, Scheier, and Segerstrom (2010) discussed optimism as the capacity of individuals to engender favorable over unfavorable expectancies regardless of the immediate or foreseeable circumstances. Research shows that optimistic traits correlate to greater subjective well-being during instances of significant life stressors, and an enhanced capacity for the employment of approach versus avoidance coping styles (Carver et al., 2010). In addition, evidence reveals a causal linkage between optimism and self-protective health and wellness-oriented behaviors (Carver et al., 2010). Similarly, optimistic individuals tend to engage in more adaptive, prosocial interactions and address their goals with greater focus and discipline than pessimists (Carver et al., 2010). The aforementioned points have significant relevance to the worldview of college seniors, for whom psychosocial stress could negatively impact goal attainment efforts and the optimism characteristics that promote global health and well-being.

In the college setting, current evidence reveals negative correlations between DO and academic stress (Huan, Yeo, Ang, & Chong, 2006) and perfectionistic cognitions (Žitniaková-Gurgová, 2011)—findings that have profound implications for the impact of perception and resilience in the young adult stage of development. In addition, a longitudinal study conducted by Nes, Evans, and Segerstrom (2009) revealed a positive association between DO and college retention, academic motivation, and psychosocial adjustment to the college environment. Such findings were corroborated in a cross-

sectional study conducted by Krypel and Henderson-King (2010) who found that optimistic students tended to perceive stress not as a barrier, but as a byproduct of engagement style (e.g., approach, avoidance) and as an opportunity to enhance coping resilience. Finally, a longitudinal study by Chemers, Hu, and Garcia (2001) revealed academic self-efficacy and optimism to be significantly linked to scholastic performance and environmental adaptation in college freshman—relevant findings given the value of academic achievement, psychosocial adjustment, and future health and well-being in postgraduation life.

Perceived Stress

Originating in the sympatho-adrenomedullary system (Cannon, 1932) and the hypothalamic-pituitary-adrenocortical axis (Selye, 1956), the activation of the stress mechanism reflects a complex cascade of neurochemical interactions (Anisman & Matheson, 2005). Such biochemical activity often challenges the regulation, resolution, and eventual stabilization of neurobiological systems, and has been shown to play an integral role in the disease process (Haque et al., 2011), addictive potentials (Goeders, 2003), and psychological stability (Lincoln et al., 2009). As early as 1946, Pressey argued that age not only plays a mediative role in postgraduation achievements, but for managing the rigors of adult life. For college seniors, the significance of Pressey's view has continued relevance given the preponderance of uncertainties about adaptation and survival beyond the protective confines of the college campus.

From the outset of the college experience, students are required to self-manage a range of new responsibilities while assimilating into an unfamiliar environment that

contains new expectations, observations, and interactions (Hicks & Heastlie, 2008). Through sleep irregularities, feelings of anxiety, and perceived threat conditions (see Karademas, Kafetsios & Sideridis, 2007; Welle & Graf, 2011), coping style presumably plays an integral role in this assimilation process, with evidence linking disengaged coping styles with higher perceived stress and emotion-oriented coping styles with social connectivity, personal development, and generalized optimism in college students (Krypel & Henderson-King, 2010). With the impact of college-age stress observed in student retention rates (Robotham & Julian, 2006), the extant literature identifies social support, self-esteem, and stress level as the most common predictors of integration into the college milieu (Friedlander et al., 2007).

Given the college experience as a biopsychosocially dynamic event, the extant literature highlights the challenges associated with stress adaptation and resilience. Current evidence shows perceived problem solving ability (Largo-Wight, Peterson, & Chen, 2005), rumination (Morrison & O'Connor, 2005), and interpersonal relationships (see Darling, McWey, Howard, & Olmstead, 2007; Lopez et al., 2006) to be primary determinants of stress perception in college students. Welle and Graf (2011) discussed college stress as a pervasive issue that mediates psychophysiological health and well-being, and is characteristically unique given the need to balance academic performance, extracurricular interests, and parental expectations (Welle & Graf, 2011).

As a consequence, depression and suicidal ideation are epidemiologically prevalent issues in younger college students, and are often associated with co-morbid mental illness (see Bouteyre, Maurel, & Bernaud, 2007; Wilburn & Smith, 2005).

Further, distress over academic performance (see Baer, 2011; Murff, 2005) and identity formation (Fischer & Mccown, 2007) could impede the satiation of achievement and self-actualizing needs (Maslow, 1954, 1970). Here, the link between decisional imbalance and elevated psychological distress in college seniors (Yang & Gysbers, 2007) illuminates the maladaptive impact of stress as students prepare to make pivotal and often life-altering choices.

In a mixed methods, cross-sectional study conducted by Darling et al. (2007) that examined the impact of stress on perceived coherence in college students, results revealed quality of social interactions, romantic involvement, and parental relationships to induce significantly greater stress in females over males. In addition, sense of coherence was most profoundly impacted by emotional well being in females, whereas sense of coherence in males was significantly impacted by familial relationships (Darling et al., 2007). Similarly, in a cross-sectional study conducted by Brougham, Zail, Mendoza, and Miller (2009), survey responses reflected exponentially higher stress levels in college females versus males. Yet, while females were more inclined to employ emotion-focused coping techniques than males, such strategies were employed with far greater frequency than problem-solving strategies for both sexes (Brougham et al., 2009).

In what has become an increasingly acculturated environment, college students of the 21st century must determine how to adaptively process and integrate the divergent beliefs, norms, and values inherent to their culturally heterogeneous setting. In their cross-sectional analysis of Hispanic college students (n = 399), Menon and Harter (2012) found acculturative stress to positively predict body image maladaptations, despite the

meditative impact of social support. Similarly, Warren and Rios (2012) observed the impact of Western culture on Hispanic male college students (n = 100) and noted a significant positive correlation between acculturative stress and social comparison to idealized media influences. Given the role of the social stimulus in the establishment of belief formation and behavioral intention (Ajzen, 1991; Ajzen & Fishbein, 1980), college students are perhaps required to employ enhanced degrees of reason and discernment in their processing and filtering of acculturative stressors.

As maintained by Deci and Ryan (2000), humans fundamentally seek to meet their innate needs; consequently failing to satisfy esteem and achievement-oriented needs during the college experience has the presumed potential to induce stress in college seniors. While college freshmen might face many cognitive, emotional, and environmental adaptations during their initial emancipation from parental authority, college seniors perhaps experience an entirely unique range of stressors pertaining to the prospect of postcollege life. Given its potentially devastating, long-term impacts on quality of life (Bovier, Chamot, & Perneger, 2004), learning to reconcile stress during the college experience has implications for students to identify their coping style, learn resilience strategies, and develop an ongoing awareness of their developmental needs. As noted by Lazarus and Folkman (1984), “stress resides neither in the situation nor in the person, it depends on a transaction between the two” (p. 21, para. 1).

Physical Activity Level/Stage of Change

In the first research question of the current study, level of physical activity corresponded to the stages of change delineated by the TTM (Prochaska & DiClemente,

1983). The extant literature highlights the practical application of the stages of the TTM as a viable measure of health behavior change in the college population. In a cross-sectional study that examined cigarette smoking behavior in college students (n = 380), Pimenta, Leal, and Maroco (2008) observed stage of change to significantly influence health self-efficacy perceptions. In addition, Zizzi, Keeler, and Watson (2006) examined the relationship between exercise task challenge, ego, and stage of change and found that ego tended to decrease as individuals progressed through the change continuum, and were thus able to meet exercise task challenges. Further, evidence shows that when paired with lower stress conditions, prohealth interventions prove more effective when implemented during the earlier versus later stages of change (Dougall, Swanson, Grimm, Jenney, & Frame, 2011).

In a cross-sectional study conducted by Wallace and Buckworth (2001) that examined ESE expectations, decisional balance, and the processes of change in college students (n = 680), approximately 60% of participants reported either being sedentary or infrequent (precontemplation, contemplation, preparation stage) exercisers, with 17% and 23% of participants reported engaging in routine physical activity for $\leq$ 6 months (i.e., action stage) and $\geq$ 6 months (i.e., maintenance stage), respectively. In addition, significant differences were observed among the various TTM constructs: ESE and decisional balance were observed to be lowest among precontemplators and highest among maintainers, while consciousness raising, environmental reevaluation, self-reevaluation, and helping relationships were increasingly prevalent between the

precontemplation and action stages (Wallace & Buckworth, 2001)—highlighting the utility of the TTM for identifying both the barriers and facilitators of behavior change.

Given sex as a presumed determinant of responsivity to the TTM stages and associated constructs, a cross-sectional study (n = 330 males; n = 380 females) conducted by Fallon et al. (2005) revealed lower barrier efficacy, greater exercise benefits, and greater utility for behavior change processes than males. Here, evidence showed linkages between the action-maintenance transition and affect temptation for males and environmental reevaluation and social liberation for females. By contrast, the maintenance-termination transition was linked to barrier efficacy, environmental evaluation, and affect temptation for males, whereas barrier efficacy was salient for females.

Armitage, Sheeran, Conner, and Arden (2004) asserted the importance of acknowledging the mediators of interstage transitions, purporting that various sociodemographic factors and TPB-related constructs have significant predictive utility for stage transitions. Park and colleagues (2009) later corroborated this view in a multistage sampling analysis (n = 584) that revealed attitude, subjective norm, perceived behavior control, and behavioral intentions to predict interstage transitions. In addition, a longitudinal study of adult exercisers (n = 1,602) conducted by Lippke and Plotnikoff (2009) revealed the transition to the preparation stage to be most frequent during appraisals of high threat. Further, stage transition patterns observed in a cross-sectional study (n = 265) by Kennett, Worth, and Forbes (2009) showed (a) contemplating exercisers to be least likely to access the supports required for a successful transition to

successive stages and (b) exercise maintainers to demonstrate significantly higher levels of resourcefulness than individuals in the previous three stages of change.

Finally, six-month post-intervention measures in a longitudinal study conducted by Wallace and Buckworth (2003) that examined the factors that impact exercise behavior in college students (n = 161) revealed no changes in ESE and social support in exercise maintainers. By contrast, exercise relapsers exhibited dramatic negative changes in ESE and social support between pre and posttest measures (Wallace & Buckworth, 2003)—findings that highlighted (a) the importance of identifying the psychosocial factors that accurately predict relapse and promote maintenance and (b) stage of change as a determinant of ESE (Marshall & Biddle, 2001).

While various criticisms have been published regarding the efficacy of stage-based interventions (Bridle et al., 2005; Riemsma et al., 2003), the TTM has demonstrated appreciable efficacy for the evaluation of behavior change in obese and overweight populations, with the action stage showing significant efficacy for the design of staging algorithms for moderate-to-vigorous activity (Sarkin, Johnson, Prochaska, & Prochaska, 2001).

Summary and Conclusions

Given their far-reaching impacts on quality of life and global well-being across the lifespan, ESE, DO, and PS are relevant constructs in the lives of college seniors. The wide-ranging prohealth effects of routine exercise engagement on cognitive health (Muscari et al., 2010), self-concept (Lindwall & Martin-Ginis, 2006), social self-perception (Hart, 2007) transcend physiological boundaries, and have significant

implications for adaptation processes throughout young adulthood and beyond. In addition, trait characteristics of optimism have profound implications for the perceived controllability of future outcome expectancies, despite the myriad challenges posed by daily life stressors.

Further, the development of coping style has implications for the adaptive appraisal and management of stressful stimuli (Lazarus, 1991). As suggested by Taub et al. (2006), the stress perceptions of college seniors extend beyond vocational aspirations and decisional challenges; the ability to formulate adaptive stress appraisals during the college years has implications for the problem solving, decision-making, and emotional regulation skills required for real-world success. Finally, the stages of health behavior change and their respective relation to change processes, self-efficacy, and decisional balance suggests that change is not a linear process, but a series of events that are invariably impacted by cognition, affect, and experiential learning (see Prochaska & DiClemente, 1983; Prochaska et al., 1992). Thus, the associations between ESE, DO, and PS represent what is perhaps a complex intersection between competence, controllability, and coping perceptions that can dramatically impact the future health and well-being of college seniors.

In the Chapter 3, I discuss the rationale and methodological design for the current study. In addition, I provide a detailed overview of the population under analysis, sampling procedures, and processes specific to recruitment, participation, and data collection follows, in conjunction with a review of the psychometric instruments that have been selected for the current research. For purposes of clarity, I discuss operational

definitions of the variables of interest and their associated constructs. Further, I discuss the data analysis plan that provided an outline for the procedures that I employed in the current study, and a discussion on potential threats to external, internal, and construct validity supports the future replication of the current findings. Finally, I discuss ethical considerations and the measures taken to prevent ethical conflict within the current study that served to safeguard participants from undue harm.

Chapter 3: Research Method

Lack of engagement in physical activity has been cited as a growing problem among college students in the United States (ACHA, 2008; USDHHS, 2008). As such, I conducted the current study in an effort to investigate three areas of inquiry related to ESE, DO, and PS in college seniors. Firstly, I conducted three one-way between-groups analyses of variance to examine whether significant mean differences in ESE, DO, and PS scores exist in relation to current level of physical activity.

Secondly, I conducted multiple bivariate correlation analyses to determine whether relationships exist between mean ESE, DO, and PS scores. Thirdly, I used standard multiple regression modeling to identify whether DO, PS, and sex had predictive utility for ESE scores. Given the well-documented state of health inattention exhibited by college students nationwide (see ACHA, 2008; USDHHS, 2008), the aforementioned inquiries highlighted the linkages between health competencies, future outcome expectancies, and stress appraisals relative to prohealth behavior in college seniors.

In the following chapter, I provide a detailed overview of the sample under analysis, in addition to procedures for sampling, recruitment, participation, data collection, and the operationalization of constructs. In addition, I discuss the operationalization of constructs and provide a data analysis overview that highlights the operating procedure employed within the current study. Finally, I discuss threats to external, internal, and construct validity, and potential ethical concerns as these constructs relate to ESE, DO, and PS in college seniors.

Research Design and Rationale

Adhering to the tradition of quantitative research, I based the current study on a cross-sectional, descriptive design that employed an electronic survey-based method to (a) examine whether mean differences in ESE, DO, and PS scores exist in relation to current physical activity level; (b) assess whether relationships exist between mean ESE, DO, and PS scores; and (c) analyze the predictive utility of DO, PS, and sex for ESE scores while alternately controlling for each variable. As opposed to longitudinal analyses that typically gather and analyze data at multiple intervals across a specific time frame (White & Arzi, 2005), cross-sectional analyses gather data from a sample at one specific point in time (Bowden, 2011). As maintained by Babbie (1990), cross-sectional survey methods serve to generate a numeric depiction of the behavioral patterns, attitudes, and beliefs of a sample that can ultimately be generalized to the mean of the population under analysis—a methodological approach that was expected to sufficiently address the current research questions.

Given the lack of a need to manipulate independent variables in the current study, I based the first research hypothesis (i.e., ANOVA) on a preexperimental static group comparison design (Campbell & Stanley, 1963). Due to the need to examine statistical relationships among variables, I based the second (i.e., bivariate correlation) and third (i.e., standard multiple regression) research hypotheses on a correlational design (Tabachnick & Fidell, 2012). Statistical analyses generated via SPSS Statistics v21.0 (IBM, 2013) served to facilitate the interpretation of between-group mean differences, Pearson correlations, and regression modeling amongst variables.

Economic and temporal factors are additionally noteworthy research considerations, as Babbie (1990) emphasized the need to acknowledge parameters related to participant availability and budgetary constraints. Here, I structured participation in the study to complement, not interfere with, academic responsibilities, and ensured that it would be no financial cost to participants. Given the cross-sectional nature of data collection, notable constraints existed with regard to time and resources in the current study. First, convenience proved to be a significant factor in the data collection process given limitations on student availability during specific periods throughout the year (i.e., summer versus fall matriculation), with each semester anticipated to yield differential response rates.

Similarly, I anticipated that time of participation within a semester might impact data collection efforts, given the need for students to give priority attention to mid-term and final exams. Further, it was plausible that end-of-semester stress could mediate response bias and, thus, could potentially yield inaccurate response patterns. Finally, current research reflects the methodological utility of employing cross-sectional survey approaches to descriptively analyze between-group mean differences and correlations between health specific variables in the college milieu. Sidman et al. (2009) employed the 36-item, six-point Likert-based Perceived Wellness Survey (PWS; Adams, Bezner, & Steinhardt, 1997) to examine the association between ESE and perceived wellness in college students (n = 611).

In addition, Khallad (2010) administered an adapted 30-item, 7-point version of Life Orientation Test (LOT-R; Scheier, Carver, & Bridges, 1994) to evaluate the

differences in DO, self-protective behaviors, and sociodemographic factors between American (*n* = 167) and Jordanian (*n* = 260) college students. Finally, in their examination of the relationship between current physical activity level and health variables (i.e., exercise, diet, smoking, alcohol consumption, stress, depression management) in college students (*n* = 304), Horneffer-Ginter (2008) used the 5-point Likert-based Health Risk Assessment (HRA; Pro-Change Behavior Systems, 2001). The aforementioned examples are but just a few that exemplify the practical application of the survey method in research in college health research.

Methodology

Population

In the current study, I collected a sample of 138 senior-level college students who were enrolled in undergraduate studies at five universities located in the mid-Hudson Valley region of upstate New York: the State University of New York at New Paltz, Marist College, Vassar College, Bard College, and Pace University. As observed in the following section on power analysis, I initiatlly targeted a minimum sample size of 200 in order to achieve statistical power of .80 at a .05 significance level—parameters that sufficiently supported the one-way between-groups ANOVAs, multiple bivariate correlation analyses, and standard multiple regression modeling (see Cohen, 1988; Faul, Erdfelder, Buchner, & Lang, 2009) used to test the respective research hypotheses. However, the continual addition of community research partners eventually led to the exhaustion of recruitment resources and, thus, the discontinuation of data collection efforts.

As reported in 2012-2013 institutional statistics, total enrollment numbers of the five community research partners used in this study were as follows: 6,685 (State University of New York at New Paltz, 2013a); 6,365 (Marist College, 2013); 2,400 (Vassar College, 2013); 2,051 (Bard College, 2013); and 8,336 (Pace University, 2013). Each institution employed different methods to facilitate participant recruitment: mass e-mail to faculty (e.g., instructors, advisors) whom were affiliated with senior-level students, e-flyer upload to an intranet site frequented by senior students, and campus-wide bulletin postings. Approval to advertise the study was obtained through the Institiutional Review Board (IRB; Approval # 05-06-13-0227713) of each participating research partner prior to conducting sampling procedures.

Sampling and Sampling Procedures

Just as recruitment method can dramatically influence sample variability (Winhusen, Winstanley, Somoza, & Brigham, 2012), the researcher must determine which sampling method would most effectively yield the evidence that best supports the research inquiry (Bernard, 2002). Given the need to examine a characterologically discrete population (i.e., senior-level college students), I employed a purposive sampling method in the current study —a nonrandomized, specificity-based selection protocol "that is most effective when one needs to study a certain cultural domain with knowledgeable experts within" (Tongco, 2007, p. 147, para. 1). In the current study, it could be argued that college seniors possess the most acute awareness of the inherent challenges posed by the senior year; therefore, their subjective perceptions of ESE, DO, and PS were anticipated to hold significant empirical value.

By contrast, random sampling is a form of probability sampling that allows each participant, regardless of sample characteristics, an equal opportunity for selection (Moore & McCabe, 2006). Despite the capacity for random sampling to enhance sample characteristic heterogeneity and reduce bias (Blankertz, 1998), challenges related to controlling for error minimization and homogeneity that results in inadequate sample size have been identified as confounding issues (Blankertz, 1998). While recent studies on body image dissatisfaction (White, Reynolds-Malear, & Cordero, 2011), drinking norms (Woodyard, Hallam, & Bentley, 2013), and stress tolerance (Bland, Melton, Welle, & Bigham, 2012) in college students reflect the efficacy of random sampling approaches in quantitative research circles, the virtual impossibility of generalizing findings across all populations (Cook & Campbell, 1979) is a noteworthy limitation to all sampling methods. Therefore, I selected purposive sampling as the method that would allow for the generation of viable inferences about population parameters and ensure generalizability to the greater college senior population.

Sampling frame. Jessen (1978) argued for the critical importance of establishing a distinguishable sampling frame, purporting that the lack of a clear frame can result in a failure to produce valid empirical outcomes. As maintained by Tappen (2010), the sampling frame reflects criteria that establish eligibility parameters in a study, representing “the set of people you will draw your sample from” (p. 105, para. 2). In the current study, the sole criterion for inclusion was that all participants were matriculated, senior-level (i.e., fourth year) students who were anticipated to graduate within the current school year. However, given the impossibility of establishing a comprehensive

list of every student in the available college senior population, we were unable to achieve a true sampling frame in the current study.

While Erikson (1963) described the young adult stage of human development as ranging from ages 20-40 years, it would have been impractical to employ a specified age range as a parameter in this study due to the presumed variability in graduation age. Yet, a fundamental assumption suggested that most participants would be in their early to mid-20s. Given the time frame (i.e., beginning in July 2013) and inclusion criteria (i.e., college seniors) of the current study, the participant sample consisted of students graduating by May 2014.

Sample size and power analysis. Statistical power is essential to decreasing the odds of inadvertently committing a Type II error; that is, rejecting the null hypothesis when it is in fact true (Aberson, 2010). In empirical research, power is critical to the generation of valid inferences, and is dependent upon factors related to the significance of the analysis, the magnitude of effect, and the sample size (Aberson, 2010). In determining sample size for multiple analyses, Hsu (1988) asserted the critical importance of ensuring a sample size for which all confidence intervals (a) correspond to the actual parameters of the study and (b) ensure high probability values. Conducting a power analysis for sample size in G*Power 3.1 (Faul et al., 2009), standard parameters for statistical power = .80, p = .05, two-tailed were employed to detect the occurrence of a significant effect (Cohen, 1988). Finally, Cohen's (1988, 1992) conventions for small, medium, and large effects: .1, .25. and .4 for f values (i.e., ANOVA); .1, .3, and .5 for

Pearson correlation coefficients (i.e., correlation), and .02, .13, and .26 for R^2 values (i.e., regression) were employed in the current study.

Given the variability in effect size and the need to identify the parameters necessary to induce “clinically meaningful change” (Eisen, Ranganathan, Seal, & Spiro, 2007, p. 273, para. 2) in the health research milieu, Rutledge and Loh (2004) posited the notion that large effect sizes are not a prerequisite for clinical significance—a perspective that supports Cohen’s (1969) assertion that the use of terminology such as ‘small’, ‘medium’, and ‘large’ is often context-dependent. Glass, McGaw, and Smith (1981) supported Cohen’s perspective, asserting that the effect of an intervention is only valid if compared to the effect of a similar intervention. Thus, given the fact that parameters for effect size vary dramatically among health research domains (Rutledge & Loh, 2004) and due to the “attenuation in validity of the measures employed and the subtlety of the issue frequently involved" (Cohen, 1988, p. 13), employing a medium effect size generated statistical power that was deemed sufficient enough to (a) yield significant results and (b) reduce the incidence of Type II errors (Cohen, 1988) in the current study.

For the one-way between-groups ANOVAs used to test the first research hypothesis, a power analysis calculation that used a medium effect size (i.e., Cohen’s f^2 = .25) yielded a total sample size of 200 and an actual power of .8097710 (Faul et al., 2009). For the correlation analysis used to test the second research hypothesis, a power analysis calculation that used a medium effect size (i.e., Cohen’s f^2 = .3) yielded a total sample size of 67 and an actual power of .8032714 (Faul et al., 2009). For the standard multiple regression analysis required to test the third research hypothesis, a power

analysis calculation that used a medium effect size (i.e., Cohen's f^2 =.13) yielded a total sample size of 88 and an actual power of .8006614 (Faul et al., 2009).

In studies with multiple outcomes, Chadha (2006) argued for using the largest sample size; similarly, Wilson-Van Voorhis and Morgan (2007) maintained that statistical power is enhanced when larger sample sizes are employed. However, the addition of multiple community research partners over a five-month period resulted in the depletion of recruitment resources, thus justifying the final sample size of 138 participants in the current study.

Prior Research Involving the Selected Statistical Analyses

Analysis of variance. In an effort to test the first research hypothesis, I employed a one-way between-groups ANOVA to examine whether current physical activity level impacted ESE, DO, and PS in college seniors. As suggested by Howell (2002), the one-way between-groups ANOVA measures mean differences in continuous data among two or more groups—a method that allowed for the analysis of ESE, DO, and PS (i.e., dependent variables) as each variable related to each of the five levels of physical activity (i.e., independent variables). With regard to previous ANOVA studies, perceived barriers to exercise (Grubbs & Carter, 2002), personality factors that underpin ESE (Buckworth, Granello, & Belmore, 2002), and the intersection between physical activity, ESE, and stage of change (Leenders, Silver, White, Buckworth, & Sherman, 2002) have been rigorously examined in college health research. Similarly, Buckworth and Nigg (2004) investigated the relationship between physical activity, exercise, and sedentarism in college students. Further, Moore and Werch (2008) examined the association between

engagement in vigorous exercise and substance abuse, while Egli et al. (2011) assessed the influence of student demographic characteristics such as age, sex, and ethnicity on exercise motivation in college students.

Correlation analysis. In an effort to test the second research hypothesis, I employed multiple bivariate correlation analyses to examine the strength and direction of linear relationships between ESE, DO, and PS in college seniors. Correlation analyses are designed to test for associations between two variables (Babbie, 2009). However, the second research question necessitated the examination of the relationships between multiple (i.e., more than two) normally distributed continuous variables; therefore, validating the application of multiple bivariate correlation analyses in the current study. In previous correlation-based studies, Racette, Deusinger, Strube, Highstein, and Deusinger (2005) assessed the relationships between dietary patterns, exercise, and weight fluctuation in first and second-year university students. In addition, Reed and Phillips (2005) examined the associations between physical activity and nearness of exercise facilities, while Rogers, Courneya, Shah, Dunnington, and Hopkins-Price (2007) elucidated the linkages between exercise barriers, exercise preferences, outcome expectancies, and stage of change. Finally, Sidman et al. (2009) examined the association between ESE and perceived wellness in college students, whereas Perry and Butterworth (2011) observed a correlation between stage of change and the commitment to change health behavior.

Regression analysis. In an effort to test the third research hypothesis, I employed standard multiple regression modeling to examine whether DO, PS, and sex predict ESE

in college students. Here, standard multiple regression modeling served to test the hypothesis that multiple explanatory variables can predict a continuous primary outcome such as ESE (Cohen, Cohen, West, & Aiken, 2003). Standard multiple regression modeling was selected to examine (a) the size of the relationship between the criterion variables and predictor variables and (b) the extent to which each predictor variable contributed to the relationship (Harrell, 2001). In SPSS (IBM, 2013), the enter method was employed—a feature that allows for the simultaneous addition of all predictor variables into the regression equation as a means of identifying the variable with the greatest predictive utility (Tabachnick & Fidell, 2012).

The application of regression as a predictive technique is widely documented in the health self-efficacy domain; in a study conducted by Barclay et al. (2007) that examined the predictive utility of health beliefs, self-efficacy, and neurocognitive status on medication compliance in HIV-positive adults, the researchers designed a model for each treatment condition employing regression modeling to identify statistically significant variables. In an effort to generate a regression model that accurately predicted falls, Delbaere, Crombez, Vanderstraeten, Willems, and Cambier (2004) employed regression modeling to examine statistically significant associations between fear-driven avoidance of physical activity and frailty. Finally, Garrod, Marshall, Barley, and Jones (2006) examined predictors of success and failure in the pulmonary rehabilitation setting by generating a regression model to elucidate the characteristics of treatment dropouts and completers.

Procedures for Recruitment, Participation and Data Collection

Recruitment procedures. As an institutional consideration, each community research partner dictated the respective mode of participant recruitment. For example, the network administrator of SUNY New Paltz sent mass e-mails containing recruitment invitations to all faculty members (e.g., instructors, advisors) who interfaced with senior-level students; the faculty member would then announce the study to their students. In addition, Marist College uploaded the e-flyer that contained the survey URL to an intranet site frequented by senior-level students. By contrast, Vassar College employed the more traditional public bulletin posting method of advertisement.

By comparison, the Dean of Students at Bard College directly e-mailed the e-flyer to all senior-level students. Finally, I was granted permission to send an e-mail request to all Pace University faculty instructors and advisors who would then announce the study to their senior-level students. With regard to those community partners who employed e-mail methods of recruitment, efforts to advertise the study did not exceed more than three attempts throughout the course of the data collection phase.

Provision of informed consent. The informed consent process entailed a thorough overview of the risks and benefits of participation that preceded participation in the online survey. When participants accessed the survey URL, they were immediately directed to the informed consent portion; once reviewed, participants were subsequently directed to the survey portion. Pursuant to Section 8.02(a) of the Ethical Principles of Psychologists and Code of Conduct (American Psychological Association [APA], 2010), the informed consent process should explicitly advise the participant of the purpose of the research, their right to either decline or withdraw from the study, limits of confidentiality,

participation incentives, and a point of contact in the event that pertinent questions or issues should arise.

In addition, I fully informed participants of the research focus of the study and the volunteer (i.e., non-compensatory) nature of participation (8.02[b], APA, 2010). In a population-based questionnaire survey (n = 1,324) conducted by Länsimies-Antikainen, Laitinen, Rauramaa, and Pietil (2010) that examined key components of the informed consent process, evidence showed information, comprehension, competence, decision-making, and voluntariness to be critical variables in the informed consent process. It was therefore prudent to create a survey experience that promoted the welfare of participants as a basis for best research practices in the current study.

Mode of data collection. I implemented the data collection process via an anonymous web-based survey design that was made available to all participants via the Survey Monkey Web Link Collector option (SurveyMonkey, 2013). Compared to paper survey modalities, the expedited implementation, data import facility, and significant reductions in cost associated with electronic surveys reflect what Dillman (2000) considered to be some of the primary advancements in contemporary survey technology.

In college health behavior research, web-based surveys have demonstrated proven efficacy as viable data collection modalities across various lines of inquiry, including but not limited to studies that examined alcohol consumption (White, Jamieson-Drake, & Swartzwelder, 2002), smoking behavior (see D'Abundo, Marinaro, & Fiala, 2009; Morrell, Cohen, Bacchi, & West, 2005), and HIV testing intentions (Hou & Wisenbaker, 2005). And while some variation in response rates and non-response bias has been

observed across research on both web and paper survey-based studies (Sax, Gilmartin, & Bryant, 2003), Carini, Hayek, Kuh, Kennedy, and Ouimet (2003) conducted a meta-analysis on the differential impact of survey mode (i.e., web, paper) on response in college students (n = 58,288) that revealed web respondents to report more favorable responses than paper respondents across all domains under analysis.

Practical and technical considerations regarding the use of web surveys. Current evidence reveals the academic level of the student and the technological culture of the institution to significantly mediate the perceived acceptability of web-based surveys (Mitra, Jain-Shukla, Robbins, Champion, & Durant, 2008). In addition, research shows web survey participation to be mediated by the format (i.e., convenience, comprehensibility), content (i.e., pertinence, relevance), affiliation (i.e., professional, institutional), and level of contact support (i.e., personalized correspondence, follow-up e-mails) associated with the survey (Park & Khan, 2006). However, low response rates (Dillman et al., 2009) and expensive web survey software packages (Wright, 2005) have been cited in the extant literature as disadvantages of web-based surveys. Further, the legal and ethical considerations related to data storage elucidate the challenges inherent to ensuring confidentiality (Wright, 2005). Given the dramatic shifts in computer literacy since the advent of the internet in the mid-1990s and the ubiquity of computer technology in the modern American college system (Tomaiuolo, 2005), I anticipated the web-survey modality to elicit best outcomes in the current study.

Considerations specific to participant-to-researcher communication. As suggested in section 8.08 of the APA ethical standards (2010), researchers are obligated

to grant participants access to post-study research outcomes. In the event that deception is an IRB-approved component of the experimental methodology, researchers must take measures to disclose all manipulations and dispel all misconceptions regarding the purpose or outcomes of the study (8.08[a], APA, 2010). Despite the fact that the current study did not employ deceptive approaches, did not overtly threaten psychological harm, and did not require the use of a formal follow-up protocol (e.g., post-study interview), participants were encouraged to report any adverse events that arose at any time within the duration of participation. While no such events were reported within the context of the current study, the results of such reports would have been discussed as potential considerations to be applied to future research efforts.

Instrumentation

Given the availability of the selected instruments in the public domain, each of the authors of the instruments employed in this study stated that they do not require the obtainment of permission in the event that the measures are used for purposes of academic research. All pertinent e-mail correspondence of such verification by instrument developers has been kept on file. Table 1 aligns the instrument with the corresponding psychometrics, theories, and constructs that I examined in the current study.

Table 1

Instruments, Psychometrics, Theories, and Variables of Interest

Instrument	Internal Consistency	Theory	Variable
BARSE	.88	SET	ESE
LOT-R	.72	ATT	DO
PSS-10	.89	CAT	PS
SECQ[a]	.94[b]		
SDQ[c]			

Note. [a]SECQ identifies current level of physical activity and is associated with the TTM. [b].94 reflects an intraclass correlation. [c]SDQ collects sociodemographic data and is not associated with a theory or construct specific to this study.

Barriers Self-Efficacy Scale (BARSE)

In the current study, I employed the Barriers Self-Efficacy Scale (BARSE; McAuley, 1992) to assess the extent to which participants felt confident about their ability to maintain exercise behavior despite the existence of perceived barriers to adherence (i.e., ESE). Designed in response to a need to examine "the problem of sustaining adherence to exercise regimens once they have begun" (McAuley, 1992, p. 66, para. 2), the BARSE is a 13-question, 11-point Likert-based survey that assesses the determination to exercise through barriers such as weather, boredom, disinterest, discomfort, transportation, self-consciousness, and lack of social support (McAuley, 1992). McAuley (1993) went on to design the Exercise Self-Efficacy Scale (ESES), a derivative of the BARSE; however, the ESES proved inapplicable to this study given its emphasis on exercise intensity (McAuley, 1993).

Unlike the Self-Efficacy for Exercise Scale (SEES; Resnick & Jenkins, 2000), a revised version of the BARSE designed to assess for barrier self-efficacy in older adults,

the BARSE is designed to assess ESE in younger to middle-aged adult populations (McAuley, 1992). Participants are required to select their perceived confidence level for each item on a scale based on ten percentage point increments, from 0 (*not at all confident*) to 100 (*highly confident*). Confidence values are subsequently added and divided by the total number of items, resulting in an overall confidence value (McAuley, 1992). The extant literature reflects the wide-ranging application of derivative subscales of the BARSE in exercise behavior research, including but not limited to studies on adolescent females (Motl et al., 2005), cardiac rehabilitation patients (Blanchard et al., 2007), and postnatal women (Cramp & Bray, 2011).

Life Orientation Test-Revised (LOT-R)

In the current study, I employed the Life Orientation Test-Revised (LOT-R; Scheier et al., 1994) to differentiate between innate optimistic and pessimistic tendencies across various indicators associated with outcome expectancies for students (i.e., DO). Designed in 1985 by Scheier and Carver, the validity of the original LOT raised questions about the interaction of optimism with variables such as neuroticism (Scheier et al., 1994). Lacking predictive validity, the measure was consequently revised based on the results of a study (n = 4,309) that revealed significant associations between optimism, depression, and coping while controlling for neuroticism, trait anxiety, self-mastery, and self-esteem (Scheier et al., 1994). Two items from the original LOT were eliminated given their emphasis on coping style (Scheier et al., 1994).

The current LOT-R is a 10-item Likert-based scale designed to examine the affective, cognitive, behavioral, and overall health implications of the optimistic-

pessimistic expectancy paradigm (Scheier et al., 1994). Based on a five-point Likert scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*), four of the ten statements (i.e., 2, 5, 6, 8) are filler items and should be discounted; the rater is only required to total the six non-filler items and reverse scores for three items (i.e., 3, 7, 9) (Scheier et al., 1994). For purposes of the current study, the scoring algorithm for low (i.e., 0-13), medium (i.e., 14-18), and high (i.e., 19-24) optimism ratings was applied (Scheier et al., 1994).

Perceived Stress Scale, 10-Item (PSS-10)

In the current study, I employed the 10-item Perceived Stress Scale (PSS-10; Cohen & Williamson, 1988) to assess the extent to which students appraised life events as stressful (i.e., PS). Considered one of the gold standards of stress perception measurement given its capacity to elucidate linkages between psychological and physiological stress markers (Cohen & Williamson, 1988), the need to tap subjective perceptions of stress and ultimately convert such perceptions into an objective, measureable framework provided the initial impetus behind the design of the PSS (Cohen, Kamarck, & Mermelstein, 1983). Originally a 14-item instrument (Cohen et al., 1983), the PSS has been reproduced in 10- and 4-item short form scales that have been translated into various languages, including but not limited to Arabic (Chaaya, Osman, Naassan, & Mahfoud, 2010), Chinese (Leung, Lam, & Chan, 2010), and Japanese (Mimura & Griffiths, 2004).

Like the LOT-R, items on the PSS-10 are rated on a 5-point Likert-based scale from 0 (*never*) to 4 (*very often*) that measures the frequency at which participants have experienced specific thoughts or feelings within the previous month (Cohen et al., 1983).

Six of the questions are negative in orientation; four of the questions are positive in orientation (Cohen et al., 1983). Scoring on the PSS-10 requires the examiner to reverse responses to the positively stated questions and then total all of the scores (Cohen et al., 1983). The short-scale, 4-item PSS is derived from questions 2, 4, 5, and 10, and has been used extensively in health research on suicide survivorship (Mitchell, Crane, & Kim, 2008), HIV/AIDS (Su et al., 2008), and respiratory conditions (Sharp, Kimmel, Kee, Saltoun, & Chang, 2007). The PSS-10 was designed for application in community samples that have attained a minimum of a seventh grade education level (Cohen et al., 1983). Given the need for a more comprehensive measure of stress perception than that which was provided by the short-scale, 4-item PSS, the PSS-10 was employed in the current study.

Stage of Exercise Change Questionnaire (SECQ)

Based on the prior work of Marcus et al. (1992), the Stage of Exercise Change Questionnaire (SECQ; Norman et al., 1998) is a TTM-derived staging algorithm that was employed to determine the current level of physical activity undertaken by participants. In the current study, I defined the term *current level of activity* as being synonymous with the term *stage of change*. Norman et al. (1998) defined physical activity as physical behavior of an intensity that results in observable increases in respiration and perspiration. While various TTM-based algorithms have been published in recent years to gather characteristic data on adolescent (Lee, Nigg, DiClemente, & Courneya, 2001) and older adult populations (Nigg & Riebe, 2002), the exercise parameters set forth by Reed,

Velicer, Prochaska, Rossi, and Marcus (1997) of 30 minutes per day on 5 days per week are frequently cited in the extant literature.

In the current study, I asked participants to self-assess which of the following stages of change (Prochaska & DiClemente, 1983) most accurately described their current level of physical activity (a) precontemplation (i.e., currently inactive and not considering engagement in exercise within the next six months); (b) contemplation (i.e., currently inactive, but considering exercise engagement within the next six months); c) preparation (i.e., not routinely active, yet engaged in occasional physical activity and intending to begin more regular engagement within the next six months); d) action (i.e., have been actively engaging in physical activity for less than a six-month period; or e) maintenance (i.e., have been actively engaging in physical activity for more than a six-month period). Participants indicated their status by self-selecting one of the five aforementioned levels of physical activity. Here, the categorical nature of the TTM stages promotes clarity, thus enhancing the potential for accurate choice making.

Sociodemographic Questionnaire (SDQ)

In an effort to identify the sociodemographic characteristics of the participants, I designed a questionnaire to collect data on the descriptive characteristics of participants—one of which, sex, was intended for analysis in the third research question of the current study. Specifically, I asked participants to self-select their sex by clicking on *male* or *female* in the sociodemographic section of the survey. In addition, I gathered data pertaining to age, ethnicity, student status (i.e., part-time, full-time), athletic status (i.e., participate, do not participate in college athletics), place of residence (i.e., on-

campus housing, off-campus housing, at home with family), and college major to allow for a more comprehensive depiction of sample characteristics and to provide descriptive depth to the research analysis. Further, I compiled the comprehensive listing of college majors incorporated in the SDQ from the websites of each participating community research partner.

Previous studies in the behavioral health domain have employed questionnaire-based measures to evaluate the impact of sociodemographic characteristics on well-being and quality of life (see Al-Windi, Elmfeldt, Tibblin, & Svärdsudd, 1999; Quercioli, Messina, Barbini, Carriero, Fanì, & Nante, 2009). An example of the SDQ employed in the current study can be found in Appendix A.

Operationalization of Constructs

Exercise Self-Efficacy

While Bandura (1977) described self-efficacy as the capacity to experience mastery and competence for a specific behavior, Fletcher and Banasik (2001) discussed ESE from the standpoint of compliance and adherence. The ability to adhere to routine exercise prescription—despite interference by life commitments and responsibilities (Dibonaventura & Chapman, 2008)—strongly reflects the ideals of "belief and conviction" (Fletcher & Banasik, 2001, p. 390, para. 2). In accordance with social cognitive theory (Bandura, 1977), Fletcher and Banasik (2001) argued that ESE is based on mastery, social learning, positive reinforcement, and self-preservation. In United States adults, exercise compliance research shows that enhanced ESE is related to a dramatically greater likelihood of compliance to prescribed exercise protocols than low

ESE (Fletcher & Banasik, 2001). In the current study, I measured ESE via the BARSE (McAuley, 1992).

Dispositional Optimism

Carver and Scheier (1981) defined DO as a characterological trait that promotes an unwavering belief in generalized positive outcomes across various life domains. Early research on behavior regulation suggested DO to be primarily attributable to personality (Carver & Scheier, 1981)—a perspective that was later corroborated by Scheier and Carver (1987) who observed a significant correlation between optimistic dispositions and preference for exercise as a stress management modality. Findings in research conducted by Hmieleski (2007) in the organizational setting reflect the dichotomous trait-specific disparities between optimists and pessimists: Optimists appear to thrive in stable contexts, whereas pessimists thrive in unstable settings. However, evidence shows that optimists often rely on pre-existing knowledge as a basis for decision-making, and are therefore less inclined to seek new information than pessimists (Hmieleski, 2007). In the exercise milieu, DO has been cited as a predictive factor in cancer remission (Allison, Guichard, & Gilain, 2000), adjustment to the aging process (Steptoe, Wright, Kunz-Ebrecht, & Iliffe, 2006), and the prevention of sexually transmitted diseases among college students (Zak-Place & Stern, 2004).

For purposes of clarity and comprehension, I deemed it prudent to distinguish between DO and its antithesis—situational optimism. Unlike the fixed, trait-derived nature of DO (Carver & Scheier, 1981), situational optimism is an ever-changing, contextually dependent phenomenon (Peterson, 2000). While situational optimism may

be based on explanatory style (Kamen & Seligman, 1987), individuals tend to justify optimistic states according to perceptions of internal/external control over the stimulus, whether the stimulus is stable or changes with time, or whether the circumstance is unique or can be generalized to the greater populace (Buchanan & Seligman, 1995). In contrast to situational optimism, Carver and Scheier (1981) described DO as a cardinal trait underpinned by a global assumption that good, not bad, events will ultimately prevail regardless of context and perceived control over the stressful stimulus. For purposes of the current research, dispositional optimism (i.e., trait), not situational optimism (i.e., state), was examined in an effort to elucidate linkages to health competencies and coping outcomes in college seniors. In the current study, I measured DO via the LOT-R (Scheier et al., 1994).

Perceived Stress

Due to a need to constantly adapt to the ever-changing demands of the environment, individuals continually seek to gain an understanding of the sensory stimuli that comprise their surroundings (Pomerantz, 2003). Given the need for humans to identify, organize, and interpret information (Pomerantz, 2003), early perception theorist Gibson (1950) discussed the idea that individuals are innately equipped with the capacity to efficiently process contextual stimuli. Yet by contrast, Bruner (1957) argued that such processing abilities are not innate, but the product of cognitive artifacts that are grounded in experiential learning. Later, Gregory (1970) posited the notion that perception is a fundamentally constructive process, with intelligence (i.e., reason, discernment) playing an essential role in the inferential analysis of the perceived stimulus. As such, individuals

may generate appraisals of stimuli that are progressively more accurate and, thus, provide a framework for future appraisals.

Due to the continual interaction of individuals with the external environment, psychological stress is a pervasive human phenomenon. Baum (1990) defined stress as an emotional event that is frequently associated with dramatic neurochemical and physiological alterations. While the stress experience is often characterized by transient states worry or fatigue, chronic levels of stress have been shown to have insidious and sometimes devastating cardiovascular and psychoneuroimmunological impacts (Baum & Polsusnzy, 1999). As previously discussed, a noteworthy distinction should be made with regard to positive (i.e., eustress) and negative (i.e., distress) stress (Selye, 1974). Where distress refers to a clear negative response to stressful stimuli (Baum, 1990), Selye (1974) described eustress as a positive coping response to stress, one that is often characterized by a sense of purpose, optimism, and excitement when addressing stressful stimuli (Nelson & Cooper, 2005). Given the potential for emergent feelings of uncertainty, indecision, and confusion experienced by college seniors, I focused exclusively on the perceptions that resulted in distress, not eustress. In the current study, I measured PS via the PSS-10 (Cohen & Williamson, 1988).

Data Analyses

In order to test the research hypotheses, I used SPSS Statistics Standard version 21.0 (IBM, 2013) to perform the statistical analyses conducted in the current study. To test the first hypothesis, I conducted three one-way between groups ANOVAs to assess differences in mean ESE, DO, and PS scores across the five levels of physical activity.

To test the second hypothesis, I performed three bivariate Pearson Product-Moment correlations to determine whether relationships exist between ESE, DO, and PS scores. To test the third hypothesis, I employed standard multiple regression modeling to examine the predictive utility for DO, PS, and sex for ESE scores while alternately controlling for each variable. I discuss each of the aforementioned analyses in comprehensive detail in Chapter 4.

Statistical Assumptions

Analysis of variance. According to Howell (2002), the comparison of two or more sample means can be conducted via one-way between-groups ANOVA. The reliability of the one-way between-groups ANOVA is predicated upon three basic assumptions: (a) observations are independent, (b) the means for each level of the independent variable fall within a normal distribution, and (c) variances between populations are homogeneous.

Correlation analysis. Given its application in measuring the strength and direction of linear associations (Cohen & Cohen, 1975), a bivariate correlation analysis maintains the following assumptions: (a) the relationship between X and Y is monotonic, (b) the variance in errors of Y is constant across all values of X (i.e., homoscedastic), and (c) the errors are normally distributed (Cohen, Cohen, West, & Aiken, 2003).

Standard multiple regression. In order to provide a stronger foundation for generating causal inferences, standard multiple regression extends the functionality of simple linear regression through the addition of multiple predictor variables (Harrell, 2001; Osborne & Waters, 2002). The applicability of standard multiple regression is

predicated upon the following assumptions: (a) two or more independent variables are employed, (b) observations are independent, (c) relationships between variables are monotonic, (d) data reveals homogeneity of error variance (i.e., homoscedasticity), (e) data do not reveal multicollinearity, and (f) errors fall within a normal distribution (Tabachnick & Fidell, 2012).

Threats to Validity

External Validity

As discussed by Persaud and Mamdani (2006), the identification of potential threats to external validity is prudent to the generalizability and overall integrity of research findings. In addition, evaluating threats to external validity reflects the attempt of researchers to bridge the gap between research findings and real-world application (Persaud & Mamdani, 2006). In the current study, one plausible threat to external validity pertained to the personality characteristics of participants. Despite their current level of physical activity, some participants may have possessed high self-efficacy beliefs in other non-health related domains (e.g., academics, personal organization) and, thus, possessed innate ESE potentials. Therefore, questions remain as to whether general (i.e., non-health related) self-efficacy could mediate ESE.

In addition, Cicourel (2007) asserted that ecological validity could never be definitively achieved in behavioral research due to the inability to eradicate all confounding factors. Therefore, contextual considerations were prudent to acknowledge in the current study given the potential influence of the timing (e.g., participation during or following examination periods) and the location (e.g., participation in distractive or

non-distractive environments) of survey completion. Further, the appeal of the study (e.g., extent to which participants demonstrated interest in the subject matter) and the quality and nature of researcher-participant interactions (e.g., clarity, concision, contact information) reflected plausible external effects. Finally, the most significant threat to generalizability in the current study may have pertained to the biopsychosocial uniqueness of the population under analysis. The stage of development, impact of stress on perception, and contextual factors that indirectly shape the belief systems of college seniors could have dramatically influenced research outcomes.

Internal Validity

As suggested by Grimes and Schulz (2002), a study must measure what it intends to measure. In an effort to identify potential threats to the integrity of the relationship between variables in the current study, it is prudent to discuss potential threats to internal validity. The emergence of confounding variables such as cognitive changes (i.e., enhanced confidence level due to the processing of survey questions), the subjective quality of survey questions, the level of willingness to participate, and the sociocultural and maturational factors that have been shown to influence survey response (Deeks et al., 2003) may have impacted internal validity in the current study.

With regard to variability in sample characteristics, the sociodemographic variation observed in the current study served to enhance the degree of representativeness and the potential to generalize findings to the greater populace. However, outcome expectancies that are innately held by researchers could result in experimenter bias (Sackett, 1979). If researchers possess a working knowledge of a specific line of inquiry,

its effects could potentially contaminate perceptions—further reinforcing the need for objectivity and impartiality in research. María and Miller (2010) discounted the timeworn notion of internal and external validity as a trade-off, instead asserting the importance of ensuring that the study measures its intended target and that findings generate the most empirically applicable research outcomes.

Construct Validity

In the current study, I took active measures to actively avoid many of the potential threats to construct validity discussed by Cook and Campbell (1979). First, operational definitions that lack clarity could result in a failure to explain the precise meaning of the constructs, thus yielding inaccurate data (Cook & Campbell, 1979). I avoided this issue by providing objective, peer reviewed operational definitions that served to minimize the margin of interpretative error. In addition, a percentage of participants will experience anxiety about the choice to participate or decline participation in a study (Cook & Campbell, 1979)—an event that could potentially be exacerbated in the event that faculty members participate in the recruitment process. To alleviate the emergence of this effect, I encouraged all faculty members who agreed to participate in the recruitment process to advise all prospective participants that the choice to decline participation in the study would not impact the student-faculty dynamic.

However, the ability to avoid additional threats to construct validity may have proven more challenging throughout the course of the current study. Involvement by participants in programs that either promoted self-efficacious behavior (e.g., military training) or that supported psychological health (e.g., counseling therapies) could have

resulted in an interactive effect (Cook & Campbell, 1979) yielding a similar impact to that which was being examined in the current study. Further, concerns specific to performance (i.e., perceived accuracy of responses) and vanity (i.e., appearing competent) are noteworthy given their potential impact on research outcomes (Cook & Campbell, 1979). Optimally, participants would remain calm, honest, and engage in critical thinking about their responses; however, a range of biopsychosocial factors perhaps impact the assurance of such conditions.

Ethical Procedures

With respect to the APA guidelines for ethical protections in the treatment of human participants, I stringently adhered to the ethical guidelines set forth by the Walden IRB and the IRBs of all participating community research partners. During the informed consent process, I advised participants of their ability to withdraw from participation at any time. In addition, the fact that participants could withdraw at will and without any negative repercussions was strongly emphasized. In the event that participants elected to withdraw from the study prior to its conclusion due to the occurrence of an adverse psychological event, measures would be implemented to inform the respective community research partner IRB of the event in order to expedite a safe and humanistic resolution to the issue.

In an effort to ensure participant anonymity, the weblink option that I employed in the current study did not register IP addresses (SurveyMonkey, 2013). In addition, I did not require participants to create unique identifiers (i.e., usernames, passwords); therefore, participant identity remained anonymous throughout the duration of the study.

With regard to data transfer, participant responses were recorded via the survey weblink; their responses were subsequently displayed in the analysis section of the survey account (SurveyMonkey, 2013). Next, I scored the raw data via the respective instrument, which was saved in an Excel (Microsoft, 2008) file and subsequently transferred to SPSS (IBM, 2013) for statistical analysis. Following the analysis phase, both raw and statistical data were securely stored on a dedicated external hard drive, with access restricted via a password-protected administrator lock. I will regularly update all electronic storage media associated with the data to ensure adherence to current efficiency standards; virus protection will be periodically updated to ensure the electronic integrity of the data set. Finally, I will ensure that the data will be secured in this location for five years; its disposition will be subject to the discretion of Walden University.

Despite the non-invasive, survey-based method of inquiry that I employed in the current study, Punch (2005) observed several noteworthy ethical considerations that have relevance to the protection of both the participant and researcher. With regard to the research problem examined in the current study, promoting the betterment—not the marginalization (Punch, 2005)—of college seniors was critical to the current research initiative. Rather than simply elucidating the factors that challenge ESE, DO, and PS, findings in the current study will serve to promote the capacity of individuals to enhance health competencies, promote perceived controllability over future outcome expectancies, and establish adaptive appraisals of challenge. In addition, Sarantakos (2005) asserted the importance of ensuring that participants are fully informed of the purpose of the study—a point that was made explicitly clear during the informed consent portion of the current

study. Yet regardless of the clarity of information dissemination, it was ethically prudent to ensure that participants felt able to inquire about the intent of my research at any point within the context of the study.

While Berg (2001) noted the importance of debriefing in qualitative studies as a means of maintaining ethical conduct, opportunities for participant-to-researcher communication should perhaps be permitted regardless of the research model. As such, the current study provided opportunities for post-survey commentary to allow participants to report on adverse events, general psychological experiences, and emergent perspectives catalyzed by the survey experience. In specific instances, such reports could elucidate whether the framing of questions had a positive or negative post-study impact on participants—a critical finding that could serve to enhance the efficacy of future survey experiences. Further, it was within the scope of ethical conduct for me to include a final "thank you" page as an expression of my gratitude to respondents for the expenditure of their time and effort to participate.

Finally, the overarching notion of the college institution as a culture was central to the current research—an ideal that I upheld and respected by maintaining an ongoing awareness of the academic, spiritual, and psychosocial needs of this specific cohort. Moreover, the participant—as a primary contributor to the ever-expanding body of evidence on prohealth lifestyles—was instrumental to discovering how such contributions have transferability to the skills that promote future social change agency.

Summary

In Chapter 3, I discussed the purposive, cross-sectional design of the current study—a method that ultimately yielded descriptive detail to the findings presented in the upcoming chapters. Given the ever-progressive technological immersion of college students (Tomaiuolo, 2005) in an increasingly tech-driven world, the use of a web-based survey method was integral to data collection efforts. The BARSE (McAuley, 1992), LOT-R (Scheier et al., 1994), PSS-10 (Cohen & Williamson, 1988), and SECQ (Marcus et al., 1992; Norman et al., 1998) are empirically validated measures that have been proven to yield reliable data across myriad research domains, each of which possessed the simplicity and brevity required to effectively capture the self-perceptions of the college senior cohort.

Subsequent to data collection protocols, I conducted the following statistical analyses via SPSS v.21.0 (IBM, 2013): (a) three one-way between-groups ANOVAs that examined mean differences in ESE, DO, and PS scores as they related to current physical activity level; (b) three bivariate correlation analyses that examined the relationships between mean ESE, DO, and PS scores; and (c) standard multiple regression modeling that examined whether DO, PS, and sex predicted ESE scores. Given the need for ethical protections implemented to safeguard participant welfare (APA, 2010), a comprehensive informed consent process and the opportunity for participant-researcher communication served to centralize the role of the participant as what is perhaps the most vital component of the research process.

In Chapter 4, I summarize details pertaining to data collection efforts, including aspects of time frame, recruitment, and how the final sample size and characteristics

yielded adequate representativeness. In addition, I present a comprehensive overview of the results of the current study, which include a presentation of descriptive statistics, statistical analyses, and tables that provide enhanced clarity to the interpretation of findings. Overall, I elucidate how the differences, relationships, and predictors of ESE, DO, PS, and current physical activity level reflect a population on the verge of significant transition.

Chapter 4: Results

The issue of health inattention in the college population (ACHA, 2008; USDHHS, 2008) has overarching implications for the ability of college seniors to successfully navigate the impending real-world transition. When combined with vocational (Wood, 2004) and financial (Norvilitis et al., 2006) concerns, the manner in which college seniors view such challenges may have implications for outcome expectancies. Similarly, the capacity for students to adaptively appraise stress may affect their perceived ability to cope during this period. Employing a triadic framework of self-efficacy, attribution, and appraisal theories, I examined (a) whether mean differences in ESE, DO, and PS scores exist in relation to current physical activity level; (b) whether relationships exist between mean ESE, DO, and PS scores; and (c) whether DO, PS, and sex predict ESE scores.

In the following chapter, I provide a presentation of the current findings, which highlight the various intersections between ESE, DO, and PS and, more specifically, elucidate the factors that underscore the problem of health inattention for college seniors. First, I discuss the time frame of the study and the events that resulted in actual and usable data. Secondly, I present descriptive and sociodemographic characteristics that provide a dynamic view of sample heterogeneity and representativeness. Descriptive statistics will include measures of central tendency and distribution characteristics specific to the age, sex, ethnicity, student status, athletic status, residential status, and college major of participants.

Lastly, I present a summary of the results of the statistical analyses that served to test the following three research hypotheses: (a) three one-way between groups ANOVA

used to determine whether current level of physical activity impacted mean ESE, DO, and PS scores; (b) three bivariate correlation analyses used to determine whether relationships existed between ESE, DO, and PS scores; and (c) standard multiple regression modeling used to determine whether DO, PS, and sex predicted ESE scores. Tables have been provided to facilitate discussion and optimize reader comprehension.

Data Collection

Time Frame, Actual Recruitment, and Response Rates

Participants accessed 177 electronic surveys via the WebLink Collector URL function (SurveyMonkey, 2013) between the months of July and December 2013. Based on the power analysis for sample size previously discussed in Chapter 3, I initially targeted a total sample size of 200; however, the continual addition of community research partners eventually led to the exhaustion of recruitment resources over the five-month data collection phase. By December, I confirmed a final sample size of 177 and data collection efforts were discontinued. Of the 177 responses, 138 were deemed usable as a result of partial completion. Based on the ratio of total-to-usable surveys submitted, the overall usability rate was 78%.

Of the 138 usable survey responses, nine surveys had missing data points in the section derived from the BARSE (i.e., exercise self-efficacy). Of the nine cases that had missing data points, only one data point was missing per case. According to E. McAuley (personal communication, December 8, 2013), sample item mean substitution is a standard practice for addressing data missingness associated with the BARSE. For Likert-based studies missing < 20% of data values, Downey and King (1998) highlighted the

efficacy of sample item mean substitution as an effective data replacement method. After applying mean substitution to the aforementioned data points, a total of 138 surveys were available for analysis.

Emergence of Adverse Events

Throughout the data collection phase, there were no instances of psychological harm or other adverse events reported by a survey respondent. However, several participants submitted comments ranging from thought provoking ideas about exercise motivation, to suggestions about how to enhance the comprehensibility of the survey questions, to perspectives about how the survey questions related to current issues in their personal life, to expressing good wishes for the outcome of my dissertation.

Data Cleaning and Screening Procedures

In an effort to avoid bias and statistical confounds (Muller, Freytag, & Leser, 2012), I screened and cleaned data prior to analysis. Data cleaning facilitates the monitoring of inadvertent errors that occur because of the data collection and recording processes, including but not limited to missing data codes, keystroke errors, and coding errors (Muller et al., 2012). The most frequently encountered issues in data analysis pertain to (a) insufficient data due to missing values; (b) outliers that influence the proximity of the mean from the median value; (c) the shape, skewness, and kurtosis of the distribution; and (d) the degree of linearity between variables (Tabachnick & Fidell, 2012).

Detection of Multivariate Outliers

In the current study, I generated a Mahalanobis' D^2 statistic (IBM, 2013) to detect multivariate outliers in the data set (i.e., values for ESE, DO, PS, and sex). Employing critical X^2 value = 18.47, p = .001, and df = 4 as parameters, the Mahalanobis' D^2 value of 8.27 did not exceed the critical X^2 value. In addition, all *p_mah_1* values in SPSS were greater than or equal to .001, with the smallest value .02—suggesting no evidence of outliers in the distribution.

Despite their potential influence on the relationship between mean and median values (Tabachnick & Fidell, 2012), Seaman and Allen (2010) cautioned against the arbitrary removal of outliers, asserting that their deletion could impact the characterological complexities of the data. Similarly, Osbourne and Overbay (2004) maintained the idea that extreme values are random occurrences with the potential for real-world applicability. Given the highly individualized nature of subjective self-report, the aforementioned views suggest that the perceptual heterogeneity of the participants could potentially enhance the overall generalizability of the findings.

The nine research hypotheses that I tested in the current study were:

RQ1: Do mean exercise self-efficacy scores significantly differ by physical activity level in college seniors?

$H_0$1: There are no significant mean differences in exercise self-efficacy scores by physical activity level in college seniors.

$H_1$1: There are significant mean differences in exercise self-efficacy scores by physical activity level in college seniors.

RQ2: Do mean dispositional optimism scores significantly differ by physical activity level in college seniors?

$H_0$2: There are no significant mean differences in dispositional optimism scores by physical activity level in college seniors.

$H_1$2: There are significant mean differences in dispositional optimism scores by physical activity level in college seniors.

RQ3: Do mean perceived stress scores significantly differ by physical activity level in college seniors?

$H_0$3: There are no significant mean differences in perceived stress scores by physical activity level in college seniors.

$H_1$3: There are significant mean differences in perceived stress scores by physical activity level in college seniors.

RQ4: Is there a statistically significant relationship between mean exercise self-efficacy and dispositional optimism scores in college seniors?

$H_0$4: There is no statistically significant relationship between mean exercise self-efficacy and dispositional optimism scores in college seniors.

$H_1$4: There is a statistically significant relationship between mean exercise self-efficacy and dispositional optimism scores in college seniors.

RQ5: Is there a statistically significant relationship between mean dispositional optimism and perceived stress scores in college seniors?

$H_0$5: There is no statistically significant relationship between mean dispositional optimism and perceived stress scores in college seniors.

$H_1$5: There is a statistically significant relationship between mean dispositional optimism and perceived stress scores in college seniors.

RQ6: Is there a statistically significant relationship between mean exercise self-efficacy and perceived stress scores in college seniors?

$H_0$6: There is no statistically significant relationship between mean exercise self-efficacy and perceived stress scores in college seniors.

$H_1$6: There is a statistically significant relationship between mean exercise self-efficacy and perceived stress scores in college seniors.

RQ7: Do dispositional optimism scores predict exercise self-efficacy scores while controlling for perceived stress scores and sex in college seniors?

$H_0$7: Dispositional optimism scores do not predict exercise self-efficacy scores while controlling for perceived stress scores and sex in college seniors.

$H_1$7: Dispositional optimism scores predict exercise self-efficacy scores while controlling for perceived stress scores and sex in college seniors.

RQ8: Do perceived stress scores predict exercise self-efficacy scores while controlling for dispositional optimism scores and sex in college seniors?

$H_0$8: Perceived stress scores do not predict exercise self-efficacy scores while controlling for dispositional optimism scores and sex in college seniors.

$H_1$8: Perceived stress scores predict exercise self-efficacy scores while controlling for dispositional optimism scores and sex in college seniors.

RQ9: Does sex predict exercise self-efficacy scores while controlling for dispositional optimism and perceived stress scores in college seniors?

$H_0$9: Sex does not predict exercise self-efficacy scores while controlling for dispositional optimism and perceived stress scores in college seniors.

$H_1$9: Sex predicts exercise self-efficacy scores while controlling for dispositional optimism and perceived stress scores in college seniors.

Descriptive Statistics for Sociodemographic Characteristics

Table 2 shows descriptive statistics for the 138 senior-level college students (M = 21.46 years, SD = .897) who participated in the study. Forty-three male (31%) and 95 female (69%) students participated. The ethnic distribution showed White/Caucasian participants to have comprised 79% of the sample. Full-time students constituted over 95% of the sample, with less than 11% of participants reported engagement in athletic sports, and more than 50% of participants lived in off-campus housing. Finally, psychology (19%), communication (9%), and sociology (8%) majors responded most frequently to the survey, with all other majors constituting subsamples of $\leq$ 5%.

Table 2

Demographics for Overall Sample (N = 138)

Variable	*n*	%
Sex		
Male	43	31.2
Female	95	68.8
Age		
Mean	21	60.1
Median	21	60.1
Ethnicity		
Asian	8	5.8
Biracial/Biethnic	2	1.4
Black/African American	3	2.2
Hispanic/Latino	10	7.2
Multiracial/Multiethnic	6	4.3
White/Caucasian	109	79.0
Student status		
Part-time	6	4.3
Full-time	132	95.7
Athletic status		
Participate in sports	15	10.9
Do not participate in sports	123	89.1
Residential status		
On campus	55	39.9
Off campus	75	54.3
At home with family	8	5.8

Scale Reliability

Designed to measure competency beliefs, evidence reveals the BARSE to have demonstrated high reliability and validity ratings across various areas of health research in both younger and older adult populations, yielding Cronbach alphas of .88 and .92—high internal consistencies (see McAuley, 1992; McAuley, Jerome, Marquez, Elavsky, & Blissmer, 2003). Yong (2010) noted significant correlations between self-efficacy and DO observed in BARSE-related measures such as the General Self-Efficacy Scale (GSE; Schwarzer, & Jerusalem, 1995) and the Self-Efficacy for Exercise Scale (SEE; Resnick & Jenkins, 2000)—observations that supported the applicability of the BARSE to the college population.

As a measure of future outcome expectancies, the LOT-R (Scheier, Carver, & Bridges, 1994) yielded a reliability rating of .82—a high internal consistency. In a college sample, the LOT-R demonstrated acceptable four-month test-retest reliability yielding an internal consistency of .79. Correlation between the original LOT and the LOT-R is .95 (Scheier et al., 1994). Steed (2002) maintained that the LOT-R and the Hope Scale (HS; Snyder et al., 1991) are superior measures than the Generalized Expectancy for Success Scale-Revised (GESS-R; Hale, Fiedler, & Cochran, 1992) given their brevity and ease of use when evaluating optimism and hope. Measures of optimism have shown applicability across various research domains on general health and well-being, including but not limited to adaptation (Olason & Roger, 2001), goal pursuits (Fung & Carstensen, 2004), and cynicism (Brockway, Carlson, Jones, & Bryant, 2002) in college students.

Further, evidence reveals the PSS-10 (Cohen & Williamson, 1988) as a widely applicable measure of psychosocial stress across myriad populations. In a college sample (n = 285), the six negative items (i.e., perceived helplessness), the four positive items (i.e., perceived self-efficacy), and the combined ten items of the PSS-10 yielded Cronbach's alphas of .85, .82, and .89, respectively (Roberti, Harrington, & Storch, 2006)—high reliability values. In a meta-analysis of 16 studies dating from 2000 to 2012, results showed the PSS-10 to be most applicable to community-based studies that evaluated current and emergent stress in adolescents and older school age students (Al Kalaldeh & Shosha, 2012). The use of the PSS-10 in undergraduate studies (Whitney, 2010), professional student studies (Mane-Abhay, Krishnakumar, Niranjan, & Hiremath-Shashidhar, 2011), and cross-cultural studies (Sebena, El Ansari, Stock, Orosova, & Mikolajczyk, 2012) evince its applicability to the cohort under analysis.

Efficacy data supports the SECQ as an effective staging algorithm for physical activity in college students. Two-week test-retest reliability of the SECQ revealed a kappa index reliability of .78 and an intraclass correlation of .94 (Marcus & Forsyth, 2003)—evidence of significant stability. While the SECQ and related scales have demonstrated proven efficacy in studies that examined college-age cohorts (Fischer & Bryant, 2008; Keating et al., 2005), its application in studies that examined the intersection between exercise behavior and personality (Lochbaum et al., 2010), weightism (Lee, Chang, Liou, & Chang, 2006), energy expenditure (Bulley, Donaghy, Payne, & Mutrie, 2008) and psychological well-being (Jones, Harris, Waller, & Coggins, 2005) evince its practical utility for the assessment of health behavior in young adults.

Results

Research Question 1

In the first research question, I examined whether mean exercise self-efficacy, dispositional optimism, and perceived stress scores significantly differ by physical activity level in college seniors. Table 3 shows descriptive statistics for each of the dependent variables (i.e., ESE, DO, PS) as they relate to each of the independent variables (i.e., precontemplation, contemplation, preparation, action, maintenance) derived by self-selection by participants. Despite the low sample size for the precontemplation group (i.e., 12), I retained this subsample in the current study in order to preserve the stage continuity established by the TTM (Prochaska & DiClemente, 1983).

Table 3

Descriptive Statistics for ESE, DO, and PS by Physical Activity Level

DV	IV	*n*	*M*	*SD*	*SE*	95% CI		Min.	Max.
ESE	Precontemplation	12	20.00	10.08	2.91	[13.59,	26.41]	10	42
	Contemplation	18	35.83	12.46	2.97	[29.64,	42.03]	15	54
	Preparation	34	36.97	12.62	2.17	[32.57,	41.38]	20	68
	Action	28	49.57	16.84	3.18	[43.04,	56.10]	17	83
	Maintenance	46	71.22	16.91	2.49	[66.19,	76.24]	38	100
	Total	138	49.32	22.67	1.93	[45.50,	53.13]	10	100
DO	Precontemplation	12	10.67	4.72	1.36	[7.67,	13.66]	2	17
	Contemplation	18	12.33	5.02	1.18	[9.84,	14.83]	5	21
	Preparation	34	11.79	5.43	0.93	[9.90,	13.69]	2	22
	Action	28	12.36	4.30	0.81	[10.69,	14.02]	5	19
	Maintenance	46	16.74	4.08	0.60	[15.53,	17.95]	7	24
	Total	138	13.53	5.15	0.44	[12.66,	14.40]	2	24
PS	Precontemplation	12	25.17	7.23	2.09	[20.57,	29.76]	15	36
	Contemplation	18	23.61	6.22	1.47	[20.52,	26.71]	12	34
	Preparation	34	24.97	7.55	1.30	[22.34,	27.60]	9	37
	Action	28	21.93	6.60	1.25	[19.37,	24.49]	8	33
	Maintenance	46	16.65	5.98	0.88	[14.88,	18.43]	5	27
	Total	138	21.42	7.47	0.64	[20.16,	22.68]	5	37

Note. ESE = Exercise Self-Efficacy; DO = Dispositional Optimism; PS = Perceived Stress

To test the assumption of normality, I employed $p = .001$ in the Shapiro-Wilk test (Table 4) —a conservative, yet widely held convention in social science research (Tabachnick & Fidell, 2007). Each variable exceeded this value, revealing a normal distribution among factor levels.

Table 4

Test of Normality for ESE, DO, and PS by Physical Activity Level

Variable	Current level of physical activity	Kolmogorov-Smirnov			Shapiro-Wilk		
		Stat.	*df*	*p*	Stat.	*df*	*p*
ESE	Precontemplation	.29	12	.01	.85	12	.04
	Contemplation	.16	18	.20[a]	.93	18	.18
	Preparation	.15	34	.04	.92	34	.02
	Action	.13	28	.20[a]	.97	28	.64
	Maintenance	.13	46	.05	.96	46	.11
DO	Precontemplation	.15	12	.20[a]	.94	12	.52
	Contemplation	.12	18	.20[a]	.95	18	.38
	Preparation	.14	34	.10	.96	34	.20
	Action	.11	28	.20[a]	.94	28	.14
	Maintenance	.12	46	.08	.97	46	.21
PS	Precontemplation	.14	12	.20[a]	.94	12	.55
	Contemplation	.13	18	.20[a]	.97	18	.81
	Preparation	.19	34	.01	.94	34	.07
	Action	.14	28	.20	.95	28	.17
	Maintenance	.11	46	.20[a]	.97	46	.21

Note. [a]This is a lower bound of the true significance.

To further evaluate normality, I applied Bulmer's (1979) mathematical conventions for skewness: < -1 or > +1 (*high*), -1 to -.5 (*moderate*), and -.5 to +.5 (*approximately symmetric*). In addition, I applied the conventions maintained by Balanda and MacGillivray (1988) for kurtosis: ≈ 3 (mesokurtic [*no excess*]), < 3 (platykurtic [*negative excess*]), and > 3 (leptokurtic [*positive excess*]).

However, given the linear transformation generated by SPSS (IBM, 2013), kurtosis is automatically distributed to a value of zero. As shown in Table 5, measures of skewness and kurtosis for ESE, DO, and PS showed marginal platykurtic characteristics, yet did not produce a curve that deviated significantly from a normal distribution—thus validating the assumption of normality.

Table 5

Central Tendency, Standard Deviation, Skewness, and Kurtosis for ESE, DO, and PS

Variable	*M*	Median	*SD*	Skewness	Kurtosis
ESE	49.32	48.50	22.67	0.33	-0.78
DO	13.53	14.00	5.15	-0.14	-0.91
PS	21.42	21.00	7.47	-0.14	-0.68

To test for homogeneity of variances, *F* values for Levene's statistic are shown in Table 6. Each value had a significance value of $p < .001$, thus supporting the conclusion that no significant differences existed between group variances.

Table 6

Levene's Test of Homogeneity of Variances for ESE, DO, and PS

Variable	*F(4, 133)*	*df*1	*df*2	*p*
ESE	2.21	4	133	.07
DO	1.55	4	133	.19
PS	1.06	4	133	.38

I conducted three one-way between-groups ANOVAs in order to examine mean differences in ESE, DO, and PS in relation to five levels of physical activity. Given Cohen's (1988, 1992) conventions for small (i.e., .1), medium (i.e., .25), and large (i.e.,

.4) ANOVA effects, Table 7 reveals statistically significant differences in current level of activity at the $p < .05$ level for ESE [$F(4, 133) = 45.96$, $p < .05$, $\eta^2 = .58$]—a large effect, DO [$F(4, 133) = 8.50$, $p < .05$, $\eta^2 = .20$]—a medium effect, and PS [$F(4, 133) = 9.79$, $p < .05$, $\eta^2 = .23$]—a medium effect. In sum, findings suggested that ESE, DO, and PS scores were differentially impacted by current level of physical activity.

Table 7

ANOVA for ESE, DO, and PS

Variable		*SS*	*MS*	*F*(4, 133)	η^2
ESE	Between Groups	40833.82	10208.45	45.96	.58
	Within Groups	29542.15	222.12		
	Total	70375.97			
DO	Between Groups	738.86	184.72	8.50	.20
	Within Groups	2891.52	21.74		
	Total	3630.38			
PS	Between Groups	1736.42	434.10	9.79	.23
	Within Groups	5899.21	44.36		
	Total	7635.62			

In an effort to determine precisely which physical activity levels yielded the most statistically significant impact for ESE, DO, and PS, I conducted a post hoc analysis that employed Tukey's HSD test for multiple comparisons (Tukey, 1953) to obtain simultaneous contrasts of factor level means (Tables 8-10). Compared to Scheffé's method, which is a more conservative (i.e., less statistically powerful) test that yields narrower confidence intervals when all pairwise comparisons are examined (Scheffé, 1959), I selected Tukey's test as my post hoc analysis of choice in an effort to optimally control for the commission of Type II errors.

Table 8

Tukey's Test for Multiple Comparisons: ESE

(I) Activity level	(J) Activity level	*M* Diff. (I-J)	*SE*	*p*	95% CI	
Precontemplation	Contemplation	-15.83	5.55	.04	[-31.19,	-.47]
	Preparation	-16.97	5.00	.01	[-30.81,	-3.13]
	Action	-29.57	5.14		[-43.79,	-15.35]
	Maintenance	-51.22	4.83		[-64.58,	-37.86]
Contemplation	Preparation	-1.14	4.34	1.00	[-13.15,	10.88]
	Action	-13.74	4.50	.02	[-26.19,	-1.29]
	Maintenance	-35.38	4.14		[-46.84,	-23.92]
Preparation	Action	-12.60	3.80	.01	[-23.12,	-2.08]
	Maintenance	-34.25	3.37		[-43.57,	-24.92]
Action	Maintenance	-21.65	3.57		[-31.53,	-11.77]

Table 9

Tukey's Test for Multiple Comparisons: DO

(I) Activity level	(J) Activity level	*M* Diff. (I-J)	*SE*	*p*	95% CI	
Precontemplation	Contemplation	-1.67	1.74	.87	[-6.47,	3.14]
	Preparation	-1.13	1.57	.95	[-5.46,	3.20]
	Action	-1.69	1.61	.83	[-6.14,	2.76]
	Maintenance	-6.07	1.51		[-10.25,	-1.89]
Contemplation	Preparation	0.54	1.36	1.00	[-3.22,	4.30]
	Action	-0.02	1.41	1.00	[-3.92,	3.87]
	Maintenance	-4.41	1.30	.01	[-7.99,	-.82]
Preparation	Action	-0.56	1.19	.99	[-3.85,	2.73]
	Maintenance	-4.95	1.06		[-7.86,	-2.03]
Action	Maintenance	-4.38	1.12		[-7.47,	-1.29]

Table 10

Tukey's Test for Multiple Comparisons: PS

(I) Activity level	(J) Activity level	*M* Diff. (I-J)	*SE*	*p*	95% CI	
Precontemplation	Contemplation	1.56	2.48	.97	[-5.31,	8.42]
	Preparation	0.20	2.24	1.00	[-5.99,	6.38]
	Action	3.24	2.30	.62	[-3.12,	9.59]
	Maintenance	8.51	2.16		[2.54,	14.48]
Contemplation	Preparation	-1.36	1.94	.96	[-6.73,	4.01]
	Action	1.68	2.01	.92	[-3.88,	7.25]
	Maintenance	6.96	1.85		[1.84,	12.08]
Preparation	Action	3.04	1.70	.39	[-1.66,	7.74]
	Maintenance	8.32	1.51		[4.15,	12.48]
Action	Maintenance	5.28	1.60	.01	[0.86,	9.69]

For ESE, Tukey post-hoc comparisons of the five physical activity levels showed several statistically significant pairwise differences in mean scores at the $p < .05$ level. When compared to mean ESE scores reported for the precontemplation stage (*M* = 20.00, *SD* = 10.08, 95% CI [13.59, 26.41]), students in the following stages reported significantly higher mean ESE scores: contemplation (*M* = 35.83, *SD* = 12.46, 95% CI [29.64, 42.03]), preparation (*M* = 36.97, *SD* = 12.62, 95% CI [32.57, 41.38]), action (*M* = 49.57, *SD* = 16.84, 95% CI [43.04, 56.10]), and maintenance (*M* = 71.22, *SD* = 16.91, 95% CI [66.19, 76.24]).

When compared mean ESE scores reported for the contemplation stage (*M* = 35.83, *SD* = 12.46, 95% CI [29.64, 42.03]), students in the action (*M* = 49.57, *SD* =

16.84, 95% CI [43.04, 56.10]) and maintenance (*M* = 71.22, *SD* = 16.91, 95% CI [66.19, 76.24]) reported significantly higher mean ESE scores.

When compared to mean ESE scores reported for the preparation stage (*M* = 36.97, *SD* = 12.62, 95% CI [32.57, 41.38]), students in the action (*M* = 49.57, *SD* = 16.84, 95% CI [43.04, 56.10]) and maintenance (*M* = 71.22, *SD* = 16.91, 95% CI [66.19, 76.24]) stages reported significantly higher mean ESE scores.

When compared to mean ESE scores reported for the action stage (*M* = 49.57, *SD* = 16.84, 95% CI [43.04, 56.10]), students in the maintenance stage (*M* = 71.22, *SD* = 16.91, 95% CI [-32.81, -10.49]) reported significantly higher mean ESE scores than students in all other stages of change. Overall, exercise maintainers reported the highest mean ESE scores.

In comparison to mean DO scores reported for the precontemplation (*M* = 10.67, *SD* = 4.72, 95% CI [7.67, 13.66]), contemplation (*M* = 12.33, *SD* = 5.02, 95% CI [9.84, 14.83]), preparation (*M* = 11.79, *SD* = 5.43, 95% CI [9.90, 13.69]), and action (*M* = 12.36, *SD* = 4.30, 95% CI [10.69, 14.02]) stages, significantly higher mean DO scores were reported for the maintenance stage (*M* = 16.74, *SD* = 4.08, 95% CI [15.53, 17.95]). As in the case of ESE, exercise maintainers reported the highest mean DO scores.

In comparison to mean PS scores reported for the precontemplation (*M* = 25.17, *SD* = 7.23, 95% CI [20.57, 29.76]), contemplation (*M* = 23.61, *SD* = 6.22, 95% CI [20.52, 26.71]), preparation (*M* = 24.97, *SD* = 7.55, 95% CI [22.34, 27.60]), and action (*M* = 21.93, *SD* = 6.60, 95% CI [19.37, 24.49]) stages, significantly higher mean PS scores were reported for the maintenance stage (*M* = 16.65, *SD* = 5.93, 95% CI [14.88,

18.43]). Here, exercise maintainers reported the lowest mean PS scores of any physical activity level.

Research Question 2

In the second research question, I examined whether relationships exist between mean exercise self-efficacy, dispositional optimism, and perceived stress scores in college seniors. Scatter plots revealed general linear relationships for all variables, thus validating the respective assumptions of normality and linearity. Pearson correlations for ESE, DO, and PS scores are shown in Table 11.

Table 11

*Pearson Correlations between ESE, DO, and PS (*N *= 138)*

Variable	DO	PS
ESE	.52	-.59
DO		-.77

Note. All correlations significant at $p < .001$ (2-tailed).

I conducted multiple Pearson product-moment correlation analyses to examine the relationships between mean ESE ($M = 49.32$; $SD = 22.67$), DO ($M = 13.53$; $SD = 5.15$), and PS ($M = 21.42$; $SD = 7.47$) scores. Adhering to Cohen's (1988, 1992) conventions for small (i.e., .1), medium (i.e., .3), and large (i.e., .5) correlation effects, results showed a significant large positive relationship between ESE and DO scores, $r(136) = .52$. As indexed by R^2, 27% of the variance was accounted for by the relationship between ESE and DO scores. Students who reported higher mean ESE scores concurrently reported higher mean DO scores.

In addition, results indicated a significant large negative relationship between ESE and PS scores, $r(136) = -.59$. As indexed by R^2, .34% of the available variance was accounted for by the relationship between ESE and PS scores. Here, students who reported higher mean ESE scores concurrently reported lower mean PS scores. Finally, results showed a significant very large negative relationship between DO and PS scores, $r(136) = -.77$. As indexed by R^2, 59% of the available variance was accounted for by the relationship between DO and PS scores. Students who reported higher mean DO scores concurrently reported lower mean PS scores.

Research Question 3

In the third research question, I examined whether dispositional optimism, perceived stress, or sex significantly predict exercise self-efficacy scores in college seniors. I employed standard multiple regression modeling to identify the variable that would reveal the greatest predictive utility for ESE while alternately controlling for the other variables. In this analysis, DO and PS were continuous variables, whereas sex (i.e., categorical) was dummy coded into a dichotomous variable for the observation of contrasts (Wendorf, 2004).

Prior to conducting the analysis, I tested the basic assumptions of regression to ensure analytical robustness. To test the assumption of linearity, I generated partial regression plots, which indicated the presence of linear relationships between the criterion and predictor variables included in the regression model (Larsen & McCleary, 1972). In addition, I tested the assumption of homoscedasticity in order to optimize *b*-values and to ensure parameter accuracy (Cook & Weisberg, 1982). Constant error

variance and adequate consistency of spread within the distribution suggested no evidence of heteroscedasticity.

Further, I produced a scatter plot of studentized residuals, which yielded a random distribution (i.e., no distinguishable cluster or pattern) of data values—no observable autocorrelation was detected among variables, thus, validating the assumption of independence among observations. In order to determine the correlations that yielded statistical confounds, I generated multicollinearity statistics to assess for potentially adverse impacts on regression estimates (Kumar, 1975). Adhering to Marquardt's (1970) conventions for multicollinearity (i.e., tolerance > .10; VIF < 10), collinearity statistics (Table 13) revealed non-significant intercorrelations between predictor variables and, thus, no evidence of multicollinearity.

Finally, the distribution approximated normal curvature and showed a minimal deviation of the expected values from the observed values. Table 12 displays the Pearson correlations and associated significance values for the criterion (i.e., ESE) and predictor variables (i.e., DO, PS, and sex) examined in this research question.

Table 12

*Pearson Correlations between ESE, DO, PS, and Sex (*N = *138)*

Variable	DO	PS	[a]Sex
ESE	.52	-.59	.27
DO		-.77	.18
PS			.-26

Note. All correlations significant at $p < .001$ (2-tailed). [a]Coded as 0 = male, 1 = female.

Table 13 shows the unique statistical contributions of each predictor variable to the regression model. Cohen's (1988, 1992) conventions for small (i.e., .02), medium (i.e., .13), and large (i.e., .26) multiple R^2 effects were applied.

Table 13

*Regression Summary Table: DO, PS, and Sex for ESE (*N = *138)*

Variable	B	*SE*	β	*t*	95% CI		Tolerance	r^2
(Constant)	69.15	12.62		5.48	[44.19,	94.12]		
DO	0.82	0.47	0.19	1.75	[-0.11,	1.75]	0.41	.011
[a]PS	-1.24	0.33	-0.41	-3.77	[-1.90,	-0.59]	0.40	.072
Sex	-6.27	3.45	-0.13	-1.82	[-13.11,	0.56]	0.93	.015

Note. R = .61; R^2 = .37; F = 26.51; [a]PS (p =.02).

I employed standard multiple regression modeling to evaluate the predictive utility of DO, PS, and sex for ESE, while simultaneously controlling for each variable under analysis. The R for the regression (.61) was statistically significant, $F(3,134) = 26.51$, $p < .001$, $R^2 = .37$. PS had a statistically significant negative regression weight (β = .-41, $p = .02$), accounting for 36% of the variability between the criterion and predictor variables. Of the three predictor variables tested in the model, only PS contributed significantly to ESE at the $p < .05$ level, indicating that students with lower PS scores were predicted to experience higher levels of ESE.

Summary

In my review of the data analyses, I noted several important findings pertaining to exercise self-efficacy, dispositional optimism, and perceived stress in college seniors. For the three one-way between-groups ANOVAs conducted in the first hypothesis test, I found statistically significant mean differences in ESE, DO, and PS scores by activity

level in college seniors. First, ESE scores increased as current level of activity increased, indicating a positive relationship. In addition, DO scores increased in relation to each successive physical activity level, with the exception of an observable decrease during the transition from the contemplation to preparation stages. By contrast, PS scores trended negatively across all levels of activity, with the exception of a slight positive trend between the contemplation and preparation stages. Post hoc analysis revealed several statistically significant pairwise differences in variable means, with maintainers reporting (a) the highest mean ESE and DO scores and (b) the lowest mean PS scores. Overall, the results support the omnibus hypothesis that significant differences in ESE, DO, and PS exist by physical activity level in college seniors; however, not all pairwise comparisons were statistically significant.

For the multiple bivariate correlation analyses conducted in the second hypothesis test, I observed differences in strength, direction, and significance among the relationships between mean ESE, DO, and PS scores. Results showed a large positive relationship between mean ESE and DO scores, a large negative relationship between mean ESE and PS scores, and a very large negative relationship between mean DO and PS scores. For the standard multiple regression modeling conducted in the third hypothesis test, only PS was observed to have statistically significant predictive utility for ESE in college seniors when controlling for DO and sex. In combination, the findings establish a basis for several viable conclusions about health motivation during the developmentally transitional period associated with the final year of college.

In Chapter 5, I provide a conclusive summary of the current study, including an analysis and interpretation of the findings; a comparison of the limitations presented in Chapter 1 to the emergent, post-study limitations; recommendations for future research; and a discussion that highlights how the results of the current study could have far-reaching implications for positive social change. Finally, I establish a mission statement for future college health initiatives—one that highlights the value of employing a biopsychosocial lens when attempting to indoctrinate prohealth ideals and establish viable partnerships with college students.

Chapter 5: Conclusion and Future Directions

In light of the well-documented lack of attention to good health practices observed across the general college populace, I conducted the current study in an effort to examine three lines of inquiry specific to college seniors. First, I investigated the impact of current physical activity level on ESE, DO, and PS. Results showed statistically significant mean omnibus differences in ESE, DO, and PS scores by physical activity level, with exercise maintainers reporting (a) the highest mean ESE and DO scores and (b) the lowest mean PS scores. Secondly, I examined the strength, direction, and significance of the relationships between ESE, DO, and PS. Results revealed (a) a large positive relationship between mean ESE and DO scores, (b) a large negative relationship between mean ESE and PS scores, and (c) and a very large negative relationship between mean DO and PS scores.

Lastly, I tested whether DO, PS, and sex could predict ESE, with findings showing only PS to have statistically significant predictive utility for ESE when controlling for DO and sex. With the research objectives having been met, the current evidence revealed several noteworthy outcomes pertaining to health beliefs, outcome expectancies, and coping appraisals at the college senior level.

Interpretation of the Findings

Exercise Self-Efficacy

In the first research question, I observed statistically significant mean omnibus differences in ESE, DO, and PS scores as they related to current activity level. Clearly, exercise maintainers showed the highest ESE and DO scores and the lowest PS scores—

findings that have implications for routine exercise engagement as a critical indicator of exercise competency, outcome expectancies, and stress perception. The upward trend in PS scores observed between the contemplation and preparation stage had implications for the presumed anticipatory stress of approaching the action level—a stage that Fallon and colleagues (2005) associated with the highest rate of exercise programming dropout.

The current findings corroborated previous data reported by Pimenta, Leal, and Maroco (2008) that highlighted the significant impact of activity level on the health self-efficacy perceptions of individuals. In addition, the current research supported the findings previously reported by Keating and colleagues (2009), which revealed significantly higher reports of ESE in exercise maintainers versus infrequent exercisers. Such findings extend the work of Deci and Ryan (1985, 2000) on health competency and mastery beliefs, and further align with the adherence characteristics observed by Anshel and Seipel (2006) in college exercise maintainers. Overall, the current findings address a gap in the extant body of evidence: For college seniors, exercise maintenance was positively linked to ESE and DO and negatively linked to PS—highlighting the practical utility of routine exercise as a mechanism of health competencies, future outcome expectancies, and, perhaps most significantly, stress management for this cohort.

Dispositional Optimism

In the second research question, I observed statistically significant relationships between ESE, DO, and PS. The large effect sizes yielded within the analysis (i.e., all correlations > .5) substantiated the strength of the relationships among the variables. The strong positive relationship observed between ESE and DO supported the position

maintained by Roddenberry and Renk (2010) that suggested health locus of control to be integral to the ESE experience. Similarly, linkages between optimism and self-protective health behaviors (Carver et al., 2010) and ESE and various aspects of DO (Sidman et al., 2009) highlight the connectivity between competency beliefs and perceived controllability over outcomes—findings that have multidimensional implications for college seniors given the value of self-efficacy and perceived control during a period of identity formation and future planning.

In addition, findings revealed a significant negative relationship between DO and PS; that is, as DO increased, PS decreased. This finding has implications for the potential impact of perceived controllability on stress level, and corroborates the work of Nes and Segerstrom (2006) that revealed significant linkages between DO and approach characteristics (i.e., addressing stressors), not avoidance characteristics (i.e., ignoring stressors). Further, the current findings corroborate the work of Huan, Yeo, Ang, and Chong (2006) who observed a significant correlation between higher DO and lower academic stress in college students. Given the scoring conventions established by Scheier and colleagues (1994) for low (i.e., 0-13), medium (i.e., 14-18), and high (i.e., 19-24) levels of optimism, the overall sample mean DO score of 13.53 has implications for the perceptions of controllability and outcome expectancies held by college seniors.

Perceived Stress

In the third research question, I observed PS to have the greatest predictive utility for ESE when controlling for DO and sex. As previously observed in the first research question, mean PS scores reported by exercise maintainers (M = 16.65) were lower than

scores reported by students in the action (*M* = 21.93), preparation (*M* = 24.97), contemplation (*M* = 23.61), and precontemplation (*M* = 25.17) stages of change. When applied to a predictive model for ESE, findings highlight the potential effect of PS on barrier efficacy and approach-avoidance perceptions; in other words, stress perception can dramatically influence extent to which college seniors feel competent enough to approach the challenge of adopting prohealth behaviors.

The negative relationship observed between ESE and PS corroborates the work of Collins and colleagues (2009), who cited the appreciable impact of physical activity on stress level. In addition, the current findings underscore the work of Welle and Graf (2011), who identified linkages between college-age stress and psychophysiological health and well-being. Here, perceived coping ability (Lazarus 1982, 1991) and coping approach (Smith & Kirby, 2009) are presumed to drive health self-efficacy beliefs of individuals supporting the inference that senior-year stress level is not only influential to competency perceptions and mastery beliefs, but foreshadows potential challenges for decisional capacity and problem solving skills that are essential to success in postgraduation life. Given the scoring conventions established by Cohen and Williamson (1988) for high stress levels (i.e., > 20), the overall sample mean PS score of 21.42 underscores the salient coping and adaptation challenges experienced by this population.

Current Level of Physical Activity

Above and beyond all other physical activity levels, exercise maintenance—as a physical activity level, a stage of behavior change, and a lifestyle ideal—was an integral construct in the current findings. As previously noted, maintainers reported the highest

mean ESE and DO scores—a finding that has implications for the perceived mastery of behaviors that fundamentally contribute to successful outcomes in students. In addition, such evidence has implications for the extent to which college seniors weigh the costs and benefits of exercise engagement—an allusion to previous findings that showed maintainers as having reported higher levels of ESE and decisional balance (Wallace & Buckworth, 2001) and resourcefulness (Kennett, Worth, & Forbes, 2009) than individuals in the prior four stages of change. With exercise maintainers having reported the lowest mean PS scores in the current study, the exercise-stress management linkage becomes an increasingly salient consideration during the graduation transition and beyond.

Limitations of the Study

As observed in many empirical studies that employ participant self-report as the primary response mechanism in the health domain (see Gorber, Tremblay, Moher, & Gorber, 2007; Prince, Adamo, Hamel, Hardt, Gorber, & Tremblay, 2008), the current study was subject to limitations that could have impacted the reliability of data collection. As discussed in Chapter 1, I assumed that specific factors could potentially impact the generalizability of findings and, moreover, the validity of conclusions. As I presumed, the most noteworthy limitations of the current study were (a) the time frame and (b) the characteristics inherent to online surveys.

With regard to time frame, the fact that the data collection phase began during the summer semester (e.g., period of low student attendance, limited participant availability) could have accounted for the slow initial response rate. Presumably, some students may have experienced a differential ability to focus during a specific semester given periods

of lower or higher matriculation. Similarly, the time of the semester (e.g., return from summer break, exam periods, holidays) during which responses were submitted could have differentially impacted the quality of participant response. Here, it is unknown whether students experienced differential levels of ESE, DO, or PS in the summer or fall semesters, given the plausible psychosocial impact of academic stress, impending graduation, and weather on self-perceptions.

With personality and engagement style cited as additional contributive factors in response bias for students (Porter & Whitcomb, 2005), the impossibility of determining which community research partners (a) yielded a greater contribution to the collective survey response and (b) provided the greatest degree of stress management support to their students reflected an unknown and potentially confounding variable in the current study. Given the conventions for stress level (i.e., 13 = average; > 20 = high) established by Cohen and Williamson (1988), the overall sample mean PS score (M = 21.42) not only reflects the exceedingly high cumulative stress level experienced by participants, but has implications for response accuracy and, most critically, the validity of findings.

With regard to survey mode, Dillman's (2000) observation of the limitations of online surveys, specifically that non-response is more prevalent in web versus paper surveys, may have posed an additional limitation within the current study. Here, current evidence shows web surveys to yield 11% fewer response rates than e-mail, postal mail, fax, telephone, and touch-tone modalities (Manfreda, Berzelak, Vehovar, Bosnjak, & Haas, 2008)—a concern that has been linked to issues in the development, delivery, completion, and return phases of the survey design and experience (Fan & Yan, 2010).

While it is unknown whether paper surveys would have induced a similar degree of non-responsiveness in the current study, it was plausible to presume that (a) the virtual (i.e., nonmaterial) nature of the web survey, (b) the rate at which participants perused and processed survey questions, (c) the voluntary nature of the study, and (d) the pervasive stress factor may have significantly contributed to participant non-response and response bias. Yet, while it was critical to acknowledge the possible existence of unknown variables in the current study, the mere identification of correlations between specific phenomena does not imply causal relationships (Bewick, Cheeck, & Ball, 2003).

Recommendations

In light of the findings generated within the current study, the recommendations for future research are many. In the following section, I highlight various social, psychological, and cultural considerations as they apply to potential directions for future research in the college health domain.

Capitalize on the Early Stages of the College Experience

As with all stages of human development, need satisfaction is critical to self-fulfillment (Maslow, 1954). Here, critical linkages have been observed between basic need satisfaction, the adoption of deep versus superficial learning approaches, and the application of approach versus avoidance achievement strategies (Betoret & Artiga, 2011). In addition, lower self-efficacy and greater disinterest in academic challenge has been observed more frequently in upper classmen than freshmen (Lynch, 2008). Given the negative relationship observed between DO (i.e., outcome expectancies) and PS (i.e., coping appraisal) in the current study, it is perhaps prudent to capitalize on the earlier, not

later, period of the college experience as an opportunity to not only assess basic need requirements, but to encourage students to explore the psychosocial factors that promote the adoption of self-efficacy beliefs (i.e., ESE), perceived controllability over outcomes (i.e., DO), and adaptive appraisals (i.e., PS) in students. Just as personal exploration competency is essential to career readiness (Yang & Gysbers, 2007), the importance of instilling such competencies at the earliest possible opportunity in the college transition—when students are perhaps most willing to self-explore and are most amenable to change—becomes increasingly evident.

Reinforce Perceptions of Controllability

In the current study, perceived control was a central component of the self-efficacy-attribution-appraisal paradigm. Citing Weiner's (1974, 1986) emphasis on perceived controllability over outcomes, the efficacy beliefs of students are presumably contingent upon the extent to which they feel competent about their ability to successfully negotiate and control the factors that influence mastery for specific behaviors (Bandura, 1997). Given (a) the positive association observed between DO and ESE and (b) the negative association observed between DO and PS in the current study, college health initiatives should perhaps seek to identify and promote the psychological characteristics that college students perceive as being within their immediate control. With family history, physiological risk factors, efficacy beliefs, outcome expectancies, individual differences, coping potential, and context cited as primary health risk profile components (Biscaro, Broer, & Taylor, 2004), three of the aforementioned factors—

efficacy beliefs, outcome expectancies, and coping potential—are indisputably within the scope of self-controllability, however mediated by individual differences.

Enrich the Skills that Reinforce Barrier Efficacy During the Preparation Stage

As both a stage of behavior change and a precursor to action, the idea of preparation has wide-ranging applicability and, perhaps, tenuous implications for college seniors. The current data revealed DO to decrease (i.e., students became less optimistic) and PS to increase (i.e., students became more stressed) during the transition from the contemplation to preparation stages—findings that are perhaps highly generalizable to college seniors as they negotiate a significant life transition. As students reconcile issues related to the pregraduation period, flawed outcome expectancies and stress appraisals presumably enhance the threat perceptions associated with the adoption of new behaviors (Rosenstock, Strecher, & Becker, 1988). Here, an argument can be established that suggests the capacity for students to simultaneously prepare for graduation and alleviate the psychosocial barriers to exercise adherence during a period of low DO and high PS is perhaps a tenuous undertaking. In an effort to optimally prepare for the adoption of new behavior during a period of significant challenge, institutions are encouraged to place due emphasis on the teaching and promotion of competency, controllability, and coping skills that reinforce barrier efficacy for college seniors.

Investigate the Addictive Potential of the Exercise Stimulus

In contrast to the focus on exercise non-adherence in college students as a basis for the current study, Adams and Kirkby (2002) purported the existence of a biochemical link between exercise and the catecholaminergic excitation that underpins the addiction

process—highlighting the addictive potential of the exercise stimulus (Warner & Griffiths, 2006). In a college student sample (n = 257), Garman, Hayduk, Crider, and Hodel (2004) found that approximately 22% of students exercised in excess of six hours per week and exhibited a minimum of one exercise-dependent characterological trait. Similarly, current studies on deprivation (Aidman & Woollard, 2003), escapism (Krivoschekov & Lushnikov, 2011), and the psychophysiological impact of withdrawal (Lejoyeux, Avril, Richoux, Embouazza, & Nivoli, 2008) highlight linkages between exercise engagement and addictive patterning. Given the prevalence of an exercise dependent percentage of the general population (see Bamber, Cockerill, & Carroll, 2000; Cox & Orford, 2004; Gapin, Etnier, & Tucker, 2009; Krivoschekov & Lushnikov, 2011) and exercise maintenance as a predominate factor in the current findings, the fact that some individuals appear to innately possess high levels of exercise motivation—while such motivation is unequivocally absent in others—underscores the need to further examine the biopsychological substrates of exercise motivation in the college setting.

Adopt a Biopsychosocial Approach to Addressing Obesity

With lifestyle choices as a potential indicator of future outcomes, the biopsychosocial complexity of health inattention in the college setting (ACHA, 2008) has insidious implications for future health and well-being. Despite the comprehensive and increasing array of alternative physical activity options available to university students worldwide (see Johansson et al., 2011; Ross & Thomas, 2010; Taylor-Piliae et al., 2006), the college-age obesity prevalence continues on an ever-upward trajectory (Desai, Miller, Staples, & Bravender, 2008) with over one-third of all college students currently

diagnosed as either overweight (i.e., body mass index [BMI] = 25.0-29.9 kg/m^2) or clinically obese (BMI > 30.0 kg/m^2) (ACHA, 2008). However, linkages have been observed between routine physical activity and enhanced resilience to the factors that underpin obesity and weight-related disease (Harley et al., 2009)—findings that expose a critical gap between the perceptions that underpin controllability over outcomes and the perceptions that internalize the self-regulatory behaviors associated with weight management. Given the psychosocial implications for stress-related eating (Jääskeläinen et al., 2014) and current data that supports routine exercise as a moderator of obesity and overweight issues in the college setting (Gupta, Ray, & Saha, 2009), a comprehensive systems approach should be undertaken to further examine (a) the physiological, psychological, and contextual substrates of obesity and (b) examine the presumed linkages between health behavior competency (i.e., ESE), future outcome expectancies (i.e., DO), and coping appraisal (i.e., PS) for obesity patterning and related weight pathology in the college-age cohort.

Bridge the Gap Between Intentionality and Behavior

With regard to the exercise stages cited in the first research question of the current study, Nigg (2005) asserted that there is far more to consider in the exercise paradigm than the behavioral component. Above and beyond performance and execution, physical exercise involves the dynamic engagement of various cognitive phenomena, including intentionality (Nigg, 2005). Given the developmental uniqueness of the young adulthood stage of development, the cognitive gaps between intention and behavior are noteworthy, and are presumably mediated by an array of biopsychosocial factors. As maintained by

Schwarzer (1992, 2008), those new to the exercise paradigm experience a period of intention formation that establishes the basis for motivation. Decisional balance (i.e., weighing the pros and cons of behavior change) impacts intention formation, and is salient during the precontemplation, contemplation, and preparation stages of change (Prochaska & DiClemente, 1983). Following this initiation period, such intentions give way to volitional behavior that is moderated by planning and subsequent action, and ultimately results in perceived self-efficacy (Schwarzer, 1992). Therefore, student exercisers are perhaps best supported when introspection about the processes that promote (a) competency and mastery beliefs (i.e., ESE), (b) perceived controllability over future outcomes (i.e., DO), and (c) adaptive appraisals of challenge (i.e., PS) functions as a core component of health awareness programming.

Create Mentorship Opportunities During the Early College Transition

Garrin (2013) discussed the biopsychosocial complexity of young adulthood, a time during which individuals must emancipate and "cross the threshold into accountability, emergent adulthood, and social responsibility" (p. 41, para. 2). Given the college years as a period of increasing independence, linkages identified between maladaptive lifestyle factors and enhanced risk for chronic disease (Nelson et al., 2008) suggest that the adoption of behaviors during this period could have far-reaching impacts across the lifespan. In the current findings, the significance of exercise maintenance had implications for the perceived capacity to master behaviors (i.e., ESE), control future outcomes (i.e., DO), and approach challenge (i.e., PS). Here, the value of exercise adherence characteristics such as perceived competence, planning, action, and challenge

orientation (Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008) cannot be ignored when considering the agentic role of mentors in generalizing such constructs to the indoctrination of self-determined potentials, adaptive appraisals, and prohealth ideals. Just as Wood (2004) highlighted the need for colleges to augment efforts to support the vocational transition, it is perhaps equally prudent for institutions to look beyond the academic value of mentors (Bernier, Larose, & Soucy, 2005) and consider the potential impact of mentorship programming on (a) establishing adaptive strategies for successful integration (Clark, 2005); (b) engendering a professional identity (Shakespeare & Webb, 2008); and (c) cultivating prosocial attitudes, beliefs, and values (Stenfors-Hayes et al., 2010)—factors presumed to have an inestimable influence on both the present and future well-being of students.

Embrace Collaboration as a Dynamic Opportunity for Reciprocal Learning

Despite the frequent allusion to young adulthood as period of ideal health (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008), the developmentally transitional nature of the college years has profound implications for compromises in global well-being. For students, the most believable health information is derived from campus medical staff, health educators, and trusted faculty (Vader, Walters, Roudsari, & Nguyen, 2011); as such, the obligation to disseminate credible, valid prohealth information is an institutional responsibility (Bound, Lovenheim, & Turner, 2010). Presumably, students possess the most personal degree of investment in their well-being—a view that underscores an overarching notion: Programs for students should be established by students (Garrin, 2013). As indicated by the current findings, (a) health

competencies (i.e., ESE) and outcome perceptions (i.e., DO) were positively linked and (b) stress appraisals (i.e., PS) were negatively linked to those who reported the greatest investment in their health and well-being (i.e., exercise maintainers). Therefore, dynamic, thinktank-based initiatives would serve to (a) guide student-focused health program design and implementation while providing institutions with constructive feedback about student health perceptions and (b) most critically examine the factors that influence the competency beliefs (i.e., ESE), perceived controllability over outcomes (i.e., DO), and adaptive stress appraisals (i.e., PS) that impact the ideological investment in prohealth behavior for college students. By reframing away from the idea of health education as a didactic obligation and instead applying efforts to tap the unique phenomenological lens of the student, valued partnerships between students and institutions—golden opportunities for reciprocal learning—can be established.

Implications for Positive Social Change

Beyond the applicability of the current findings to college seniors during a highly transitional period of development, the true power of the research perhaps cannot be fully appreciated until it is applied to the social change paradigm. Throughout the college experience, elements of self-awareness, adaptability, responsibility, and potentiality come to fruition for students (New & Ghafar, 2011), inducing dynamic changes in their ability to evaluate the social condition, negotiate social objectives, and discover their leadership potential. As future leaders, educators, public figures, and parents, college seniors not only stand on the precipice of change, but they are poised to convert intention into action after four years of cultivating their social change competencies.

Garrin's (2013) view of the college years as a "social change classroom" (p. 51, para. 1) illuminates the college experience as a dynamic, ongoing opportunity to develop the social change skills associated with self-efficacy, attribution, and appraisal. In the current study, exercise maintainers reported the highest ESE and DO scores—findings that have implications for the extent to which perceptions of competence (i.e., ESE) and controllability (i.e., DO) promote behaviors that are determined by oneself, not others. By contrast, exercise maintainers reported the lowest PS scores, which suggested that, by maintaining routine engagement in prohealth behavior, coping appraisals (i.e., PS) can be self-regulated. Here, it is through a combination of competency, controllability, and self-regulatory perceptions—and an embrace of the core values that drive self-determination—that social change aptitude is cultivated.

As highlighted in the current study, the core characteristics of ESE, DO, and PS have indirect, yet potentially valuable relevance to the perceptions that fundamentally underpin social change aptitudes. Citing Grande and Srinivas' student leadership model (2001), the college experience promotes the mastery and competence perceptions (i.e., ESE) that in turn promote rational thought. In addition, students develop the capacity become more critical attributors of outcomes (i.e., DO) as they learn to embrace individual differences, eradicate bias, and develop the culturally competencies required for success in a diversity-positive environment (Trotta-Tuomi, 2005). Further, students have opportunities to develop the appraisal skills that ultimately promote objectivity and instill challenge-approach, not challenge-avoidance (i.e., PS), orientations (Grande & Srinivas, 2001). Given the fundamental roles of self-efficacy, attribution, and appraisal in

the characterological development of college students (Garrin, 2013), the aforementioned experiences serve to instill advocacy tendencies, social awareness, leadership roles, and the synergistic perspectives that act as fundamental drivers of social change orientation.

As maintained in the New and Ghafar (2011) model, self-awareness, adaptability, responsibility, and potentiality are inextricably linked to the respective autonomy drives, creative thought processes, leadership orientations, and self-actualizing tendencies that underpin social change orientation. When applying these ideals to social change agency, the intersections observed between ESE, DO, and PS in the current study elucidate emergent linkages between competency, controllability, and appraisal that have viable social change implications: (a) competency and mastery beliefs promote the sense of autonomy and objectivity that underpins self-efficacy and self-awareness, (b) perceived controllability over objectives promotes responsibility for self-determined outcomes, and (c) constructive appraisals of challenge promote adaptability and the willingness to approach and ultimately undertake new objectives—all of which is differentially linked to potentiality and self-actualization.

Allport and Schanck (1936) asserted that attitudes are essentially biological in origin, yet are differentially impacted by culture and are significantly associated with personal motivations. Therefore, it is perhaps prudent to conceive of social change agency as driven by an amalgamation of attitudes, beliefs, and values that are adopted—and dramatically influenced by—the college experience. It is through the indoctrination of these attitudes, beliefs, and values that self-awareness, adaptation, social responsibility, and the capacity to actualize social change outcomes not only emerges, but

is potentiated. From the challenges of integration and assimilation associated with the freshman year to the sense of social purpose and desire of seniors to meaningfully contribute to the greater good, graduation reflects what is perhaps a metaphorical springboard for the application of social change theory to real-world practice.

Conclusion

Given the trajectory of human development, the period preceding graduation can be considered a highly influential biopsychosocial stage in personal development. With looming changes that perhaps hold more questions than answers, beliefs, expectancies, and appraisals are subject to a host of phenomenological events that punctuate this phase of life. Just as Clark (2005) asked freshman students how they negotiate and navigate the college transition, the same question is posed to college seniors who encounter similar but different challenges as they prepare for the real-world transition. Yet, despite the inherent challenges associated with this developmental transition, college seniors—the leaders, role models, and mentors of the future—should be encouraged to introspect on and ultimately apply the many acquired skills and internalized behaviors that have enduring relevance as they begin an exciting, if not precarious, new life phase.

For college students, campus-wide opportunities to bolster self-efficacy are ubiquitous, from efforts to achieve economic self-sufficiency (Heckman & Grable, 2011) to engagement in sexual behavior precautions (Tung, Cook, & Lu, 2011). The seeds of empowerment are sown as students negotiate, feel accountable for, and ultimately internalize their health locus of control—not one that is attributed to others, luck, fate, or chance, but to oneself (White et al., 2011). And given cognitive appraisal as a complex,

cumulative process (Rovira, Edo, & Fernandez-Castro, 2010), an ongoing exploration of available coping resources, style, and potential is essential to stress regulation practices for students. Yet, how to balance the value of active coping and positive reframing while engendering an overarching "acceptance" (Devonport & Lane, 2006, p. 264, para. 4) of stress as an inherent aspect of life is an uncertain, but critically important undertaking in student health education.

Engstrom (2004) discussed sociocultural change and its potentially negative impact upon any sense of urgency to remain physically active. Today, individuals have unprecedented access to sedentary luxuries in communication, work, and transportation (Engstrom, 2004)—conveniences that promote a sense of immediacy and, thus, can be potentially counterproductive to health and well-being. Such views lead to questions about the external (e.g., doctor recommendation, peer pressure) versus internal (e.g., volitional choice, core lifestyle value) substrates of health motivation. Claps, Katz, and Moore (2005) observed the need for health and wellness practitioners to eschew a prescriptive approach to health practices for approaches that serve to enhance self-awareness, elucidate intrinsic motivators, promote individualized goals, and develop barrier self-efficacy. It is through this focus on self-administrated, volitional resources that individuals are presumably more inclined to adopt an internalized locus of control that fosters personal accountability for health behavior.

As maintained by Garrin (2013), the college experience reflects a microcosm of the myriad biopsychosocial interactions that individuals will encounter as they continue to traverse the developmental continuum. Given the abundance of dynamic learning

opportunities endowed by the college years, the experiences that promote competency beliefs, perceived controllability over outcomes, and adaptive coping appraisals have enduring value to real-world adaptation and survival in a rapidly evolving world. As individuals explore their advocacy and leadership potentials, their social change voice emerges—an ever-evolving phenomenon that crystallizes in young adulthood, is guided by human development, and has transformative potential well beyond the confines of the college campus and across the lifespan.

References

Abbas, Y., Abbasi, N., Vahidi, R., Najafipoor, F., & Farshi, M. (2011). Effect of exercise on psychological well-being in T2DM. *Journal of Stress Physiology & Biochemistry*, *7*(3), 133-142.

Aberson, C. L. (2010). *Applied power analysis for the behavioral science*. New York: Routledge.

Adams, T., Bezner, J., & Steinhardt, M. (1997). The conceptualization and measurement of perceived wellness integrating balance across and within dimensions. *American Journal of Health Promotion. 11*(3), 208-218.

Adams, J., & Kirkby, R. J. (2002). Excessive exercise as an addiction: A review. *Addiction Research & Theory, 10*(5), 415-438.

Aguayo, D., Herman, K., Ojeda, L., & Flores, L. Y. (2011). Culture predicts Mexican Americans' college self-efficacy and college performance. *Journal of Diversity in Higher Education, 4*(2), 79-89. doi:10.1037/a0022504

Ah, D. V., Kang, D. H., & Carpenter, J. S. (2007). Stress, optimism, and social support: Impact on immune responses in breast cancer. *Research in Nursing & Health, 30*, 72–83. doi:10.1002/nur.20164

Aidman, E. V., & Woollard, S. (2003). The influence of self-reported exercise addiction on acute emotional and physiological responses to brief exercise deprivation. *Psychology of Sport and Exercise, 4*(3), 225-236. doi:10.1016/S1469-0292(02)00003-1

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179–211.

Ajzen, I. & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Al Kalaldeh, M., & Shosha, G. (2012). Application of the perceived stress scale in health care studies. An analysis of literature. *International Journal of Academic Research*, *4*(4), 45-50. doi:10.7813/2075-4124.2012/4-4/B.6

Al-Windi, A., Elmfeldt, D., Tibblin, G., & Svärdsudd, K. (1999). The influence of sociodemographic characteristics on well-being and symptoms in a Swedish community: Results from a postal questionnaire survey. *Scandinavian Journal of Primary Health Care*, *17*(4), 201-209.

Allison, P. J., Guichard, C., Fung, K., & Gilain, L. (2003). Dispositional optimism predicts survival status 1 year after diagnosis in head and neck cancer patients. *Journal of Clinical Oncology, 21*(3), 543–548.

Allison, P., Guichard, C., & Gilain, L. (2000). A prospective investigation of dispositional optimism as a predictor of health-related quality of life in head and neck cancer patients. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*, *9*(8), 951-960.

Allport, G. W., & Schanck, R. L. (1936). Are attitudes biological or cultural in origin?. *Character & Personality; A Quarterly for Psychodiagnostic & Allied Studies*, *4,* 195-205.

American College Health Association. (2008). American College Health Association—National College Health Assessment Spring 2007 Reference Group Data Report. *Journal of American College Health, 56*(5), 469-479.

American College of Sports Medicine. (2000). *ACSM's guidelines for exercise testing and prescription* (6th ed.). Lippincott, Williams, & Wilkins, Baltimore, MD.

American College of Sports Medicine. (2010). *Hit the treadmill—not just the books—to boost grades.* Retrieved on January 26, 2013, from http://www.acsm.org/about-acsm/media-room/acsm-in-the-news/2011/08/01/hit-the-treadmill---not-just-the-books---to-boost-grades

American Psychological Association. (2010). *Ethical principles of psychologists and code of conduct*. Retrieved on October 11, 2012, from http://www.apa.org/ethics/code/index.aspx?item=11

Anisman, H., Matheson, K. (2005). Stress, depression, and anhedonia: Caveats concerning animal models. *Neuroscience & Biobehavioral Reviews, 29*(4–5), 525-546. doi:10.1016/j.neubiorev.2005.03.007

Annesi, J. J. (2004). Relationship of social cognitive theory factors to exercise maintenance in adults. *Perceptual and Motor Skills, 99*(1), 142-148. doi:10.2466/PMS.99.4.142-148

Anshel, M. H., & Seipel, S. J. (2006). Relationships between dimensions of perfectionism and exercise behavior among college students. *International Journal of Sport and Exercise Psychology, 4*(1), 25-42. doi:10.1080/1612197X.2006.9671782

Anshel, M. H., & Seipel, S. J. (2009). Self-monitoring and selected measures of aerobic and strength fitness and short-term exercise attendance. *Journal of Sport Behavior, 32*(2), 125-151.

Armitage, C. (2009). Is there utility in the transtheoretical model?. *British Journal of Health Psychology, 14*(Pt 2), 195-210.

Armitage, C. J., Sheeran, P., Conner, M., & Arden, M. A. (2004). Stages of change or changes of stage? Predicting transitions in transtheoretical model stages in relation to healthy food choice. *Journal of Consulting and Clinical Psychology, 72*(3), 491-499. doi:10.1037/0022-006X.72.3.491

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist, 55*(5), 469-480. doi:10.1037/0003-066X.55.5.469

Babbie, E. R. (1990). *Survey research methods* (2nd ed.). Belmont, CA: Wadsworth.

Babbie, E. R. (2009). *The practice of social research* (12th ed.). Belmont, CA: Wadsworth.

Baer, J. C. (2011). Students' distress over grades: Entitlement or a coping response?. *Journal of Social Work Education, 47*(3), 565-577.

Balanda, K. P. & MacGillivray, H. L. (1988). Kurtosis: A critical review. *The American Statistician, 42*(2), 111-119.

Bamber, D., Cockerill, I. M., & Carroll, D. (2000). The pathological status of exercise dependence. *British Journal of Sports Medicine, 34*, 125–132.

Bandura, A. (1969). *Principles of behavior modification*. New York: Holt, Rinehart and Winston.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1985). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, 44, 1175–1184.

Bandura A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychology, 28,* 117 -148.

Bandura, A. (1995). *Self-efficacy in changing societies*. New York: Cambridge University Press.

Bandura, A. (1997). *Self-efficacy. The exercise of control*. New York: W.H. Freeman.

Barclay, T., Hinkin, C., Castellon, S., Mason, K., Reinhard, M., Marion, S., & ... Durvasula, R. (2007). Age-associated predictors of medication adherence in HIV-positive adults: Health beliefs, self-efficacy, and neurocognitive status. *Health Psychology*, *26*(1), 40-49.

Bard College. (2013). Bard at a glance. Retrieved on December 14, 2013, from http://www.bard.edu/about/ataglance/

Barnett, R., Gareis, K. C., James, J., & Steele, J. (2001). *Planning ahead: College seniors' concerns about work-family conflict.* Paper presented at the 109th Annual

Conference of the American Psychological Association, San Francisco, CA, August 24-28, 2001.

Baum, A. (1990). Stress, intrusive imagery, and chronic distress. *Health Psychology*, 6, 653-675.

Baum, A. & Polsusnzy, D. (1999). Health psychology: Mapping biobehavioral contributions to health and illness. *Annual Review of Psychology*, 50, 137-163.

Berg, B. L. (2001). *Qualitative research methods for the social sciences* (4th ed.). Boston: Allyn & Bacon.

Bernard, H. R. (2002). *Research methods in anthropology: Qualitative and quantitative methods*, (3rd ed.). AltaMira Press: Walnut Creek, CA.

Bernier, A., Larose, S., & Soucy, N. (2005). Academic mentoring in college: The interactive role of student's and mentor's interpersonal dispositions. *Research in Higher Education*, *46*(1), 29-51. doi:10.1007/s11162-004-6288-5

Betoret, F., & Artiga, A. (2011). The relationship among student basic need satisfaction, approaches to learning, reporting of avoidance strategies and achievement. *Electronic Journal of Research in Educational Psychology*, *9*(2), 463-496.

Betz, N. E., & Hackett, G. (2006). Career self-efficacy theory: Back to the future. *Journal of Career Assessment*, *14*(1), 3-11. doi:10.1177/1069072705281347

Bewick, V., Cheeck, L., & Ball, J. (2003). Statistics review 7: Correlation and regression. *Critical Care*, *7*(6), 451–459.

Blaine, B., & McElroy, J. (2002). Selling stereotypes: Weight loss infomercials, sexism, and weightism. *Sex Roles*, *46*(9-10), 351-357. doi:10.1023/A:1020284731543

Blanchard, C. M., Reid, R. D., Morrin, L. I., Beaton, L. J., Pipe, A., Courneya, K. S., & Plotnikoff, R. C. (2007). Barrier self-efficacy and physical activity over a 12-month period in men and women who do and do not attend cardiac rehabilitation. *Rehabilitation Psychology, 52*(1), 65-73. doi:10.1037/0090-5550.52.1.65

Bland, H. W., Melton, B. F., Welle, P., & Bigham, L. (2012). Stress tolerance: New challenges for millennial college students. *College Student Journal*, *46*(2), 362-375.

Blankertz, L. (1998). The value and practicality of deliberate sampling for heterogeneity: A critical multiplist perspective. *American Journal of Evaluation*, *19*(3), 307-24.

Bound, J., Lovenheim, M. F., & Turner, S. (2010). Why have college completion rates declined? An analysis of changing student preparation and collegiate resources. *American Economic Journal of Applied Econometrics*, *2*(3), 129-157. doi:10.1257/app.2.3.129

Bouteyre, E., Maurel, M., & Bernaud, J. L. (2007). Daily hassles and depressive symptoms among first year psychology students in France: The role of coping and social support. *Stress and Health, 23*, 93–99. doi:10.1002/smi.1125

Bovier, P. A., Chamot, E., & Perneger, T. V. (2004). Perceived stress, internal resources, and social support as determinants of mental health among young adults. *Quality of Life Research, 13*(1), 161-170. doi:10.1023/B:QURE.0000015288.43768.e4

Bowden, V. R. (2011). Demystifying the research process: Cross-sectional design. *Pediatric Nursing*, *37*(3), 127-128.

Boyd, M. P., Weinmann, C., & Yin, Z. (2002). The relationship of physical self-perceptions and goal orientations to intrinsic motivation for exercise. *Journal of Sport Behavior*, *25*(1), 1.

Brenes, G., Rapp, S., Rejeski, W., & Miller, M. (2002). Do optimism and pessimism predict physical functioning?. *Journal of Behavioral Medicine*, *25*(3), 219-231.

Bressler, L. A., Bressler, M. E., & Bressler, M. S. (2010). The role and relationship of hope, optimism and goal setting in achieving academic success: A study of students enrolled in online accounting courses. *Academy of Educational Leadership Journal*, *14*(4), 37-51.

Bridle, C., Riemsma, R. P., Pattenden, J., Sowden, A. J., Mather, L., Watt, I. S., & Walker, A. (2005). Systematic review of the effectiveness of health behavior interventions based on the transtheoretical model. *Psychological Health*, *20*, 283–301.

Biscaro, M., Broer, K., & Taylor, N. (2004). Self-efficacy, alcohol expectancy and problem-solving appraisal as predictors of alcohol use in college students. *College Student Journal*, *38*(4), 541.

Brisswalter, J., Collardeau, M., & René, A. (2002). Effects of acute physical exercise characteristics on cognitive performance. *Sports Medicine*, *32*(9), 555-566.

Brittian, A., Sanchez, B., & Sy, S. (2006). *The effects of parental influence on college student's self-efficacy*. Tacoma, Washington, US: Western Psychological Association (WPA).

Brockway, J., Carlson, K. A., Jones, S. K., & Bryant, F. B. (2002). Development and validation of a scale for measuring cynical attitudes toward college. *Journal of Educational Psychology, 94*(1), 210-224. doi:10.1037/0022-0663.94.1.210

Brougham, R. R., Zail, C. M., Mendoza, C. M., & Miller, J. R. (2009). Stress, sex differences, and coping strategies among college students. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*, *28*(2), 85-97. doi:10.1007/s12144-009-9047-0

Brown, R. A., Abrantes, A. M., Read, J. P., Marcus, B. H., Jakicic, J., Strong, D. R.…Gordon, A. A. (2009). Aerobic exercise for alcohol recovery: Rationale, program description, and preliminary findings. *Behavior Modification, 33*(2), 220-249. doi:10.1177/0145445508329112

Bruininks, P., Crowell, A., & Howington, D. (2006). *The Role of Positive and Negative Anticipatory States in Making Decisions About Future Outcomes*. Philadelphia, Pennsylvania, US: Society for Judgment and Decision Making.

Bruner, J. S. (1957). On perceptual readiness. *Psychological Review, 64*, 123-152.

Buchanan, G., & Seligman, M. E. P. (1995). *Explanatory style*. Hillsdale, N.J.: Erlbaum.

Buckworth, J., Granello, D., & Belmore, J. (2002). Incorporating personality assessment into counseling to help college students adopt and maintain exercise behaviors. *Journal of College Counseling*, *5*(1), 15-25.

Buckworth, J., & Nigg, C. (2004). Physical activity, exercise, and sedentary behavior in college students. *Journal of American College Health*, *53*(1), 28-34.

Bui, M., Kemp, E., & Howlett, E. (2011). The fight against obesity: Influences of self-efficacy on exercise regularity. *Journal of Nonprofit & Public Sector Marketing, 23*(2), 181-208. doi:10.1080/10495142.2011.572709

Bulley, C., Donaghy, M., Payne, A., & Mutrie, N. (2009). Personal meanings, values and feelings relating to physical activity and exercise participation in female undergraduates: A qualitative exploration. *Journal of Health Psychology, 14*(6), 751-760. doi:10.1177/1359105309338896

Bulmer, M. G. (1979). *Principles of statistics*. Mineola, NY: Dover Publishing.

Bylund, C. L., Imes, R. S., & Baxter, L. A. (2005). Accuracy of parents' perceptions of their college student children's health and health risk behaviors. *Journal of American College Health, 54*(1), 31.

Campbell, D. & Stanley, J. (1963). *Experimental and quasi-experimental designs for research*. Chicago, IL: Rand-McNally.

Cannon, W. B. (1932). *The wisdom of the body*. New York: W. W. Norton.

Cardinal, B. J., Tuominen, K. J., & Rintala, P. (2004). Cross-cultural comparison of American and Finnish college students' exercise behavior using transtheoretical model constructs. *Research Quarterly for Exercise & Sport, 75*(1), 92-101.

Carini, R. M., Hayek, J. C., Kuh, G. D., Kennedy, J. M., & Ouimet, J. A. (2003). College student responses to web and paper surveys: Does mode matter?. *Research in Higher Education, 44*(1), 1-19.

Carroll, E., & Lanza, S. (2010). Body satisfaction and sex differences in exercise motivations. *Perspectives (University Of New Hampshire),* 1-15.

Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation: A control-theory approach to human behavior*. New York: Springer.

Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review, 30,* 879-889.

Chaaya, M., Osman, H., Naassan, G., & Mahfoud, Z. (2010). Validation of the Arabic version of the Cohen perceived stress scale (PSS-10) among pregnant and postpartum women. *BMC Psychiatry 10,* 111. doi:10.1186/1471-244X-10-111.

Chadha, V. K. (2006). Sample size determination in health studies. *NTI Bulletin, 42*(3&4), 55-62.

Chakravarthy, M. V., & Booth, F. W. (2004). Eating, exercise, and "thrifty" genotypes: Connecting the dots toward an evolutionary understanding of modern chronic diseases. *Journal of Applied Physiology, 96,* 3–10.

Chao, D., Foy, C. G., & Farmer, D. (2000). Exercise adherence among older adults: Challenges and strategies. *Controlled Clinical Trials, 21*(5), S212-S217. doi:10.1016/S0197-2456(00)00081-7

Chemers, M. M., Hu, L., & Garcia, B. F. (2001). Academic self-efficacy and first year college student performance and adjustment. *Journal of Educational Psychology, 93*(1), 55-64. doi:10.1037/0022-0663.93.1.55

Cho, H., So, J., & Lee, J. (2009). Personal, social, and cultural correlates of self-efficacy beliefs among South Korean college smokers. *Health Communication, 24*(4), 337-345. doi:10.1080/10410230902889381

Choi, N. (2005). Self-efficacy and self-concept as predictors of college students' academic performance. *Psychology in the Schools, 42*(2), 197-205.

Christophe, J., Hassane, Z., Jacques, P., Arlette, G., Danièle, B., & Paul, D. (2004). Effect of the intensity of training on catecholamine responses to supramaximal exercise in endurance-trained men. *European Journal of Applied Physiology, 91*(1), 35-40.

Chu, H., Bushman, B., & Woodard, R. (2008). Social physique anxiety, obligation to exercise, and exercise choices among college students. *Journal of American College Health, 57*(1), 7-14.

Cicourel, A. V. (2007). A personal, retrospective view of ecological validity. *Text & Talk, 27*(5/6), 735-752. doi:10.1515/TEXT.2007.033

Claps, J., Katz, A., & Moore, M. (2005). A comparison of wellness coaching and reality therapy. *International Journal of Reality Therapy, 24*(2), 39-41.

Clark, M. R. (2005). Negotiating the freshman year: Challenges and strategies among first-year college students. *Journal of College Student Development, 46*(3), 296-316. doi:10.1353/csd.2005.0022

Cohen, J. (1969). *Statistical power analysis for the behavioral sciences*. New York, NY: Academic Press.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 122*(1), 155–159. doi:10.1037/0033-2909.112.1.155

Cohen, M. (2009). The transition to college and the world. *Journal of College Admission*, (202), 8-11.

Cohen, J., & Cohen, P. (1975). *Applied multiple regression/correlation analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum.

Cohen, J., Cohen P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences*. (3rd ed.) Hillsdale, NJ: Lawrence Erlbaum Associates.

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan, & S. Oskamp (Eds.) *The social psychology of health*. Newbury Park, CA: Sage.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*(4), 385–396.

Collins, A., Hill, L., Chandramohan, Y., Whitcomb, D., Droste, S., & Reul, J. (2009). Exercise improves cognitive responses to psychological stress through enhancement of epigenetic mechanisms and gene expression in the dentate gyrus. *Plos One*, *4*(1), e4330.

Conner, M., Rhodes, R. E., Morris, B., McEachan, R., & Lawton, R. (2011). Changing exercise through targeting affective or cognitive attitudes. *Psychology & Health*, *26*(2), 133-149. doi:10.1080/08870446.2011.531570

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues for field settings.* Boston: Houghton Mifflin.

Cook, R. D., & Weisberg, S. (1982). *Residuals and influence in regression*. New York: Chapman & Hall.

Courneya, K. S., & Hellsten, L. M. (2001). Cancer prevention as a source of exercise motivation: An experimental test using protection motivation theory. *Psychology, Health & Medicine, 6*(1), 59-64. doi:10.1080/13548500020021928

Cox, R., & Orford, J. (2004). A qualitative study of the meaning of exercise for people who could be labelled as 'addicted' to exercise: Can 'addiction' be applied to high frequency exercising?. *Addiction Research & Theory, 12*(2), 167-188. doi:10.1080/1606635310001634537.

Cramp, A. G., & Bray, S. R. (2011). Understanding exercise self-efficacy and barriers to leisure-time physical activity among postnatal women. *Maternal and Child Health Journal, 15*(5), 642-651. doi:10.1007/s10995-010-0617-4

Cruise, K., Bucks, R., Loftus, A., Newton, R., Pegoraro, R., & Thomas, M. (2011). Exercise and Parkinson's: Benefits for cognition and quality of life. *Acta Neurologica Scandinavica, 123*(1), 13-19. doi:10.1111/j.1600-0404.2010.01338.x

D'Abundo, M., Marinaro, L., & Fiala, K. (2009). An online survey of cigarette use in college students: Using demographic information to influence health education, prevention and intervention efforts. *ICHPER-SD Journal of Research, 4*(2), 6-9.

Darling, C. A., McWey, L. M., Howard, S. N., & Olmstead, S. B. (2007). College student stress: The influence of interpersonal relationships on sense of coherence. *Stress and Health, 23*, 215–229. doi:10.1002/smi.1139

Davis, C. L., Tomporowski, P. D., McDowell, J. E., Austin, B. P., Miller, P. H., Yanasak, N. E., & ... Naglieri, J. A. (2011). Exercise improves executive function and achievement and alters brain activation in overweight children: A randomized, controlled trial. *Health Psychology, 30*(1), 91-98. doi:10.1037/a0021766

de Bruijn, G. (2011). Exercise habit strength, planning and the theory of planned behaviour: An action control approach. *Psychology of Sport and Exercise, 12*(2), 106-114. doi:10.1016/j.psychsport.2010.10.002

Deci, E. L. (1975). *Intrinsic motivation*. New York: Plenum.

Deci, E. L. & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Plenum: New York.

Deci, E. L. & Ryan, R. M. (2000). The what and why of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 1,* 227–268.

Deeks, J. J., Dinnes, J., D'Amico, R., Sowden, A. J., Sakarovitch, C., Song, F., Petticrew, M., & Altman, D. J. (2003). Evaluating nonrandomised intervention studies. *Health Technology Assessment, 7*(27). 1-179.

Delbaere, K., Crombez, G., Vanderstraeten, G., Willems, T., & Cambier, D. (2004). Fear-related avoidance of activities, falls, and frailty: A prospective community-based cohort study. *Age Ageing, 33*(4), 368-373. doi:10.1093/ageing/afh106

Deng, X., Castelli, D., Castro-Pinero, J., & Guan, H. (2011). University students meeting the recommended standards of physical activity and body mass index. *ICHPER-SD Journal of Research, 6*(1), 20-26.

Desai, M., Miller, W., Staples, B., & Bravender, T. (2008). Risk factors associated with overweight and obesity in college students. *Journal of American College Health, 57*(1), 109-114.

Deshpande, S., Basil, M., & Basil, D. (2009). Factors influencing healthy eating habits among college students: An application of the health belief model. *Health Marketing Quarterly, 26*(2), 145-164. doi:10.1080/07359680802619834

DesJardins, S. L., Ahlburg, D. A., & McCall, B. P. (2002). A temporal investigation of factors related to timely degree completion. *The Journal of Higher Education,* 73(5), 555-581.

Devonport, T. J., & Lane, A. M. (2006). Cognitive appraisal of dissertation stress among undergraduate students. *Psychological Record, 56*(2), 259.

DiBonaventura, M., & Chapman, G. (2008). The effect of barrier underestimation on weight management and exercise change. *Psychology, Health & Medicine, 13*(1), 111-122.

Digdon, N. L., & Howell, A. J. (2008). College students who have an eveningness preference report lower self-control and greater procrastination. *Chronobiology International: The Journal of Biological & Medical Rhythm Research, 25*(6), 1029-1046. doi:10.1080/07420520802553671

Dillman, D. A. (2000). *Mail and internet surveys: The tailored design method*. New York: John Wiley & Sons, Inc.

Dillman, D. A., Phelps, G. Tortora, R., Swift, K., Kohrell, J., Berck, J. & Messer, B. L. (2009). Response rate and measurement differences in mixed-mode surveys using

mail, telephone, interactive voice response (IVR) and the Internet. *Social Science Research, 38,* 3-20.

Dosedlova, J. J., Klimusova, H. H., Slovackova, Z. Z., & Kebza, V. V. (2011). Optimism and health-related behaviour of Czech university students. *Second World Congress on Positive Psychology Poster Abstracts*. doi:10.1037/e537902012-235

Downey, R. G., & King, C. (1998). Missing data in Likert ratings: A comparison of replacement methods. *Journal of General Psychology, 125*(2), 175-191.

Downs, A., & Ashton, J. (2011). Vigorous physical activity, sports participation, and athletic identity: Implications for mental and physical health in college students. *Journal of Sport Behavior, 34*(3), 228-249.

Downs, D. S., & Hausenblas, H. A. (2005). Elicitation studies and the theory of planned behavior: A systematic review of exercise beliefs. *Psychology of Sport and Exercise, 6*(1), 1-3. doi:10.1016/j.psychsport.2003.08.001

Dougall, A., Swanson, J. N., Grimm, J. R., Jenney, C. T., & Frame, M. C. (2011). Tempering the decline in college student physical activity using informational interventions: Moderating effects of stress and stage of change. *Journal of Applied Biobehavioral Research, 16*(1), 16-41. doi:10.1111/j.1751-9861.2011.00064.x

Economos, C., Hildebrandt, M., & Hyatt, R. (2008). College freshman stress and weight change: Differences by gender. *American Journal of Health Behavior, 32*(1), 16-25.

Edmunds, J., Ntoumanis, N., & Duda, J. L. (2006). A test of self-determination theory in the exercise domain. *Journal of Applied Social Psychology, 36*(9), 2240-2265. doi:10.1111/j.0021-9029.2006.00102.x

Edwards, S. (2006). Physical exercise and psychological well-being. *South African Journal of Psychology*, *36*(2), 357-373.

Eggermont, L., Milberg, W., Lipsitz, L., Scherder, E., & Leveille, S. (2009). Physical activity and executive function in aging: The MOBILIZE Boston Study. *Journal of the American Geriatrics Society*, *57*(10), 1750-1756. doi:10.1111/j.1532-5415.2009.02441.x

Egli, T., Bland, H. W., Melton, B. F., & Czech, D. R. (2011). Influence of age, sex, and race on college students' exercise motivation of physical activity. *Journal of American College Health*, *59*(5), 399-406. doi:10.1080/07448481.2010.513074

Eisen, S., Ranganathan, G., Seal, P., & Spiro, A. (2007). Measuring clinically meaningful change following mental health treatment. *The Journal of Behavioral Health Services & Research*, *34*(3), 272-289.

Emmons, H. C. (2007). The fall and rise of resilience: Prevention and holistic treatment of depression among college students. *Journal of College Student Psychotherapy*, *21*(3-4), 225-241.

Engel, G. L. (1977). The need for a new medical model. *Science, 196*, 129–136.

Engeln-Maddox, R. (2005). Cognitive responses to idealized media images of women: The relationship of social comparison and critical processing to body image

disturbance in college women. *Journal of Social & Clinical Psychology*, *24*(8), 1114-1138.

Engström, L. (2004). Social change and physical activity. *Scandinavian Journal of Nutrition*, *48*(3), 108-113.

Erikson, E. H. (1963). *Childhood and society*. (2nd ed.). New York: Norton.

Erikson, E. H. (1968). *Identity: Youth and crisis.* New York: Norton.

Fallon, E. A., Hausenblas, H. A., & Nigg, C. R. (2005). The transtheoretical model and exercise adherence: Examining construct associations in later stages of change. *Psychology of Sport & Exercise, 6*(6), 629-641. doi:10.1016/j.psychsport.2005.01.003

Fan, W., & Yan, Z. (2010). Factors affecting response rates or the web survey: A systematic review. *Computers in Human Behavior, 26*(2), 132-139. doi:10.1016/j.chb.2009.10.015

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149-1160.

Feinstein, A. (2011). Multiple sclerosis, cognitive dysfunction and the potential benefits of exercise. *Multiple Sclerosis (Houndmills, Basingstoke, England)*, *17*(9), 1032-1033.

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7,* 117-140. doi:10.1177/001872675400700202

Festinger, L. (1957). *A theory of cognitive dissonance*. California: Stanford University Press.

Fischer, D., & Bryant, J. (2008). Effect of certified personal trainer services on stage of exercise behavior and exercise mediators in female college students. *Journal of American College Health, 56*(4), 369-376.

Fischer, D. M., & Mccown, J. A. (2007). *Ethnic identity formation in college students: Implications for well-being*. Washington, District of Columbia, US: American Psychological Association (APA).

Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Fisler, J., Agati, H., Chance, S. M., Donahue, A. E., Donahue, G. A., Eickhoff, E. J., &….Foubert, J. D. (2009). Keeping (or losing) the faith: Reflections of spiritual struggles and their resolution by college seniors. *College Student Affairs Journal, 27*(2), 257-274.

Fletcher, J., & Banasik, J. (2001). Exercise self-efficacy. *Journal of the American Academy of Nurse Practitioners*, *13*(9), 390.

Flowers, L. A. (2002). Developing purpose in college: Differences between freshmen and seniors. *College Student Journal*, *36*(3), 478-484.

Folkman, S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior, 21*(3), 219-239.

Folkman, S., Lazarus, R. S., Dunkel-Schetter, C., DeLongis, A., & Gruen, R. J. (1986). Dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter

outcomes. *Journal of Personality and Social Psychology, 50*(5), 992-1003. doi:10.1037/0022-3514.50.5.992

Friedlander, L. J., Reid, G. J., Shupak, N., & Cribbie, R. (2007). Social support, self-esteem, and stress as predictors of adjustment among first-year undergraduates. *Journal of College Student Development, 48*(3), 259-274. doi:10.1353/csd.2007.0024

Fung, H. H., & Carstensen, L. L. (2004). Motivational changes in response to blocked goals and foreshortened time: Testing alternatives to socioemotional selectivity theory. *Psychology and Aging*, *19*(1), 68-78. doi:10.1037/0882-7974.19.1.68

Gallagher, M. W., & Lopez, S. J. (2009). Positive expectancies and mental health: Identifying the unique contributions of hope and optimism. *The Journal of Positive Psychology*, *4*(6), 548-556. doi:10.1080/17439760903157166

Gapin, J., Etnier, J. L., & Tucker, D. (2009). The relationship between frontal brain asymmetry and exercise addiction. *Journal of Psychophysiology*, *23*(3), 135-142. doi:10.1027/0269-8803.23.3.135

Garcia, K., & Mann, T. (2003). From ‘I wish’ to ‘I will’: Social-cognitive predictors of behavioral intentions. *Journal of Health Psychology, 8*, 347–360.

Garman, J. F., Hayduk, D. M., Crider, D. A., & Hodel, M. M. (2004). Occurrence of exercise dependence in a college-aged population. *Journal of American College Health*, *52*(5), 221-228. doi:10.3200/JACH.52.5.221-228

Garrin, J. M. (2012). Sociodemographic questionnaire.

Garrin, J. M. (2013). From college student to change agent: A triadic model of self-efficacy, attribution, and appraisal. *Journal of Social Change, 5*(1), 40-57. doi:10.5590/JOSC.2013.05.1.04

Garrod, R., Marshall, J., Barley, E., & Jones, P. W. (2006). Predictors of success and failure in pulmonary rehabilitation. *European Respiratory Journal, 27*(4), 788-794. doi:10.1183/09031936.06.00130605

Gibson, J. J. (1950). *The perception of the visual world*. Boston: Houghton Mifflin.

Giltay, E. J., Kamphuis, M. H., Kalmijn, S., Zitman, F. G., & Kromhout, D. (2006). Dispositional optimism and the risk of cardiovascular death: The Zutphen Elderly Study. *Archives of Internal Medicine, 166*(4), 431-436.

Glass, G. V., McGaw, B., & Smith, M. L. (1981). *Meta-analysis in social research*. London: Sage.

Goeders, N. E. (2003). The impact of stress on addiction. *European Neuropsychopharmacology, 13*, 435-441.

Gorber, S. C., Tremblay, M., Moher, D., & Gorber, B. (2007). A comparison of direct vs. self-report measures for assessing height, weight and body mass index: A systematic review. *Obesity Reviews, 8*, 307-326. doi:10.1111/j.1467-789X.2007.00347.x

Gregory, R. (1970). *The intelligent eye*. London: Weidenfeld & Nicolson.

Grimes, D., & Schulz, K. (2002). Bias and causal associations in observational research. *Lancet, 359*(9302), 248.

Grote, N., Bledsoe, S., Larkin, J., Lemay, E. R., & Brown, C. (2007). Stress exposure and depression in disadvantaged women: The protective effects of optimism and perceived control. *Social Work Research, 31*(1), 19-33.

Grubbs, L., & Carter, J. (2002). The relationship of perceived benefits and barriers to reported exercise behaviors in college undergraduates. *Family & Community Health: The Journal of Health Promotion & Maintenance, 25*(2), 76-84.

Gulve, E. (2008). Exercise and glycemic control in diabetes: Benefits, challenges, and adjustments to pharmacotherapy. *Physical Therapy, 88*(11), 1297-1321. doi:10.2522/ptj.20080114

Gupta, S., Ray, T., & Saha, I. (2009). Overweight, obesity and influence of stress on body weight among undergraduate medical students. *Indian Journal Of Community Medicine, 34*(3), 255-257. doi:10.4103/0970-0218.55296

Hagger, M. S., Chatzisarantis, N. D., & Harris, J. (2006). The process by which relative autonomous motivation affects intentional behavior: Comparing effects across dieting and exercise behaviors. *Motivation and Emotion, 30*(4), 307-321. doi:10.1007/s11031-006-9046-5

Hale, W. D., Fiedler, L. R., & Cochran, C. D. (1992). The revised generalized expectancy for success scale: A validity and reliability study. *Journal of Clinical Psychology, 48*, 517-521.

Hallgren, M. Å., Moss, N. D., & Gastin, P. (2010). Regular exercise participation mediates the affective response to acute bouts of vigorous exercise. *Journal of Sports Science & Medicine, 9*(4), 629-637.

Hamer, M., Taylor, A., & Steptoe, A. (2006). The effect of acute aerobic exercise on stress related blood pressure responses: A systematic review and meta-analysis. *Biological Psychology, 71*(2), 183-190. doi:10.1016/j.biopsycho.2005.04.004

Hansen, D., Dendale, P., van Loon, L., & Meeusen, R. (2010). The impact of training modalities on the clinical benefits of exercise intervention in patients with cardiovascular disease risk or type 2 diabetes mellitus. *Sports Medicine, 40*(11), 921-940. doi:10.2165/11535930-000000000-00000

Haque, N. N., Salma, U. U., Haque, A. F., Mukti, I. J., Rahman, M. M., Jesmin, J. J., & Mazumdar, S. H. (2011). The impact of stress on cardiovascular disease in pre- and post- menopausal women. *Trends in Medical Research, 6*(4), 246-257. doi:10.3923/tmr.2011.246.257

Harley, A., Buckworth, J., Katz, M., Willis, S., Odoms-Young, A., & Heaney, C. (2009). Developing long-term physical activity participation: A grounded theory study with African American women. *Health Education & Behavior, 36*(1), 97-112. doi:10.1177/1090198107306434

Harrell, F. E. (2001). *Regression modeling strategies: With applications to linear models, logistic regression, and survival analysis*. New York: Springer-Verlag.

Hart, A. (2007). Exercise and self-esteem. *Community Care,* (1679), 28-29.

Harvard, L. (2007). How to conduct an effective and valid literature search. *Nursing Times, 103*(45), 32-33.

Heckman, S. J., & Grable, J. E. (2011). Testing the role of parental debt attitudes, student income, dependency status, and financial knowledge have in shaping financial self-efficacy among college students. *College Student Journal*, *45*(1), 51-64.

Heider, F. (1944). Social perception and phenomenal causality. *Psychological Review, 51*, 358–374.

Heider, F. (1958). *The psychology of interpersonal relations*. New York: John Wiley & Sons.

Henscheid, J. M. (2008). Institutional efforts to move seniors through and beyond college. *New Directions for Higher Education*, (144), 79-87.

Hicks, T., & Heastlie, S. (2008). High school to college transition: A profile of the stressors, physical and psychological health issues that affect the first-year on-campus college student. *Journal of Cultural Diversity.* 15, 143-146.

Hillman, C., Erickson, K., & Kramer, A. (2008). Be smart, exercise your heart: Exercise effects on brain and cognition. *Nature Reviews. Neuroscience*, *9*(1), 58-65.

Hit the treadmill - not just the books - to boost GPA. College grades were better with vigorous activity. Paper presented at the 57th Annual Meeting Annual Meeting of the American College of Sports Medicine (ACSM), Baltimore, MD, June 2-5, 2010.

Hmieleski, K.M. (2007). A contextual study of entrepreneur dispositional optimism: Implications for new venture performance. *Academy of Management Proceedings*, 1-6.

Holmgren, E., Gosman-Hedström, G., Lindström, B., & Wester, P. (2010). What is the benefit of a high-intensive exercise program on health-related quality of life and depression after stroke? A randomized controlled trial. *Advances in Physiotherapy, 12*(3), 125-133. doi:10.3109/14038196.2010.488272

Hooker, S., & Brand, B. (2010). College knowledge: A critical component of college and career readiness. *New Directions for Youth Development. 2010*(127), 75–85. doi:10.1002/yd.364

Horcajo, J., Petty, R. E., & Briñol, P. (2010). The effects of majority versus minority source status on persuasion: A self-validation analysis. *Journal of Personality and Social Psychology, 99*(3), 498-512. doi:10.1037/a0018626

Horneffer-Ginter, K. (2008). Stages of change and possible selves: Two tools for promoting college health. *Journal of American College Health, 56*(4), 351-358.

Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). Hoboken, NJ: John Wiley & Sons.

Hou, S., & Wisenbaker, J. (2005). Using web-based survey to assess correlates of intention towards HIV testing among never-been-tested but sexually experienced college students. *AIDS Care, 17*(3), 329-334.

Howell, D. (2002). *Statistical methods for psychology*. (pp. 324–325). Pacific Grove, CA: Duxbury.

Hsieh, P., Sullivan, J. R., & Guerra, N. S. (2007). A closer look at college students: Self-efficacy and goal orientation. *Journal of Advanced Academics, 18*(3), 454-476.

Hsu, J. C. (1988). Sample size computation for designing multiple comparison experiments. *Computational Statistics & Data Analysis, 7*(1), 79-91. doi:10.1016/0167-9473(88)90017-5

Huan, V., Yeo, L., Ang, R., & Chong, W. (2006). The influence of dispositional optimism and gender on adolescents' perception of academic stress. *Adolescence, 41*(163), 533-546.

Hughes, A., Galbraith, D., & White, D. (2011). Perceived competence: A common core for self-efficacy and self-concept?. *Journal of Personality Assessment, 93*(3), 278-289.

Hutchins, M., Drolet, J. C., & Ogletree, R. J. (2010). Physical activity patterns and self-efficacy of selected college students. *Health Educator*, *42*(2), 84-88.

International Business Machines. (2013). IBM SPSS Statistics v21.0. Retrieved on October 11, 2013, from http://www-01.ibm.com/software/analytics/spss/products/statistics/

Jääskeläinen, A., Nevanperä, N., Remes, J., Rahkonen, F., Järvelin, M., & Laitinen, J. (2014). Stress-related eating, obesity and associated behavioural traits in adolescents: A prospective population-based cohort study. *BMC Public Health, 14*(1), 321.

Jackson, D. (2010). How personal trainers can use self-efficacy theory to enhance exercise behavior in beginning exercisers. *Strength & Conditioning Journal (Allen Press), 32*(3), 67-71.

Jackson, E., Tucker, C., & Herman, K. (2007). Health value, perceived social support, and health self-efficacy as factors in a health-promoting lifestyle. *Journal of American College Health*, *56*(1), 69-74.

Jeong, J., Mallinckrodt, B., Baldwin, D. R., & Brandt, I. (2011). *Moderating effects of emotion regulation of perceived stress and its psychological and biological symptoms for first-year college students*. Washington, District of Columbia, US: American Psychological Association (APA).

Jessen, R. J. (1978). *Statistical survey techniques*. New York, NY: John Wiley & Sons.

Johansson, M., Hassmén, P., & Jouper, J. (2011). Acute effects of qigong exercise on mood and anxiety. *Sport, Exercise, and Performance Psychology*, *1*(S), 60-65. doi:10.1037/2157-3905.1.S.60

Johnson, G. (2006). College graduation "is" the bottom line. *Connection: The Journal of the New England Board of Higher Education*, *20*(4), 23-24.

Jones, F., Harris, P., Waller, H., & Coggins, A. (2005). Adherence to an exercise prescription scheme: The role of expectations, self-efficacy, stage of change and psychological well-being. *British Journal of Health Psychology*, *10*(3), 359-378. doi:10.1348/135910704X24798

Kahn, L. B. (2007). The long-term labor market consequences of graduating from college in a bad economy. *Labour Economics, 17*(2) 303-316. doi:10.1016/j.bbr.2011.03.031

Kamen, L. P, & Seligman, M. E. P. (1987). Explanatory style and health. *Current Psychological Research & Reviews*, *6*(3), 207–218. doi:10.1007/BF02686648

Karademas, E. C., Kafetsios, K., & Sideridis, G. D. (2007). Optimism, self-efficacy and information processing of threat- and well-being-related stimuli. *Stress and Health, 23*, 285–294. doi:10.1002/smi.1147

Kasparek, D., Corwin, S., Valois, R., Sargent, R., & Morris, R. (2008). Selected health behaviors that influence college freshman weight change. *Journal of American College Health, 56*(4), 437-444.

Katula, J., & Mcauley, E. (2001). The mirror does not lie: Acute exercise and self-efficacy. *International Journal of Behavioral Medicine, 8*(4), 319-326.

Keating, X. D., Guan, J., Castro, J. & Bridges, D. (2005). A meta-analysis of college student physical activity levels. *Journal of American College Health, 64,* 116-215.

Keating, X., Huang, Y., Deng, M., Chen, L., Dwan, C., & Bridges, D. (2009). Southern Chinese collegiate stage of exercise behavior changes and exercise self-efficacy. *ICHPER-SD Journal of Research, 4*(1), 29-34.

Kelley, G., Kelley, K., Hootman, J., & Jones, D. (2010). Exercise and global well-being in community-dwelling adults with fibromyalgia: A systematic review with meta-analysis. *BMC Public Health, 10,* 198.

Kennett, D. J., Worth, N. C., & Forbes, C. A. (2009). The contributions of Rosenbaum's model of self-control and the transtheoretical model to the understanding of exercise behavior. *Psychology of Sport and Exercise, 10*(6), 602-608. doi:10.1016/j.psychsport.2009.03.012

Keppel, G. (1991). *Design and analysis: A researcher's handbook* (3rd ed.). Engelwood Cliffs, NJ: Prentice Hall.

Khallad, Y. (2010). Dispositional optimism among American and Jordanian college students: Are Westerners really more upbeat than Easterners? *International Journal of Psychology: Journal International de Psychologie, 45*(1), 56-63. doi:10.1080/00207590902767020

Kilpatrick, M., Hebert, E., & Bartholomew, J. (2005). College students' motivation for physical activity: Differentiating men's and women's motives for sport participation and exercise. *Journal of American College Health, 54*(2), 87-94.

Kim, E. S., Park, N., & Peterson, C. (2011). Dispositional optimism protects older adults from stroke: The health and retirement study. *Stroke, 42*(10), 2855–2859. doi:10.1161/STROKEAHA.111.613448

Kirshbaum, M. (2007). A review of the benefits of whole body exercise during and after treatment for breast cancer. *Journal of Clinical Nursing, 16*(1), 104-121. doi:10.1111/j.1365-2702.2006.01638.x

Kreider, R. B., Serra, M., Beavers, K. M., Moreillon, J., Kresta, J. Y., Byrd, M., & ... Jonnalagadda, S. S. (2011). A structured diet and exercise program promotes favorable changes in weight loss, body composition, and weight maintenance. *Journal of the American Dietetic Association, 111*(6), 828-843. doi:10.1016/j.jada.2011.03.013

Krivoschekov, S. G., & Lushnikov, O. N. (2011). Psychophysiology of sports addictions (exercise addiction). *Human Physiology, 37*(4), 509-513. doi:10.1134/S0362119711030030

Krypel, M. N., & Henderson-King, D. (2010). Stress, coping styles, and optimism: Are they related to meaning of education in students' lives?. *Social Psychology of Education: An International Journal*, *13*(3), 409-424.

Kumar, T. K. (1975). Multicollinearity in regression analysis. *The Review of Economics and Statistics, 57*(3), 365-366.

Lamb, D., & Gulliford, A. (2011). Physical exercise and children's self-concept of emotional and behavioural well-being: A randomised controlled trial. *Educational and Child Psychology*, *28*(4), 66-74.

Länsimies-Antikainen, H., Laitinen, T., Rauramaa, R., & Pietil, A. (2010). Evaluation of informed consent in health research: A questionnaire survey. *Scandinavian Journal of Caring Sciences*, *24*(1), 56-64. doi:10.1111/j.1471-6712.2008.00684.x

Largo-Wight, E., Peterson, P., & Chen, W. (2005). Perceived problem solving, stress, and health among college students. *American Journal of Health Behavior*, *29*(4), 360-370.

Larsen, W. A. & McCleary, S. J. (1972). The use of partial residual plots in regression analysis. *Technometrics, 14*(3), 781-790.

Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York, Toronto, London: McGraw-Hill Book Co.

Lazarus, R. S. (1982). Thoughts on the relations between emotion and cognition. *American Psychologist, 37*(9), 1019-1024. doi:10.1037/0003-066X.37.9.1019

Lazarus, R. S. (1991). Progress on a cognitive-motivational-relational theory of emotion. *American Psychologist, 46*(8), 819-834.

Lazarus, R., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer Publishing.

Lee, M. J. (2010). The effects of self-efficacy statements in humorous anti-alcohol abuse messages targeting college students: Who is in charge?. *Health Communication, 25*(8), 638-646. doi:10.1080/10410236.2010.521908

Lee, P., Chang, W., Liou, T., & Chang, P. (2006). Stage of exercise and health-related quality of life among overweight and obese adults. *Journal of Advanced Nursing, 53*(3), 295-303. doi:10.1111/j.1365-2648.2006.03726.x

Lee, R. E., Nigg, C. R., DiClemente, C. C., & Courneya, K. S. (2001). Validating motivational readiness for exercise behavior with adolescents. *Research Quarterly of Exercise and Sports, 72*(4), 401-410.

Leenders, N. M., Silver, L., White, S. L., Buckworth, J., & Sherman, W. (2002). Assessment of physical activity, exercise self-efficacy, and stages of change in college students using a street-based survey method. *American Journal of Health Education, 33*(4), 199-205.

Lejoyeux, M., Avril, M., Richoux, C., Embouazza, H., & Nivoli, F. (2008). Prevalence of exercise dependence and other behavioral addictions among clients of a Parisian fitness room. *Comprehensive Psychiatry, 49*(4), 353-358. doi:10.1016/j.comppsych.2007.12.005

Leppel, K. (2002). Similarities and differences in the college persistence of men and women. *The Review of Higher Education, 25*(4), 433-450. doi:10.1353/rhe.2002.0021

Leung, D., Lam, T., & Chan, S. (2010). Three versions of perceived stress scale: Validation in a sample of Chinese cardiac patients who smoke. *BMC Public Health 2010, 10,* 513.

Lewis, M., & Sutton, A. (2011). Understanding exercise behaviour: Examining the interaction of exercise motivation and personality in predicting exercise frequency. *Journal of Sport Behavior, 34*(1), 82-97.

Li, C., & Wu, J. (2008). *Optimism, creative self-efficacy, and innovative behaviors in college students*. Washington, District of Columbia, US: American Psychological Association (APA).

Lincoln, T. M., Peter, N., Schafer, M., & Moritz, S. (2009). Impact of stress on paranoia: An experimental investigation of moderators and mediators. *Psychological Medicine, 39*(7), 1129-1139. doi:10.1017/S0033291708004613

Lindner, D., Hughes, A., & Fahy, R. (2008). Eating pathology and social comparison in college females. *North American Journal of Psychology, 10*(3), 445-462.

Lindwall, M., & Martin-Ginis, K. (2006). Moving towards a favorable image: The self-presentational benefits of exercise and physical activity. *Scandinavian Journal of Psychology, 47*(3), 209-217.

Lippke, S., & Plotnikoff, R. (2009). The protection motivation theory within the stages of the transtheoretical model: Stage-specific interplay of variables and prediction of exercise stage transitions. *British Journal of Health Psychology, 14*(Pt 2), 211-229.

Lochbaum, M. R., Rhodes, R. E., Stevenson, S. J., Surles, J. J., Stevens, T. T., & Wang, C. J. (2010). Does gender moderate the exercising personality? An examination of continuous and stage-based exercise. *Psychology, Health & Medicine*, *15*(1), 50-60. doi:10.1080/13548500903443449

Lopez, F. G., Fons-Scheyd, A., Morúa, W., & Chaliman, R. (2006). Dyadic perfectionism as a predictor of relationship continuity and distress among college students. *Journal of Counseling Psychology*, *53*(4), 543-549. doi:10.1037/0022-0167.53.4.543

Loucks, A. B. (2004). Energy balance and body composition in sports and exercise. *Journal of Sports Sciences*, *22*(1), 1-14.

Lund, H. G., Reider, B. D., Whiting, A. B., & Prichard, J. R. (2010). Sleep patterns and predictors of disturbed sleep in a large population of college students. *Journal of Adolescent Health, 46*(2), 124-132. doi:10.1016/j.jadohealth.2009.06.016

Luszczynska, A., Schwarzer, R., Lippke, S., & Mazurkiewicz, M. (2011). Self-efficacy as a moderator of the planning-behaviour relationship in interventions designed to promote physical activity. *Psychology & Health*, *26*(2), 151-166. doi:10.1080/08870446.2011.531571

Lynch, D. J. (2008). Confronting challenges: Motivational beliefs and learning strategies in difficult college courses. *College Student Journal*, *42*(2), 416-421.

Mack, M. G. (2003). Does exercise status influence the impressions formed by college students?. *College Student Journal*, *37*(4), 483-489.

Magoc, D., Tomaka, J., & Bridges-Arzaga, A. (2011). Using the web to increase physical activity in college students. *American Journal of Health Behavior, 35*(2), 142-154.

Mahoney, A., Carels, R. A., Pargament, K. I., Wachholtz, A., Leeper, L., Kaplar, M., & Frutchey, R. (2005). The sanctification of the body and behavioral health patterns of college students. *International Journal for the Psychology of Religion, 15*(3), 221-238. doi:10.1207/s15327582ijpr1503_3

Mane-Abhay, B., Krishnakumar, M. K., Niranjan, P. C., & Hiremath-Shashidhar, G. (2011). Differences in perceived stress and its correlates among students in professional courses. *Journal of Clinical and Diagnostic Research, 5*(6), 1228-1233.

Manfreda, K., Berzelak, J., Vehovar, V., Bosnjak, M., & Haas, I. (2008). Web versus other survey modes: A meta-analysis comparing response rates. *International Journal of Market Research, 50*(1).

Marcus, B. H., & Forsyth, L. H. (2003). *Motivating people to be physically active.* Champaign, IL: Human Kinetics.

Marcus, B. H., Selby, V. C., Niaura, R. S., & Rossi, J. S. (1992). Self-efficacy and the stages of exercise behavior change. *Research Quarterly for Exercise and Sport, 63*, 60-66.

María, J., & Miller, L. M. (2010). Why a trade-off? The relationship between the external and internal validity of experiments. *Theoria, 25*(3), 301-321.

Marist College. (2013). Marist College at a glance. Retrieved on December 14, 2013, from http://www.marist.edu/about/glance.html

Marquardt, D. W. (1970). Generalized inverses, ridge regression, biased linear estimation, and nonlinear estimation. *Technometrics, 12,* 591-656.

Marsella, S., & Gratch, J. (2003). *Modeling coping behavior in virtual humans: Don't worry, be happy.* Paper presented at 2nd International Conference on Autonomous Agents and Multiagent Systems, Melbourne, Australia, July 2003.

Marshall, S., & Biddle, S. (2001). The transtheoretical model of behavior change: A meta-analysis of applications to physical activity and exercise. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine, 23*(4), 229-246.

Martin, B., Bhimy, A., & Agee, T. (2002). Infomercials and advertising effectiveness: An empirical study. *Journal of Consumer Marketing, 19*(6), 468-480. doi:10.1108/07363760210444850

Martin, K. A., & Brawley, L. R. (2002). Self-handicapping in physical achievement settings: The contributions of self-esteem and self-efficacy. *Self and Identity, 1*(4), 337-351. doi:10.1080/15298860290106814

Martin, R., Velicer, W. F., & Fava, J. L. (1996). Latent transition analysis to the stages of change for smoking cessation. *Addictive Behaviors, 21*(1), 67-80.

Maslow, A. H. (1954). *Motivation and personality.* New York, NY: Harper and Row.

Maslow, A. H. (1970). *Motivation and personality* (2nd ed.). New York: Harper & Row.

McAuley, E. (1992). The role of efficacy cognitions in the prediction of exercise behavior in middle-aged adults. *Journal of Behavioral Medicine, 15*(1), 65-88.

McAuley, E. (1993). Self-efficacy and the maintenance of exercise participation in older adults. *Journal of Behavioral Medicine, 16*, 103-113.

McAuley, E., & Blissmer, B. (2000). Self-efficacy determinants and consequences of physical activity. *Exercise and Sport Sciences Reviews, 28*, 85-88.

McAuley, E., Jerome, G., Marquez, D., Elavsky, S., & Blissmer, B. (2003). Exercise self-efficacy in older adults: Social, affective, and behavioral influences. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine, 25*(1), 1-7.

McCreary, D. R., & Saucier, D. M. (2007). *Muscularity, social comparison, and social physique anxiety in college males*. Washington, District of Columbia, US: American Psychological Association (APA).

Menon, C. V., & Harter, S. L. (2012). Examining the impact of acculturative stress on body image disturbance among Hispanic college students. *Cultural Diversity and Ethnic Minority Psychology*, *18*(3), 239-246. doi:10.1037/a0028638

Microsoft. (2008). Microsoft Excel [computer software]. Redmond, Washington: Microsoft.

Miller, N. E. & Dollard, J. (1941). *Social learning and imitation*. New Haven: Yale University Press.

Mimura, C., & Griffiths, P. A. (2004). Japanese version of the perceived stress scale: Translation and preliminary test. *International Journal of Nursing Students, 41*, 379-385.

Mitchell, A., Crane, P., & Kim, Y. (2008). Perceived stress in survivors of suicide: Psychometric properties of the perceived stress scale. *Research in Nursing & Health*, *31*(6), 576-585.

Mitra, A., Jain-Shukla, P., Robbins, A., Champion, H., & Durant, R. (2008). Differences in rate of response to web-based surveys among college students. *International Journal on E-Learning*, *7*(2), 265-281.

Moeini, B., Shafii, F., Hidarnia, A., Babaii, G., Birashk, B., & Allahverdipour, H. (2008). Perceived stress, self-efficacy and its relations to psychological well-being status in Iranian male high school students. *Social Behavior and Personality*, *36*(2), 257-266. doi:10.2224/sbp.2008.36.2.257

Moore, D. S., & McCabe, G. P. (2006). *Introduction to the practice of statistics*, (5th ed.). New York, NY: W.H. Freeman & Co..

Moore, J. B., Mitchell, N. G., Bibeau, W. S., & Bartholomew, J. B. (2011). Effects of a 12-week resistance exercise program on physical self-perceptions in college students. *Research Quarterly for Exercise & Sport*, *82*(2), 291-301.

Moore, M., & Werch, C. (2008). Relationship between vigorous exercise frequency and substance use among first-year drinking college students. *Journal of American College Health, 56*(6), 686-690.

Morrell, H., Cohen, L., Bacchi, D., & West, J. (2005). Predictors of smoking and smokeless tobacco use in college students: A preliminary study using Web-based survey methodology. *Journal of American College Health, 54*(2), 108-115.

Morrison, R., & O'Connor, R. C. (2005). Predicting psychological distress in college students: The role of rumination and stress. *Journal of Clinical Psychology, 61*, 447–460. doi:10.1002/jclp.20021

Motl, R. W., Dishman, R. K., Ward, D. S., Saunders, R. P., Dowda, M., Felton, G., & Pate, R. R. (2005). Comparison of barriers self-efficacy and perceived behavioral control for explaining physical activity across 1 year among adolescent girls. *Health Psychology, 24*(1), 106-111. doi:10.1037/0278-6133.24.1.106

Mulkana, S., & Hailey, B. (2001). The role of optimism in health-enhancing behavior. *American Journal of Health Behavior*, *25*(4), 388-395.

Muller, H., Freytag, J. C., & Leser, U. (2012). Improving data quality by source analysis. *Journal of Data and Information Quality (JDIQ), 2*(4), 15.

Murff, S. (2005). The impact of stress on academic success in college students. *ABNF Journal, 16*(5), 102-104.

Muscari, A., Giannoni, C., Pierpaoli, L., Berzigotti, A., Maietta, P., Foschi, E., & ... Zoli, M. (2010). Chronic endurance exercise training prevents aging-related cognitive decline in healthy older adults: A randomized controlled trial. *International Journal of Geriatric Psychiatry*, *25*(10), 1055-1064.

National Center for Chronic Disease Prevention and Health Promotion. (1999). Physical activity and health: A report of the Surgeon General. Retrieved on October 11, 2012, from http://www.cdc.gov/nccdphp/sgr/ataglan.htm

National Center for Health Statistics. (1995). Report of final mortality statistics. *Monthly Vital Statistics Report, 45* (suppl. 2).

Nelson, D., & Cooper, C. (2005). Stress and health: A positive direction. *Stress and Health, 21*(2), 73–75. doi:10.1002/smi.1053

Nelson, M. C., Story, M., Larson, N. I., Neumark-Sztainer, D., & Lytle, L. A. (2008). Emerging adulthood and college-aged youth: An overlooked age for weight-related behavior change. *Obesity, 16*(10), 2205–2211. doi:10.1038/oby.2008.365

Nes, L., Evans, D. R., & Segerstrom, S. C. (2009). Optimism and college retention: Mediation by motivation, performance, and adjustment. *Journal of Applied Social Psychology, 39*(8), 1887-1912. doi:10.1111/j.1559-1816.2009.00508.x

Nes, L., & Segerstrom, S. (2006). Dispositional optimism and coping: A meta-analytic review. *Personality and Social Psychology Review: An Official Journal of the Society for Personality and Social Psychology, Inc, 10*(3), 235-251.

New, K., & Ghafar, M. N. A. (2011). The social change experiences of college students at an institution of higher learning. *Higher Education Studies, 1*(2), 14-28.

Nguyen-Michel, S., Unger, J., Hamilton, J., & Spruijt-Metz, D. (2006). Associations between physical activity and perceived stress/hassles in college students. *Stress and Health, 22*, 179-188.

Nigg, C. R. (2005). There is more to stages of exercise than just exercise. *Exercise & Sports Science Reviews, 33*(1), 32–35.

Nigg, C. R., Geller, K. S., Motl, R. W., Horwath, C. C., Wertin, K. K., & Dishman, R. K. (2011). A research agenda to examine the efficacy and relevance of the transtheoretical model for physical activity behavior. *Psychology of Sport & Exercise*, *12*(1), 7-12. doi:10.1016/j.psychsport.2010.04.004

Nigg, C. R., & Riebe, D. (2002). The transtheoretical model: Research review of exercise behavior and older adults. In P. Burbank & D. Riebe (Eds.), *Promoting exercise and behavior change in older adults: Interventions with the transtheoretical model* (pp. 147-180). New York, NY: Springer Publishing.

Norman, G. J., Benisovich, S. V., Nigg, C. R., & Rossi, J. S. (1998). Examining three exercise staging algorithms in two samples. *Annals of Behavior Medicine, 20*, S 211.

Norman, E., Sherburn, M., Osborne, R., & Galea, M. (2010). An exercise and education program improves well-being of new mothers: A randomized controlled trial. *Physical Therapy*, *90*(3), 348-355. doi:10.2522/ptj.20090139

Norvilitis, J. M., Merwin, M. M., Osberg, T. M., Roehling, P. V., Young, P., & Kamas, M. M. (2006). Personality factors, money attitudes, financial knowledge, and credit-card debt in college students. *Journal of Applied Social Psychology*, *36*(6), 1395-1413. doi:10.1111/j.0021-9029.2006.00065.x

Novak, K. B., & Crawford, L. A. (2001). Perceived drinking norms, attention to social comparison information, and alcohol use among college students. *Journal of Alcohol & Drug Education*, *46*(3), 18.

O'Connor, B., Rousseau, F., & Maki, S. (2004). Physical exercise and experienced bodily changes: The emergence of benefits and limits on benefits. *International Journal of Aging & Human Development*, *59*(3), 177-203.

O'Sullivan, G. (2011). The relationship between hope, eustress, self-efficacy, and life satisfaction among undergraduates. *Social Indicators Research*, *101*(1), 155-172.

Olason, D. T., & Roger, D. (2001). Optimism, pessimism and “fighting spirit”: A new approach to assessing expectancy and adaptation. *Personality and Individual Differences, 31*(5), 755-768. doi:10.1016/S0191-8869(00)00176-8

Oliveira, J., Galvão, C., & Rocha, S. (2008). Resistance exercises for health promotion in coronary patients: Evidence of benefits and risks. *International Journal of Evidence-Based Healthcare*, *6*(4), 431-439. doi:10.1111/j.1744-1609.2008.00114.x

Osbourne, J. W., & Overbay, A. (2004). The power of outliers (and why researchers should always check for them). *Practical Assessment, Research & Evaluation, 9(6).* Retrieved on February 22, 2014, from http://PAREonline.net/getvn.asp?9&n=6.

Osborne, J. & Waters, E. (2002). Four assumptions of multiple regression that researchers should always test. *Practical Assessment, Research & Evaluation,*

8(2). Retrieved on December 23, 2013, from http://pareonline.net/getvn.asp?v=8&n=2

Pace University. (2013). Fast facts. Retrieved on December 14, 2013, from http://www.pace.edu/about-us/fast-facts

Park, K., & Khan, M. A. (2006). An investigation of factors influencing participation in online surveys by college students. *Journal of Hospitality & Tourism Education, 18*(4), 9-16.

Park, B., Lee, M., Hong, J., Bae, S., Kim, E., Kim, K., & Kim, D. (2009). The stages of physical activity and exercise behavior: An integrated approach to the theory of planned behavior. *Asia-Pacific Journal of Public Health*, *21*(1), 71-83. doi:10.1177/1010539508327089

Pauline, J. S. (2010). *Exercise, exercise self-efficacy, and sedentary behaviors in college students*. Washington, District of Columbia, US: American Psychological Association (APA).

Peterson, C. (2000). The future of optimism. *American Psychologist*, *55*(1), 44-55.

Perna, R., & Monto, K. (2006). Neurophysiology: Basis for the benefits of exercise on physical and mental health. *Psyccritiques, 51*(34), doi:10.1037/a0003443

Perry, C. K., & Butterworth, S. W. (2011). Commitment strength in motivational interviewing and movement in exercise stage of change in women. *Journal of the American Academy of Nurse Practitioners*, *23*(9), 509-514. doi:10.1111/j.1745-7599.2011.00637.x

Persaud, N., & Mamdani, M. M. (2006). External validity: The neglected dimension in evidence ranking. *Journal of Evaluation in Clinical Practice*, *12*(4), 450-453. doi:10.1111/j.1365-2753.2006.00730.x

Pimenta, F., Leal, I., & Maroco, J. (2008). Health beliefs, stages of change and smoking behaviour in Portuguese college students. *Journal of Smoking Cessation*, *3*(1), 14-22.

Plante, T. G., Cage, C., Clements, S., & Stover, A. (2006). Psychological benefits of exercise paired with virtual reality: Outdoor exercise energizes whereas indoor virtual exercise relaxes. *International Journal of Stress Management*, *13*(1), 108-117. doi:10.1037/1072-5245.13.1.108

Pomerantz, J. R. (2003). Perception: Overview. In L. Nadel (Ed.), *Encycolopedia of cognitive science* (Vol. 3) (pp. 527-537). London: Nature Publishing Group.

Porter, S. R., & Whitcomb, M. E. (2005). Non-response in student surveys: The role of demographics, engagement, and personality. *Research in Higher Education*, *46*(2), 127-152. doi:10.1007/s11162-004-1597-2

Porter, S. R., & Whitcomb, M. E. (2007). Mixed-mode contacts in web surveys: Paper is not necessarily better. *Public Opinion Quarterly*, *71*(4), 635-648. doi:10.1093/poq/nfm038

Posadzki, P., Stockl, A., Musonda, P., & Tsouroufli, M. (2010). A mixed-method approach to sense of coherence, health behaviors, self-efficacy and optimism: Towards the operationalization of positive health attitudes. *Scandinavian Journal of Psychology*, *51*(3), 246-252.

Pressey, S. L. (1946). Age of college graduation and success in adult life. *Journal of Applied Psychology, 30*(3), 226-233. doi:10.1037/h0054810

Pritchard, M., Wilson, G., & Yamnitz, B. (2007). What predicts adjustment among college students? A longitudinal panel study. *Journal of American College Health, 56*(1), 15-21.

Prince, S. A., Adamo, K. B., Hamel, M. E., Hardt, J., Gorber, S. C., & Tremblay, M. (2008). A comparison of direct versus self-report measures for assessing physical activity in adults: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity, 5*, 56 doi:10.1186/1479-5868-5-56

Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self changes of smoking: Toward an integrating model of change. *Journal of Consulting and Clinical Psychology*, 51, 390-395.

Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist, 47*(9), 1102-1114. doi:10.1037/0003-066X.47.9.1102

Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion, 12*(1), 38-48.

Puente, R., & Anshel, M. H. (2010). Exercisers' perceptions of their fitness instructor's interacting style, perceived competence, and autonomy as a function of self-determined regulation to exercise, enjoyment, affect, and exercise frequency. *Scandinavian Journal of Psychology, 51*(1), 38-45. doi:10.1111/j.1467-9450.2009.00723.x

Punch, K. F. (2005). *Introduction to social research: Quantitative and qualitative approaches* (2nd ed.). London: Sage.

Quercioli, C., Messina, G., Barbini, E., Carriero, G., Fanì, M., & Nante, N. (2009). Importance of sociodemographic and morbidity aspects in measuring health-related quality of life: Performances of three tools. Comparison of three questionnaire scores. *European Journal of Health Economics, 10*(4), 389-397. doi:10.1007/s10198-008-0139-9

Racette, S., Deusinger, S., Strube, M., Highstein, G., & Deusinger, R. (2005). Weight changes, exercise, and dietary patterns during freshman and sophomore years of college. *Journal of American College Health, 53*(6), 245-251.

Rahm, E. & Do, H. H. (2000). Data cleaning: Problems and current approaches. *Bulletin of the IEEE Computer Society Technical Committee on Data Engineering*. 1-11.

Rasmussen, H., Scheier, M., & Greenhouse, J. (2009). Optimism and physical health: A meta-analytic review. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine, 37*(3), 239-256.

Read, J. P., Colder, C. R., Merrill, J. E., Ouimette, P., White, J., & Swartout, A. (2012). Trauma and posttraumatic stress symptoms predict alcohol and other drug consequence trajectories in the first year of college. *Journal of Consulting and Clinical Psychology*, 1-13. doi:10.1037/a0028210

Read, J. P., Wardell, J. D., Vermont, L. N., Colder, C. R., Ouimette, P., & White, J. (2012). Transition and change: Prospective effects of posttraumatic stress on

smoking trajectories in the first year of college. *Health Psychology,* 1-11. doi:10.1037/a0029085

Reed, J., & Phillips, D. (2005). Relationships between physical activity and the proximity of exercise facilities and home exercise equipment used by undergraduate university students. *Journal of American College Health, 53*(6), 285-290.

Reed, G. R., Velicer, W. F., Prochaska, J. O., Rossi, J. S., & Marcus, B.H. (1997). What makes a good staging algorithm? Examples from regular exercise. *American Journal of Health Promotion, 12,* 57-66.

Rendi, M., Szabo, A., Szabó, T., Velenczei, A., & Kovács, A. (2008). Acute psychological benefits of aerobic exercise: A field study into the effects of exercise characteristics. *Psychology, Health & Medicine*, *13*(2), 180-184.

Resnick, B., & Jenkins, L. S. (2000). Testing the reliability and validity of the self-efficacy for exercise scale. *Nursing Research, 49*(3), 154-159.

Rhodes, R. E., & Courneya, K. S. (2003). Investigating multiple components of attitude, subjective norm, and perceived control: An examination of the theory of planned behaviour in the exercise domain. *British Journal of Social Psychology, 42*, 129–146. doi:10.1348/014466603763276162

Rhodes, R. E., Courneya, K. S. & Jones, L. W. (2002). Personality, the theory of planned behavior, and exercise: A unique role for extroversion's activity facet. *Journal of Applied Social Psychology*, *32*, 1721–1736. doi:10.1111/j.1559-1816.2002.tb02772.x

Riemsma, R. P., Pattenden, J. Bridle, C., Sowden, A. J., Mather, L., Watt, I. S., & Walker, A. (2003). Systematic review of the effectiveness of stage based interventions to promote smoking cessation. *British Medical Journal, 326*(7400), 1175–1177.

Rippetoe, P. A., & Rogers, R. W. (1987). Effects of components of protection-motivation theory on adaptive and maladaptive coping with a health threat. *Journal of Personality and Social Psychology*, *52*(3), 596-604. doi:10.1037/0022-3514.52.3.596

Roberti, J. W., Harrington, L. N., & Storch, E. A. (2006). Further psychometric support for the 10-item version of the perceived stress scale. *Journal of College Counseling*, *9*(2), 135.

Robotham, D., & Julian, C. (2006). Stress and the higher education student: A Critical review of the literature. *Journal of Further and Higher Education, 30*(2), 107-117. doi:10.1080/03098770600617513

Roddenberry, A., & Renk, K. (2010). Locus of control and self-efficacy: Potential mediators of stress, illness, and utilization of health services in college students. *Child Psychiatry & Human Development, 41*(4), 353-370. doi:10.1007/s10578-010-0173-6

Rogers, C. R. (1961). *On becoming a person: A therapist's view of psychotherapy.* London: Constable.

Rogers, L., Courneya, K., Shah, P., Dunnington, G., & Hopkins-Price, P. (2007). Exercise stage of change, barriers, expectations, values and preferences among

breast cancer patients during treatment: A pilot study. *European Journal of Cancer Care*, *16*(1), 55-66.

Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health Education Monographs, 2*, 328–335.

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the health belief model. *Health Education & Behavior, 15*(2), 175–183. doi:10.1177/109019818801500203

Ross, A., & Thomas, S. (2010). The health benefits of yoga and exercise: A review of comparison studies. *Journal of Alternative & Complementary Medicine*, *16*(1), 3-12. doi:10.1089/acm.2009.0044

Rothstein, J., & Rouse, C. (2011). Constrained after college: Student loans and early-career occupational choices. *Journal of Public Economics, 95*(1/2), 149-163. doi:10.1016/j.jpubeco.2010.09.015

Rotter, J. B. (1954). *Social learning and clinical psychology*. New York, NY: Prentice-Hall.

Rotter, J. B. (1966). Generalized expectancies of internal versus external control of reinforcements. *Psychological Monographs, 80*(1), 1-28. doi:10/1037/h0092976

Rovira, T., Edo, S., & Fernandez-Castro, J. (2010). How does cognitive appraisal lead to perceived stress in academic examinations?. *Studia Psychologica, 52*(3), 179-192.

Rutledge, T., & Loh, C. (2004). Effect sizes and statistical testing in the determination of clinical significance in behavioral medicine research. *Annals of Behavioral Medicine*, *27*(2), 138-145. doi:10.1207/s15324796abm2702_9

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68-78. doi:10.1037/0003-066X.55.1.68

Ryan, G., & Dzewaltowski, D. (2002). Comparing the relationships between different types of self-efficacy and physical activity in youth. *Health Education & Behavior*, *29*(4), 491-504. doi:10.1177/109019810202900408.

Sackett, D. L. (1979). Bias in analytic research. *Journal of Chronic Diseases*, *32*(1–2), 51–63. doi:10.1016/0021-9681(79)90012-2

Sailors, M. H., Jackson, A. S., McFarlin, B. K., Turpin, I., Ellis, K. J., Foreyt, J. P., & ... Bray, M. S. (2010). Exposing college students to exercise: The Training Interventions and Genetics of Exercise Response (TIGER) study. *Journal of American College Health*, *59*(1), 13-20. doi:10.1080/07448481.2010.483712

Sarantakos, S. (2005). *Social research* (3rd ed.). New York, NY: Palgrave Macmillan.

Sarkin, J. A., Johnson, S. S., Prochaska, J. O., & Prochaska, J. M. (2001). Applying the transtheoretical model to regular moderate exercise in an overweight population: Validation of a stages of change measure. *Preventive Medicine: An International Journal Devoted to Practice and Theory*, *33*(5), 462-469. doi:10.1006/pmed.2001.0916

Sax, L. J., Gilmartin, S. K., & Bryant, A. N. (2003). Assessing response rates and nonresponse bias in web and paper surveys. *Research in Higher Education*, *44*(4), 409-32.

Scheffé, H. (1959). *The analysis of variance*. New York, NY: Wiley.

Scheier, M., & Carver, C. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, *4*(3), 219-247.

Scheier, M. F., & Carver, C. S. (1987). Dispositional optimism and physical well-being: The influence of generalized outcome expectancies on health. *Journal of Personality*, *55*(2), 169-210. doi:10.1111/1467-6494.ep8970713

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology, 67*, 1063–1078.

Scheier, M. F., Carver, C. S., & Bridges, M. W. (2001). Optimism, pessimism, and psychological well-being. In E. C. Chang (Ed.), *Optimism & pessimism: Implications for theory, research, and practice* (pp. 189-216). American Psychological Association. doi:10.1037/10385-009

Schwarzer, R. (1992). *Self-efficacy: Thought control of action*. (pp. 217-243). Washington, DC, US: Hemisphere Publishing Corp.

Schwarzer, R. (2008). Modeling health behavior change: How to predict and modify the adoption and maintenance of health behaviors. *Applied Psychology: An International Review*, *57*(1), 1–29.

Schwarzer, R., & Jerusalem, M. (1995). Generalized self-efficacy scale. In J. Weinman, S. Wright, & M. Johnson (Eds.) *Measures in health psychology: A user's*

portfolio, Causal and control beliefs. (pp. 35-37). Windsor, England: NFER-NELSON.

Schwarzer, R., Luszczynska, A., Ziegelmann, J. P., Scholz, U., & Lippke, S. (2008). Social-cognitive predictors of physical exercise adherence: Three longitudinal studies in rehabilitation. *Health Psychology, 27*(1, Suppl), S54-S63. doi:10.1037/0278-6133.27.1(Suppl.).S54

Scotti, J. R., Joseph, B., Haines, C., Lanham, C., & Jacoby, V. (2008). *College student academic performance: Coping and exercise as mediators of multiple sources of stress*. Northbrook, Illinois, US: International Society for Traumatic Stress Studies (ISTSS).

Seaman, J. E., & Allen, E. (2010). Outlier options: Consider simple parametric tests to find an outlier's significance. *Quality Progress*. Retrieved on February 22, 2014, from http://mail.asq.org/quality-progress/2010/02/statistics-roundtable/outlier-options.html

Sebena, R., El Ansari, W., Stock, C., Orosova, O., & Mikolajczyk, R. T. (2012). Are perceived stress, depressive symptoms and religiosity associated with alcohol consumption? A survey of freshmen university students across five European countries. *Substance Abuse Treatment, Prevention & Policy, 7*(1), 21-30. doi:10.1186/1747-597X-7-21

Selye, H. (1956). *The stress of life*. New York, NY: McGraw-Hill.

Selye, H. (1974). *Stress without distress*. Philadelphia, PA: J.B. Lippincott Company.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2001). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin.

Shakespeare, P., & Webb, C. (2008). Professional identity as a resource for talk: Exploring the mentor–student relationship. *Nursing Inquiry, 15*(4), 270-279. doi:10.1111/j.1440-1800.2008.00415.x

Sharp, L., Kimmel, L., Kee, R., Saltoun, C., & Chang, C. (2007). Assessing the perceived stress scale for African American adults with asthma and low literacy. *The Journal of Asthma: Official Journal of the Association for the Care of Asthma*, *44*(4), 311-316.

Sides-Moore, L., & Tochkov, K. (2011). The thinner the better? Competitiveness, depression and body image among college student women. *College Student Journal, 45*(2), 439-448.

Sidman, C. L., D'Abundo, M., & Hritz, N. (2009). Exercise self-efficacy and perceived wellness among college students in a basic studies course. *International Electronic Journal of Health Education*, *12*, 162-174.

Smith, C. A., & Kirby, L. (2000). Consequences require antecedents: Toward a process model of emotion elicitation. In J. P. Forgas (Ed.), *Feeling and thinking: The role of affect in social cognition* (pp. 83-106): Cambridge University Press.

Smith, C. A., & Kirby, L. D. (2009). Putting appraisal in context: Toward a relational model of appraisal and emotion. *Cognition and Emotion, 23*(7), 1352-1372.

Snyder, C. (1994). *The psychology of hope: You can get there from here*. New York, NY: Free Press.

Snyder, C. R., Harris, C , Anderson, J. R., Holleran, S. A., Irving, L. M., Sigmon, S. T, Yoshinobu, L., Gibb, J., Langelle, C, & Hamey, P. (1991). The will and the ways: Development and validation of an individual-differences measure of hope. *Journal of Personality and Social Psychology, 60*, 570-585.

State University of New York at New Paltz. (2013a). At a glance. Retrieved on October 11, 2013, from http://www.newpaltz.edu/about/glance.html

State University of New York at New Paltz. (2013b). Majors and minors. Retrieved on October 29, 2013, from http://www.newpaltz.edu/ugc/programs.html

Steed, L. G. (2002). Psychometric comparison of four measures of hope and optimism. *Educational and Psychological Measurement, 62*(3), 466-482. doi:10.1177/00164402062003005

Stenfors-Hayes, T., Kalén, S., Hult, H., Dahlgren, L., Hindbeck, H., & Ponzer, S. (2010). Being a mentor for undergraduate medical students enhances personal and professional development. *Medical Teacher, 32*(2), 148-153. doi:10.3109/01421590903196995

Steptoe, A., Wright, C., Kunz-Ebrecht, S. R., & Iliffe, S. (2006). Dispositional optimism and health behaviour in community-dwelling older people: Associations with healthy ageing. *British Journal of Health Psychology, 11*(1), 71-84. doi:10.1348/135910705X42850

Stoll, O., & Alfermann, D. (2002). Effects of physical exercise on resources evaluation, body self-concept and well-being among older adults. *Anxiety, Stress & Coping: An International Journal*, *15*(3), 311-319. doi:10.1080/1061580021000020752

Su, X., Lau, J., Mak, W., Chen, L., Feng, T., Chen, X., & ... Cheng, J. (2008). Development of the perceived stress scale for people living with HIV/AIDS in China. *AIDS Patient Care & STDs, 22*(12), 989-998.

Sumi, K. (2004). The Japanese version of the revised life orientation test: Reliability and construct validity. *Psychological Reports, 95*(1), 86-88.

SurveyMonkey. (2013). Retrieved on October 11, 2013, from http://www.surveymonkey.com/

Sutton, S. (2001). Back to the drawing board? A review of applications of the transtheoretical model to substance use. *Addiction (Abingdon, England), 96*(1), 175-186.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Needham Heights, MA: Allyn & Bacon.

Tabachnick, B. G., & Fidell, L. S (2012). *Using multivariate statistics* (6th ed.). Englewood Cliffs, NJ: Prentice Hall.

Taber, D. R., Meischke, H., & Maciejewski, M. L. (2010). Testing social cognitive mechanisms of exercise in college students. *American Journal of Health Behavior*, *34*(2), 156-165. doi:10.5993/AJHB.34.2.3

Tajfel, H., & Turner, J. (1979). An integrative theory of conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33–48). Monterey, CA: Brooks/Cole.

Tan, E. (2007). You're not too shocked people actually watch infomercials. *Advertising Age, 78*(29), 4.

Tappen, R. M. (2010). *Advanced nursing research*. Sudbury, MA: Jones & Bartlett Learning.

Taub, D. J., Servaty-Seib, H. L., & Cousins, C. (2006). On the brink of transition: The concerns of college seniors. *Journal of the First-Year Experience & Students in Transition, 18*(2), 111-132.

Taylor, A. H., Ussher, M. H. & Faulkner, G. (2007). The acute effects of exercise on cigarette cravings, withdrawal symptoms, affect and smoking behaviour: A systematic review. *Addiction, 102,* 534–543. doi:10.1111/j.1360-0443.2006.01739.x

Taylor-Piliae, R., Haskell, W., Waters, C., & Froelicher, E. (2006). Change in perceived psychosocial status following a 12-week tai chi exercise programme. *Journal of Advanced Nursing, 54*(3), 313-329. doi:10.1111/j.1365-2648.2006.03809.x

Tetlie, T., Eik-Nes, N., Palmstierna, T., Callaghan, P., & Nøttestad, J. (2008). The effect of exercise on psychological & physical health outcomes. *Journal of Psychosocial Nursing & Mental Health Services, 46*(7), 38-43.

Thomas, J., Britt, T., Odle-Dusseau, H., & Bliese, P. (2011). Dispositional optimism buffers combat veterans from the negative effects of warzone stress on mental

health symptoms and work impairment. *Journal of Clinical Psychology*, *67*(9), 866-880. doi:10.1002/jclp.20809

Tien, H., Lin, C., & Chen, S. (2005). A grounded analysis of career uncertainty perceived by college students in Taiwan. *Career Development Quarterly, 54*(2), 162-174.

Titus, M. A. (2006). Understanding college degree completion of students with low socioeconomic status: The influence of the institutional financial context. *Research in Higher Education*, *47*(4), 371-398.

Tomaiuolo, N. G. (2005). Faculty views of open web resource use by college students. *The Journal of Academic Librarianship, 31*(6), 559-566. doi:10.1016/j.acalib.2005.08.014

Tomkins, S. (1968). A modified model of smoking behavior. In E. F. Borgatta & R. R. Evans (Eds.), *Smoking, health, and behavior* (pp. 165–186). Chicago, IL: Aldine.

Tomporowski, P. D. (2008). *Physical activity and cognition: Executive function theory*. Washington, District of Columbia, US: American Psychological Association.

Tongco, M. D. C. (2007). Purposive sampling as a tool for informant selection. *Ethnobotany Research & Applications, 5*, 147-158.

Tozun, M., Unsal, A., Ayranci, U., Arslan, G., Arslantas, D., & Koc, F. (2009). Prevalence of eating disorders and risk profile in a group of female college students. *Internet Journal of Epidemiology, 7*(1), 7.

Trotta-Tuomi, M. (2005). Agents of social change in education. *Community Development Journal, 40*(2), 205-211.

Tsatsoulis, A., & Fountoulakis, S. (2006). The protective role of exercise on stress system dysregulation and comorbidities. *Annals of The New York Academy of Sciences, 1083*, 196-213.

Tukey, J. W. (1953). *The problem of multiple comparisons*. Unpublished manuscript.

Tung, W., Cook, D., & Lu, M. (2011). Sexual behavior, stages of condom use, and self-efficacy among college students in Taiwan. *AIDS Care*, *23*(1), 113-120. doi:10.1080/09540121.2010.498863

United States Department of Health and Human Services. (1996). *Physical activity and health: A report of the surgeon general.* U.S. Department of Health and Human Services, Center for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Atlanta, GA.

United States Department of Health and Human Services. (2008). Physical activity guidelines for Americans. Retrieved on October 11, 2012, from http://www.health.gov/paguidelines/

United States Department of Health and Human Services. (2010). The Surgeon General's vision for a healthy and fit nation. Rockville, MD: U.S. Department of Health and Human Services, Office of the Surgeon General.

Vader, A. M., Walters, S. T., Roudsari, B., & Nguyen, N. (2011). Where do college students get health information? Believability and use of health information sources. *Health Promotion Practice*, *12*(5), 713-722. doi:10.1177/152483991036999

Van Etten, S., Pressley, M., McInerney, D. M., & Liem, A. (2008). College seniors' theory of their academic motivation. *Journal of Educational Psychology, 100*(4), 812-828. doi:10.1037/0022-0663.100.4.812

Vassar College. (2013). About Vassar College. Retrieved on December 14, 2013, from http://www.vassar.edu/about/

Vaughan, S. C. (2000). *Half empty, half full: Understanding the psychological roots of optimism*. New York: Harcourt.

Vlachopoulos, S. P., Kaperoni, M., & Moustaka, F. C. (2011). The relationship of self-determination theory variables to exercise identity. *Psychology of Sport and Exercise, 12*(3), 265-272. doi:10.1016/j.psychsport.2010.11.006

Wallace, L., & Buckworth, J. (2001). Application of the transtheoretical model to exercise behavior among nontraditional college students. *American Journal of Health Education, 32*(1), 39-47.

Wallace, L., & Buckworth, J. (2003). Longitudinal shifts in exercise stages of change in college students. *Journal of Sports Medicine & Physical Fitness, 43*(2), 209-212.

Wallace, L. S., Buckworth, J., Kirby, T. E., & Sherman, W. M. (2000). Characteristics of exercise behavior among college students: Application of social cognitive theory to predicting stage of change. *Preventive Medicine: An International Journal Devoted to Practice and Theory, 31*(5), 494-505. doi:10.1006/pmed.2000.0736

Warburton, D., Bredin, S., Horita, L., Zbogar, D., Scott, J., Esch, B., & Rhodes, R. (2007). The health benefits of interactive video game exercise. *Applied Physiology, Nutrition & Metabolism, 32*(4), 655-663.

Warner, R., & Griffiths, M. D. (2006). A qualitative thematic analysis of exercise addiction: An exploratory study. *International Journal of Mental Health and Addiction*, *4*(1), 13-26. doi:10.1007/s11469-006-9000-5

Warren, T. Y., Barry, V., Hooker, S. P., Sui, X., Church, T., & Blair, S. N. (2010). Sedentary behaviors increase risk of cardiovascular disease mortality in men. *Medicine and Science in Sports and Exercise*, 42(5), 879–885.

Warren, C. S., & Rios, R. M. (2012). The relationships among acculturation, acculturative stress, endorsement of Western media, social comparison, and body image in Hispanic male college students. *Psychology of Men & Masculinity*. doi:10.1037/a0028505

Weiner, B. (1974). *Achievement motivation and attribution theory.* Morristown, NJ: General Learning Press.

Weiner, B. (1986). *An attributional theory of motivation and emotion*. New York, NY: Springer-Verlag.

Weinstock, J. (2010). A review of exercise as intervention for sedentary hazardous drinking college students: Rationale and issues. *Journal of American College Health, 58*(6), 539-544. doi:10.1080/07448481003686034

Welch, A. S., Hulley, A., & Beauchamp, M. (2010). Affect and self-efficacy responses during moderate-intensity exercise among low-active women: The effect of cognitive appraisal. *Journal of Sport & Exercise Psychology*, *32*(2), 154-175.

Welle, P. D., & Graf, H. M. (2011). Effective lifestyle habits and coping strategies for stress tolerance among college students. *American Journal of Health Education, 42*(2), 96-105.

Wendorf, C. A. (2004). Primer on multiple regression coding: Common forms and the additional case of repeated contrasts. *Understanding Staistics, 3*(1), 47-57. doi:10.1207/s15328031us0301_3

White, R. T. & Arzi, H. J. (2005). Longitudinal studies: Designs, validity, practicality, and value. *Research in Science Education, 35,* 137-149.

White, A., Jamieson-Drake, D., & Swartzwelder, H. (2002). Prevalence and correlates of alcohol-induced blackouts among college students: Results of an e-mail survey. *Journal of American College Health, 51*(3), 117.

White, J., Puckett, F., Dutta, A., Hayes, S., Kundu, M. M., & Johnson, E. (2011). The relationship of multidimensional health locus of control and attitude toward HIV/AIDS: College students' perspectives. *Journal of Rehabilitation, 77*(2), 12-18.

White, S., Reynolds-Malear, J. B., & Cordero, E. (2011). Disordered eating and the use of unhealthy weight control methods in college students: 1995, 2002, and 2008. *Eating Disorders, 19*(4), 323-334. doi:10.1080/10640266.2011.584805

Whitney, C. (2010). Social supports among college students and measures of alcohol use, perceived stress, satisfaction with life, emotional intelligence and coping. *Journal of Student Wellbeing, 4*(1), 49-67.

Wilburn, V. R., & Smith, D. E. (2005). Stress, self-esteem, and suicidal ideation in late adolescents. *Adolescence,* 40, 33-46.

Wilson, K., & Brookfield, D. (2009). Effect of goal setting on motivation and adherence in a six-week exercise program. *International Journal of Sport and Exercise Physiology, 6*, 89-100.

Wilson-Van Voorhis, C. R., & Morgan, B. L. (2007). Understanding power and rules of thumb for determining sample sizes. *Tutorials in Quantitative Methods for Psychology*, *3*(2), 43□50.

Windle, G., Hughes, D., Linck, P., Russell, I., & Woods, B. (2010). Is exercise effective in promoting mental well-being in older age? A systematic review. *Aging & Mental Health*, *14*(6), 652-669. doi:10.1080/13607861003713232

Winhusen, T., Winstanley, E. L., Somoza, E., & Brigham, G. (2012). The potential impact of recruitment method on sample characteristics and treatment outcomes. *Drug & Alcohol Dependence, 120*(1-3), 225-228.

Wipfli, B. M., Rethorst, C. D., & Landers, D. M. (2008). The anxiolytic effects of exercise: A meta-analysis of randomized trials and dose-response analysis. *Journal of Sport & Exercise Psychology, 30*, 392-410.

Wood, F. B. (2004). Preventing postparchment depression: A model of career counseling for college seniors. *Journal of Employment Counseling*, *41*(2), 71.

Woodyard, C., Hallam, J. S., & Bentley, J. P. (2013). Drinking norms: Predictors of misperceptions among college students. *American Journal of Health Behavior*, *37*(1), 14-24. doi:10.5993/AJHB.37.1.2

Woolf, S., Johnson, R., Phillips, R. R., & Philipsen, M. (2007). Giving everyone the health of the educated: An examination of whether social change would save more lives than medical advances. *American Journal of Public Health, 97*(4), 679-683. doi:10.2105/AJPH.2005.084848

World Health Organization. (2013). Obesity and overweight. Data and statistics. Retrieved on October 11, 2013, from http://www.who.int/mediacentre/factsheets/fs311/en/index.html

Wright, K. B. (2005). Researching Internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. *Journal of Computer-Mediated Communication, 10*(3), 11.

Yang, E., & Gysbers, N. C. (2007). Career transitions of college seniors. *The Career Development Quarterly, 56*(2), 157-170.

Yong, F. L. (2010). A study on the self-efficacy and expectancy for success of pre-university students. *European Journal of Social Sciences, 13*(4), 514-524.

Zak-Place, J., & Stern, M. (2004). Health belief factors and dispositional optimism as predictors of STD and HIV preventive behavior. *Journal of American College Health, 52*(5), 229-236.

Žitniaková-Gurgová, B. (2011). Perfectionistic cognitions as related to optimism and pessimism in college students. *New Educational Review, 26*(4), 272-280.

Zizzi, S. J., Keeler, L. A., & Watson, J. (2006). The interaction of goal orientation and stage of change on exercise behavior in college students. *Journal of Sport Behavior*, *29*(1), 96-110.

Zouhal, H., Jacob, C., Delamarche, P., & Gratas-Delamarche, A. (2008). Catecholamines and the effects of exercise, training and gender. *Sports Medicine*, *38*(5), 401-423. doi:10.2165/00007256-200838050-00004

Appendix A: Sociodemographic Questionnaire

The results of this sociodemographic questionnaire will be used to formulate a sociological depiction of the individuals who have elected to participate in this study. The contents of this questionnaire are simple and easily comprehensible at the college level—completion should not require additional assistance.

Answering each question is accomplished by simply clicking the response or responses that most accurately reflects your answer. Multiple responses to a question are permitted.

You are encouraged to answer all questions honestly; no response will be met with judgment. If you do not wish to answer a question, you can skip that question and move on to the next question. This questionnaire should take you less than two minutes to complete.

Thank you for taking the time to complete the introductory portion of this study.

1. Please indicate your age:
   - 18
   - 19
   - 20
   - 21
   - 22
   - 23
   - 24
   - 25
   - Over 25

2. Please indicate your sex:
   - Male
   - Female

3. Please indicate your race/ethnicity:
   - American Indian / Native American
   - Asian
   - Black / African American
   - Hispanic / Latino
   - White / Caucasian
   - Pacific Islander
   - Biracial/Bi-ethnic
   - Multiracial/multi-ethnic

4. Please indicate your student status:

- Part-time
- Full-time

5. Please indicate your athletic status:
   - I participate on an organized college athletics team
   - I do not participate in an organized college athletics team

6. Please indicate your place of residence:
   - On campus (i.e., dormitory)
   - Off-campus housing (i.e., apartment)
   - At home with my family

7. What is your college major? Please check all that apply.
   - Accountancy
   - Adolescence Education
   - Anthropology
   - Art Education
   - Art History
   - Asian Studies
   - Astronomy
   - Biological Chemistry
   - Biology
   - Black Studies
   - Ceramics
   - Chemistry
   - Communication Studies
   - Communication Disorders
   - Computer Engineering
   - Computer Science
   - Digital Media Production
   - Digital Media Programming & Management
   - Early Childhood & Childhood Education
   - Economics
   - Electrical Engineering
   - English
   - Environmental Geochemical Science
   - Finance
   - General Business
   - Geography
   - Geology
   - Graphic Design
   - History
   - International Business
   - International Relations

- Journalism
- Languages & Cultures
- Latin American & Caribbean Studies
- Management
- Marketing
- Mathematics
- Media
- Metal
- Music
- Painting
- Philosophy
- Photography
- Physics
- Political Science
- Printmaking
- Psychology
- Sculpture
- Sociology
- Theatre Arts
- Visual Arts
- Women’s Studies
- Undeclared

Curriculum Vitae

Education

Ph.D. Health Psychology 2014
Walden University, Minneapolis, Minnesota
Dissertation Topic: Exercise Self-Efficacy, Dispositional Optimism, and Perceived Stress
GPA: 4.0

M.S. Cognitive Psychology 1998
Pace University, White Plains, New York
Thesis Topic: Cognitive Attributes of Group Dynamics
GPA: 4.0

B.S. General Psychology 1993
State University of New York at New Paltz
GPA: 3.9

Recent Coursework

- History & Systems of Psychology
- Doctoral Statistics I & II
- Biopsychology
- Social Psychology
- Tests & Measurements
- Ethics & Standards of Professional Practice
- Research Design
- Health Psychology
- Psychology & Social Change
- Psychoneuroimmunology
- Psychopharmacology
- Stress & Coping
- Changing Health Behavior
- Clinical Neuropsychology
- Cognitive Psychology
- Human Motivation

Professional Experience

Psycologistics (Owner) 3/2010-present
Health Communications Professional
• Design abstracts, advocacy literature, brochures, proposals, press releases, and related health marketing media for various clinical and educational paradigms.

- Publish online health/wellness articles for select media outlets that address obesity, stress management, health motivation, and related biopsychsocial issues.
- Provide consultative oversight to fitness program design and implementation protocols for regional organizations.
- Conduct self-regulation trainings that focus on the application of emotional intelligence and cognitive reframing in the organizational setting.

The Center for Discovery 3/2009—8/2010
Human Resources Recruiter/Trainer

- Spearheaded the design and facilitation of mindfulness, stress management, effective communication, and emotional intelligence training programs for over 1500 employees—decreasing agency wide attrition rates.
- Conducted process groups that facilitated conflict resolution and negotiation skills—enhancing interpersonal effectiveness and adaptive employee relations.
- Designed and implemented behavioral strategies that resulted in the safe and humanistic implementation of client interventions.

The Center for Discovery 7/2007—8/2010
Department Supervisor

- Provided oversight of behavioral protocols, monthly progress notes, and data collection methodologies for psychology department.
- Implemented regulatory checks and balances that resulted in multiple superior departmental audits.
- Initiated structured team building exercises that significantly enhanced intradepartmental peer relations.
- Conducted one-to-one supervision, performed bi-annual evaluations, and monitored goal attainment objectives—increasing department size from 4 to 28 employees in a three-year period.

The Center for Discovery 2/2006—7/2007
Integration Specialist

- Engaged in multidisciplinary collaboration with allied professionals to implement behavior management approaches for individuals diagnosed with autism.
- Conducted in-service trainings on behavioral protocols that resulted in an agency-wide decrease in reportable incidents.
- Analyzed, synthesized, and presented behavior data at clinic consultations and Human Rights committee briefings.

Academic & Professional Affiliations

- American Psychological Association
- APA Division 38—Health Psychology
- Golden Key International Honour Society
- Psi Chi—National Honor Society of Psychology

- Zeta Beta Tau Fraternity, Inc. – Zeta Iota Chapter

Certifications & Licenses

- American College of Sports Medicine Certified Fitness Professional (#673479)
- American Council on Exercise Certified Fitness Professional (#T151676)
- Institute of HeartMath – Resilient Educator Licensed Practitioner

Honors & Awards

- New York State Journalistic Achievement Award
- Pace University Academic Honors
- Pace University "Achievements In The Field of Psychology" Award

Lectures

Garrin, J. M. (2014, March). A first-hand guide to successfully navigating the IRB process: Experiential perspectives. *Write a Quality Prospectus in Psychology.* Lecture conducted from Walden University, Minneapolis, MN.

Publications

Garrin, J. M. (2013). From college student to change agent: A triadic model of self-efficacy, attribution, and appraisal. *Journal of Social Change, 5*(1), 40-57. doi:10.5590/JOSC.2013.05.1.04

Websites

http://www.psycologistics.com/
http://theprogressprocess.psycologistics.com/