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Measuring Perceived Stress Levels and Adaptive Coping Strategies in Undergraduate College Students: A Quasi-Experimental Study

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MEASURING PERCEIVED STRESS LEVELS AND ADAPTIVE COPING STRATEGIES IN UNDERGRADUATE COLLEGE STUDENTS: A QUASI-EXPERIMENTAL STUDY

by

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DEDICATION

This dissertation is dedicated to my students, specifically those that could have benefited from a Stress Management class during their academic journey.

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To my classmates in Cohort 4, cheers to completing this degree and to new opportunities, colleagues, and friends.

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NOMENCLATURE

APA	American Psycholgocial Association
CITI	Collaborative Institutional Training Initiative
GAS	General Adaptation Syndrome
GHQ	General Health Questionnaire
MBSR	Mindfulness-Based Stress Reduction
MCB	Math Chemistry Biology
PMR	Progressive Muscle Relaxation
PSQI	Pittsburg Sleep Quality Index
PSS-10	Perceieved Stress Scale 10
RHR	Resting Heart Rate
SPSS	Statistical Package for the Social Sciences
TAS	Test Anxiety Scale

ABSTRACT

This study aimed to analyze changes in perceived stress and physiological variables in undergraduate students and identify preferred adaptive coping strategies utilized over one semester. Additionally, the study aimed to assess the impact of demographic factors on the students' perception of stress. A quasi-experimental study was conducted using non-random convenience sampling with 30 undergraduate students enrolled in an Introduction to Stress Management class at a small, regional institution in the upper Midwest in the fall of 2022. Data collection included the use of the Perceived Stress Scale (i.e., PSS-10), stress physiological variables (e.g., heart rate), demographic characteristics (e.g., sex, relationship status), and usage of coping strategies (e.g., mindfulness, yoga, progressive muscle relaxation, power napping). Participants were surveyed three times using pre-, mid-, and post-treatment assessments. Both descriptive statistics and the Wilcoxon-signed rank test were used to address the study's research questions and null hypothesis. The findings showed a statistically significant difference ($p < .05$) from pre- to post-treatment assessments in total stress scores (i.e., PSS-10, physiological variables), suggesting that coping strategies were effective. The findings did not indicate a significant decrease in PSS-10 scores from pre- to post-treatment. Data showed that undergraduate college students preferred power napping and social support, and sex accounted for some important differences. Students reported being moderately stressed, more so in their second year. Implementing adaptive coping strategies can effectively decrease perceived stress as well as the physiological manifestation of stress through academic classes or programs available to students through campus.

Keywords: stress, coping strategies, PSS-10, physiological variable

CHAPTER 1. INTRODUTION

Stress is not an unfamiliar concept for college students, but it is an increasing cause of concern for many (Childs et al., 2016, as cited in Böke et al., 2019). College students worldwide are experiencing mental health issues that affect their academic performance and overall health and well-being (Asikainen et al., 2019). An individual's health and sense of well-being are ultimately linked to one's basic needs; meeting students' fundamental needs impacts their ability to reach higher levels of Maslow's hierarchy. According to Maslow's hierarchy, students must experience satisfaction for physiological, safety, and security needs before they are able to satisfy their belongingness and esteem needs (Maslow, 1943). "Failure to meet each need may place an individual at higher risk for depression or increase the rate of growth of depressive symptoms" (Crandall et al., 2020, p. 274). Crandall et al. assert that if students' basic needs are not satisfied, their ability to progress through higher levels of Maslow's hierarchy decreases, including one's quest for self-actualization. The more support college students receive, the better their chance of successfully transitioning to emerging adulthood and reaching self-actualization. While periods of transition and change are often perceived as positive events in a college students' life, these transitions are often accompanied by stress (Brougham et al., 2009). It is important for institutions of higher education to keep students' well-being at the forefront of education; students whose basic needs are not fulfilled or whose psychological or emotional needs are not met, cannot perform academically as expected by institutions of higher education and become successful professionals capable of fully contributing to society.

College students employ a variety of coping strategies to manage stress; many times, these coping strategies involve maladaptive methods. There is an increased need for providing college students with adaptive coping strategies in which students positively reframe responses

to stress to assist in the mitigation of stress and improved health, wellness, and well-being which can affect mental health (Böke et al., 2019; Brougham et al., 2009). When stress affects the psychological health of individuals, it also impacts their overall physical health and their sense of well-being. Such effects on physical health can include hypertension, ulcers, heart disease, and anxiety (Kwaah & Essilfie, 2017). Salleh (2008) emphasized the seriousness of stress regarding morbidity and mortality and noted that emotional stress is a major factor in six leading causes of death including cancer, coronary heart disease, accidents, respiratory diseases, cirrhosis, and suicide.

When students experience stress, they often develop behaviors that negatively impact health such as under-eating, over-eating, partaking in risky behavior, tobacco, drug, or alcohol use (Scribner et al., 2020). During stressful events, college students often make poor decisions regarding class attendance, procrastination, and decisions regarding academic integrity (Kwaah & Essilfie, 2017; Robinson, 2018). Evidence suggests that young adults often turn to maladaptive coping strategies to manage stress (Pickens et al., 2019), consequently, it seems reasonable to observe students who are enduring excessive levels of stress to potentially dropout of school, abuse drugs or alcohol, or commit crimes (Kwaah & Essilfie, 2017; Robinson, 2018).

Exploring the topic of perceived causes of stress in college students is essential for not only college students' overall health and well-being, but their potential academic performance as well. During the college years, most students are going through a period of emerging adulthood (18–25-year-olds), which is often defined as a period of life when individuals adopt new roles or statuses. Entering college, finding new peer groups, leaving one’s childhood home, becoming financially independent can all occur during young adulthood (Scales et al., 2016). Scales et al. add that transitioning from childhood and adolescence into young adulthood can be challenging

for many individuals but at the same time this period of life provides opportunities for beneficial growth and change. Young adulthood is also a time when one often aims to establish habits that lead to successful adulthood; these may include adopting healthy and ethical behaviors (e.g., physical activity, a healthy diet, adequate sleep, financial responsibility, avoidance of binge drinking and use of illicit drugs, avoiding violent relationships, practicing safe sex, being honest), educational attainment (e.g., degree and certificate completion, skill training), and civic engagement (e.g., voting, or donating to charity) (Scales et al., 2016). Emerging adulthood includes a time when students are vulnerable to stress and at an increased risk for utilizing maladaptive coping strategies (Lane, 2020; Arnett, 2000).

Assessing perceived causes of stress in undergraduate students and teaching them a variety of adaptive coping strategies would allow for improvements in students' overall wellness during their time on the college campus. College life in North America includes a variety of stressors for students. Flatt (2013) identified six areas that contribute to the stress and mental health issues in North America including academic pressure, financial burden, accessibility of education, an increase in the number of women students (who tend to experience more stress than men), an increased dependence on technology, and the student's lifestyle. Flatt points out that financial burdens, often caused from the increase in college tuition and student debt, lead to stress and that stress can lead to poor academic performance. Exploring the impact of coping strategies on stress can have important ramifications for students' ability to be successful in college. Assessing stress will allow college campuses to efficiently refer students to counselors and make decisions regarding curricular content that addresses strategies to self-identify and manage stress. Exploring the link between coping strategies and stress would also help verify whether additional stress management and coping strategies need to be provided utilizing

campus resources. Exploring the phenomenon by scientific means would allow the faculty members and the institution to better serve the first-year students in their transition to college life and prioritize the overall health and well-being of the college students enrolled at institutions of higher education. Institutions of higher education should prioritize college students' health and well-being by offering activities that focus on social and emotional wellness, as these activities affect their academic performance (Işık & Ergüner-Tekinalp, 2017).

Past work has shown exposure to stress management techniques over time are more effective and beneficial to the student than a one-time stress management event (Larson, 2015). Lazarus and Folkman (1984) noted that extreme conditions cause stress for almost everyone. However, stress is unique to each individual. Elements of living the college life provide challenges and play an important role in one's ability to manage stress. Transitioning to college from high school provides a new set of challenges for young adults. Students must function independently, track finances, attend class, and maintain grades on their own. They also have the excitement of new friends and social opportunities available at all hours, which can be beneficial and stressful. Undergraduate students are figuring out their new roles during this time of transition, all while looking ahead to plan their futures (Brougham et al., 2009). The challenge for higher education administrators and instructors is to ensure that college students have access to strategies that will help them to efficiently cope with stress.

Brief Literature Review

History of the Construct of Stress: Physiological

"The concept of stress has been around for centuries, but only recently has it been systematically conceptualized and a subject of research" (Lazarus & Folkman, 1984, p. 21). While Lazarus and Folkman discussed stress research as a *recent* event in the 1980s, the issue is

more significant in the 21st century, and indisputably even more so in present day due to the COVID-19 pandemic. The construct of *stress* has evolved over time and embodies different layers of research beginning with the study in the field of physiology, the psychological manifestation, and the broader impact in society through sociological studies (Lazarus & Folkman, 1984). According to Hans Selye (1974), the pioneer in this field of research, humans have recognized stress since prehistoric times, although instead of developing theories about stress, humans used instincts to deal with stress at that time. In the early 14th century, the definition of stress included "hardship, straits, adversity, or affliction" (Lumsden, 1981, as cited in Lazarus & Folkman, 1984, p. 2). In the 19th century, "'load' was defined as an external force; "stress" was the ratio of the internal force (created by the load) to the area over which the force acted; and "strain" was the deformation or distortion of the object" (Hinkle, 1977, as cited in Lazarus & Folkman, 1984, p. 2). Also, in the 19th century, Claude Bernard, a French physiologist, introduced the concept of *milieu intérieur*, which described the condition of the internal environment, or "the environment in which all my cells live" (Selye, 1974, p. 35).

In 1936, Selye (1974) introduced the general adaptation syndrome (GAS), which he also referred to as the biological stress syndrome. GAS involved three phases: 1) alarm – the introduction of the stressor and release of adrenalin, 2) resistance – the phase after the initial alarm where the body begins adaptation, and 3) exhaustion – the final phase, which is determined by the intensity of the stressor. GAS affects the body as a whole and humans often undergo the first two stages many times, but the third stage leads to exhaustion or death (Selye, 1974).

The physiological stress includes the activation of the sympathetic nervous system, also known as the fight-or-flight response. When activated, the sympathetic nervous system increases

cortisol and adrenaline levels and leaves individuals in a state of emergency (Cady Arbeau, 2016, Selye, 1974). Heart rate, blood pressure, and respiration increase, and the immune system is suppressed to allow for fighting or fleeing (Olpin & Hesson, 2021). After Selye's initial research that produced an understanding about the GAS, the research that followed focused on hormonal responses and nervous system activity.

After Selye's research on stress was published in the mid-1950s, he helped to bridge the gap between the fields of physiology and psychology regarding this topic. Fifty years later, the concept of *homeostasis* originated from American physiologist Walter B. Cannon's research, which basically described an organism's steady-state or balance (Selye, 1974). Cannon described stress as "a disturbance of homeostasis" (Lazarus & Folkman, 1984). While the concept of physiological stress seems to be fairly straightforward, it led to additional research regarding the psychological aspect of stress. This psychological aspect is slightly more complicated as it involves the idiosyncrasies that reflect each individual's perception of life events.

History of the Construct of Stress: Psychological

Even thousands of years ago, philosophers understood the importance of perception and attitude and how that affects one's mindset. Stoic philosophy teaches that perception of events, not the events themselves, is what causes stress. Controlling the perceptions of events can provide mental clarity (Holiday & Hanselman, 2016). Stoic philosopher Epictetus preceded modern day research on stress. "There are things which are within our power, and there are things which are beyond our power. Within our power are opinion, aim, desire, aversion, and in one-word, whatever affairs are our own" (Epictetus, 1891, [translation], p. 215). Higginson (1891) also noted that "Men are disturbed not by things, but by the views which they take of

things" ([translation], p. 218). Basically, it is the individual's perception of the stressor that influences its effect.

According to Lazarus and Folkman (1984), stress in the field of psychology has often been defined as a stimulus (e.g., environmental events, sickness, job loss); stress in the biological and medical fields is often defined as a response (i.e., state of stress). "Psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p. 19). It was during this shift from looking at stress from a physiological perspective to a psychological perspective that the term "psychophysiological" emerged. Lazarus and Folkman (1984) noted that the judgement or perception of how a person views an event is determined by cognitive appraisal, which they defined as "an evaluative process that determines why and to what extent a particular transaction or series of transactions between the person and the environment is stressful" (p. 19). This stress appraisal suggests that individuals perceive stressors differently, and this appraisal reflects a process by which they give meaning to the event. Regarding psychological stress, Lazarus and Folkman (1984) indicated the importance of the event itself and stated that the key is how an individual perceives an event and responds to it.

History of the Construct Stress: Anxiety

Anxiety is a term often discussed in relation to stress. Freud utilized the term anxiety in psychopathology. "Anxiety was viewed as a classically conditioned response that led to unserviceable (pathological) habits of anxiety-reduction" (Dollard & Miller, 1950, as cited in Lazarus & Folkman, 1984, p. 5). Anxiety is typically defined as an emotional state often compared with fear. Fear can include feelings of worry, being scared, avoidance, and also

physiological responses like an increased heart rate due to a perceived threat. Anxiety tends to be more common in young girls compared to boys (Headley & Campbell, 2013). While anxiety is typical, it can progress from normal to excessive. Anxiety disorders can be classified as a disorder once anxiety reaches excessive levels and interferes with daily activities (Headley & Campbell, 2013). According to the American Psychiatric Association (2021), anxiety "is a normal reaction to stress and can be beneficial in some situations" (para. 1). Anxiety is often related to anticipation of a future event, while anxiety disorders tend to alter the individual's ability to function normally. Some common anxiety disorders can include generalized anxiety disorder, panic disorder, phobias, and social anxiety disorders (American Psychiatry Association, 2021). Lazarus and Folkman (1984) convey that as long as the individual understands that the concepts of stress and anxiety overlap, it does not matter which term is used.

Stress as it is Understood Today

Stress is a significant problem, as most people experience stress daily. In higher education, stress has been a concern among administrators and faculty because students are highly susceptible to it. "It is well established that college students experience regular and significant amounts of stress, with over three-quarters of students experiencing moderate or average levels of stress, and 40 percent reporting above average levels of stress" (Pierceall & Keim, 2007, as cited in Larson, 2015, p. 11). College students worldwide are experiencing mental health issues, often due to symptoms of depression, anxiety, and stress which affect their academic performance and overall health and well-being (Asikainen et al., 2019). The 2018 American Psychological Association (APA) Stress in America Survey (2018) reported the following:

> America's youngest generation is also significantly more likely (27 percent) than other generations, including Millennials (15 percent) and Gen Xers (13 percent), to report their mental health as fair or poor, the survey found. They are also more likely (37 percent), along with Millennials (35 percent), to report they have received treatment or therapy from a mental health professional, compared with 26 percent of Gen Xers, 22 percent of baby boomers and 15 percent of older adults. (para. 5)

According to Pickens et al. (2019), recent research indicated that college students' mental health is deteriorating and students are seeking services to aid this aspect of their lives.

Coping

Lazarus and Folkman (1984) defined coping as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p. 141). This definition incorporates the idea of coping with psychological stress as a process rather than a trait and focuses on the management, not mastery of the skill (Lazarus & Folkman, 1984).

The beginnings of stress research can be found in the field of physiology. Coping, however, is a psychological process in which individuals develop strategies to manage psychological stress and consequently researchers interested in studying stress must incorporate the psychological aspects that are innately associated to this phenomenon. Coping with stressors can positively impact students' mental health and overall well-being. Methods of reducing stress tend to have positive outcomes in college and university settings (Tollefson et al., 2018). Mindfulness, Yoga, Progressive Muscle Relaxation (PMR), Power Napping, Gratitude Journaling, and Social Support were utilized in the current study conducted on willing

participants in the Introduction to Stress Management class at a small, regional institution in the upper Midwest. Each of these methods can assist students in mitigating stress.

Mindfulness, or Mindfulness-Based Stress Reduction (MBSR) is a style of coping that can be utilized in a college setting with students. Tollefson et al. (2018) provided an overview of 15 studies using MBSR interventions with college students positing that stress significantly decreased (e.g., 73%) in self-reported stress. It was also reported that different types of mindfulness strategies improve educational experiences for students which can lead to improved academic performance (Gutierrez et al., 2019).

Yoga is a lifetime activity that provides numerous health benefits, both mental and physical. Incorporating yoga as an active coping strategy for college students could help alleviate some of the stress and anxiety they encounter (Scribner et al., 2020). Yoga activates the parasympathetic nervous system, which allows the body to "rest and digest" (Cady Arbeau, 2016). Cady Arbeau (2016) utilized yoga with college students at a community college and noted:

> Without the proper tools to manage stress and to focus the mind, those students find themselves drowning in worry and falling behind in their studies because they lack the skills to train their brains. Yoga and meditation are two skills that can be taught to students to help them more successfully manage the many stressors they face. (p. 37)

Progressive Muscle Relaxation derives from Edmond Jacobson's Progressive Relaxation (PR), which was introduced into modern Western medicine in the 1920s (Lavey & Barr Taylor, 1985). PR or Progressive Muscle Relaxation (PMR) involves tensing a muscle group, then relaxing as one progresses from muscle groups around the body. By actively tensing then relaxing a muscle, it was discovered that the parasympathetic nervous system (PNS) was

activated (Olpin & Hesson, 2021). PMR was used as relaxation therapy and historically used in treating ailments such as “hypertension, insomnia, asthma, indigestion, and anxiety” (Lavey & Barr Taylor, p. 330). According to Palkar et al. (2021), studies have shown that practicing PR can reduce test anxiety and perceived stress scores (PSS) after one month of practice, along with treating moderate cases of anxiety and stress.

Power Napping is “a means of relaxation that combines deep breathing, mindfulness, and yoga to relax and rejuvenate body and mind” (Olpin & Hesson, 2021, p. 381). The main goal of a power nap is to activate the parasympathetic nervous system (Olpin & Hesson, 2021). This technique is different from a traditional nap and involves mindful relaxation. A power nap is a nap or method used to relax and can last between five and 30 minutes. According to Brooks and Lack (2006), five-minute naps are not long enough to produce beneficial results, ten-minute naps seem to provide the most benefits, and 20-minute naps are beneficial, but the benefits do not last as long as those from a ten-minute nap.

Gratitude Journaling is a technique studied by Işık and Ergüner-Tekinalp (2017), who noted that gratitude can enhance individual’s well-being. The authors also indicated that some studies (See Işık and Ergüner-Tekinalp, p.165) showed that gratitude can increase college students’ success and promote coping and health. Işık and Ergüner-Tekinalp reported findings from their study that demonstrated increased levels of gratitude and satisfaction of life for first-year college students in Turkey when using gratitude journaling.

Social Support is a coping strategy that can lead to positive outcomes with college students (Pickens et al.,2019). When college students lack social support, along with other factors (e.g., parental pressure, lack of mental health care) this can lead to increase issues related to stress (Flatt, 2013). When college students feel socially supported, they tend to report less

depression, anxiety, and loneliness (Lane, 2020). It has also been reported that college students view social support as a positive coping strategy for stress (Wolf et al., 2015). According to Wolf et al. methods of social support included friends, family, and faculty. Wolf et al. also suggested that students be screened annually for stress and deemed it essential to implement stress reduction programs that incorporate social support in college and university settings.

The researcher aspired to contribute to the existing research regarding perceived stress and adaptive coping strategies in undergraduate college students, incorporating those in general education courses. The findings from this study provided an additional understanding of stress and allowed the possibility for immediate decision-making to impact the overall health and well-being of college students. This study may also be beneficial to administrators, faculty, and staff in higher education concerned about the health and well-being of students.

Statement of the Problem

Stress, whether eustress (positive) or distress ("damaging or unpleasant stress" Selye, 1974, p. 31), is a daily occurrence for most people. A study published in 2019 indicated that the prevalence of mental health problems ranges from 28% to 45% amongst college students (Story et al., 2019). Young adults utilize different coping strategies that they have learned throughout their life to handle stressors. Some of these strategies are not the most efficient, and for the purpose of this study are termed maladaptive; learning specific techniques to cope with stress therefore can be beneficial. It is critical to acknowledge the fact that stress may also become a trigger for mental health problems. Students struggling with mental health problems who cannot efficiently cope with stress might not complete their education, which prevents them from fully developing their talents and depriving society of their contributions. Böke et al. (2019) reported that several studies have shown the prevalence of stress in college and university students. The

studies found that college and university students experienced more mental health disorders when compared to the general population (Price et al., 2006, as cited in Böke et al., 2019). The 2018 American Psychological Association (APA) *Stress in America* survey (2018) showed that women are twice as likely to report poor to fair mental health and that Gen Z students feel they do not do enough to manage their stress (APA, 2018). College students fare worse than high school students and employed young adults in terms of happiness and stress (Sutton, 2017). This is often due to the developmental period of undergraduate college students, along with navigating a new environment, one that can include roommates and the dynamics of relating with them, academic problems, financial issues, and future career concerns (Scribner et al., 2020).

During the transition period in a college student's life, they are often unable to cope effectively with stress (Ferrer et al., 2014). Ferrer et al. suggested that if students lack proper coping skills, they may suffer from inadequate sleep, gastrointestinal issues, high blood pressure, and other physiological responses negative to the body's well-being. Ates (2019) indicated possible decreases in life satisfaction if college and university students are unsuccessful in obtaining their academic goals, leading to feelings of disappointment and lack of motivation. When students experience these feelings, they need to cope with their emotions. The inability to cope can also impact life satisfaction.

This study was grounded in a positivist paradigm that used a realist ontology and an objectivist epistemology. The methodology was a quasi-experimental research design, using questionnaires as the primary method of data collection. Using this approach allowed the researcher to measure students' perceived stress and physiological variables as well as their preferred coping strategies. Collecting information on preferred coping strategies via a rank

order scale questionnaire, in addition to the PSS-10 and physiological variables, allowed for specific information to be gathered regarding coping strategies practiced in the general education course Introduction to Stress Management a small, regional institution in the upper Midwest throughout the semester. This information was collected through pre-, mid-, and post-treatment assessments administered throughout the semester. Based on the author's review of the literature, there was a gap in the research due to the lack of quantitative studies that included general education students. Many published studies were qualitative and limited in nature, and utilized students in specific programs, such as nursing, physical therapy, or education. This proved to be problematic as not all institutions offer these specific programs; and studies that include the general population would better serve a broader array of institutions.

Theoretical Framework

The theoretical framework for this study was based on two theories, the first is Lazarus' and Folkman's (1984) transactional model of stress and coping and the second is Arnett's (2000) theory of emerging adulthood. The construct of stress is explained by analyzing the individual's perception of an event as a threat that may possibly cause harm to their own well-being (Kaya et al., 2015). The transactional model states "stress is neither in the environment nor in the person but a product of their interplay" (p. 354). According to Böke et al. (2019),

> The appraisal component refers to the weighing of situational demands against one's personal ability to cope. If environmental demands are perceived to outweigh the resources, the individual experiences stress; therefore, this transactional process significantly influences individuals' perception of psychological stress and the subsequent coping behavior in which they engage. (pp. 85-86)

Lazarus and Folkman have described two forms of coping (Lazarus & Folkman, 1984):

- Problem-focused: addressing what is causing the stress. These strategies are often used to solve the problem and may include defining the problem, finding alternative solutions, choosing the best strategy based on multiple factors (e.g., cost, time, availability), and acting.
- Emotion-focused: emotion-regulation; focuses on the emotions that arise from the stress. Examples include avoidance, minimization, distancing, selective attention, positive comparisons, and taking positive outcomes from negative events.

Lazarus and Folkman (1984) noted that how one appraised an event influenced the coping strategy chosen. They also suggested that the appraisal theory does have its limitations as certain behaviors do not fit into either form or fit both emotion-focused and problem-focused appraisal. Another method of categorizing coping strategies includes describing the coping strategies based on their outcomes, which are considered adaptive or maladaptive. This categorization has also been proven to present limitations: adaptive coping strategies do not always lead to positive outcomes, and maladaptive strategies do not necessarily lead to negative outcomes. The ability to effectively cope with stress allows individuals to problem-solve and deal with distress. "Identifying effective and ineffective ways of coping is likely to inform efforts to improve individuals' coping skills" (Brown et al., 2005).

The second theory included as a part of the theoretical framework is based on the theory of Emerging Adulthood from Arnett (2000). Arnett's (2007) theory of Emerging Adulthood encompasses individuals ranging in age from 18-25 and Arnett differentiates this period from adolescence (i.e., begins at puberty and ends in late teens) and young adulthood (i.e., traditionally defined as late teens to age 40). Since the 1970s the median age of marriage in the U.S. has continued to rise along with the age of first childbirth and the number of Americans

pursuing educational opportunities has increased as well. “These changes over the past half century have altered the nature of development in the late teen and early twenties for young people in industrialized societies” (Arnett, 2000, p. 469). Arnett characterizes emerging adulthood as “change and exploration of possible life directions” (p. 469). Arnett commented that this is a time for individuals to explore their life options. This time is also significant as mental health problems and periods of stress may arise for some during this time due to transitions in life (Arnett, 2007).

The Perceived Stress Scale (i.e., PSS-10), created by Cohen (1988), was modeled after Lazarus’ and Folkman’s transactional model of stress, one of the theories that make up this study’s theoretical framework (Chiu et al., 2016, as cited in Denovan et al., 2019). Cohen (1983) designed the Perceived Stress Scale (PSS) to investigate how unpredictable, uncontrollable, and overloading the respondents found their lives to be (Cohen et al., 1983). The PSS-10 consists of ten questions inquiring about perceptions of stress, thoughts, and feelings over the previous month. According to Denovan et al., the PSS-10 is psychometrically sound compared to other stress measurement instruments. The scale is effective in research studies that might provide multiple variables and is useful in a practical setting.

Purpose of the Study

The purpose of this study was to confirm that college students who learned and practiced adaptive coping strategies (i.e., mindfulness, yoga, progressive muscle relaxation, power napping, gratitude journaling, and social support) in the Introduction to Stress Management course at a small, regional institution in the upper Midwest were capable of mitigating the perceived stress experienced while attending college as an undergraduate student. Assessing perceived stress levels and preferred adaptive coping strategies allowed students to learn how to

identify their levels of stress and implement various coping strategies to face the stress they were experiencing. Prioritizing students' overall health and well-being is essential for college students' potential academic success and life satisfaction, which should be a fundamental goal of institutions of higher education.

This study contributes to the literature by demonstrating accessible instrumentation to assess perceived stress in undergraduate college students and provides examples of coping strategies to be utilized by the students at these institutions in a general education setting to prioritize students' overall health and well-being.

Research Questions and Hypotheses

Primary Research Questions

The primary research questions for this study address the topics of perceived stress and coping strategies.

1. How do Perceived Stress Scores (PSS-10) and physiological measures change in undergraduate students during a stress management course when comparing pre, mid-, and post-treatment assessments?
2. What are the preferred adaptive coping strategies provided throughout the semester that college students utilize to manage stress?

Secondary Research Questions

The secondary research question addresses demographics.

3. How do demographic factors impact the change in Perceived Stress Scores (PSS-10) and physiological measures among undergraduate students during a stress management course?

Hypotheses

The null and alternative hypotheses for this study are as follows:

H0: There are no changes in perceived stress scores (PSS-10) and physiological measures in undergraduate college students when comparing perceived stress before and after the Introduction to Stress Management course.

H1: There are changes in Post-Test Perceived Stress Scores (PSS-10) and physiological measures among undergraduate college students when comparing perceived stress before and after the Introduction to Stress Management course.

Definitions

Variables

The following are the variables of the study:

Independent Variable:

- Coping Strategies Introduced in Stress Management Course
    - Constitutive definition: "An introductory course designed to give students knowledge on how stress affects the body. This interactive course will provide lecture along with laboratory activities to teach appropriate and effective stress reduction techniques" (VCSU Catalog, 2021, p. 52). The following labs (e.g., coping strategies) are included in the course:
        - Mindfulness – "The state of being attentive to, and aware of, what is taking place in the present" (Olpin & Hesson, 2021, p. 380).
        - Yoga – "A system of physical postures, breathing techniques, and meditation to promote bodily or mental control and well-being" (Olpin & Hesson, 2021, p. 383).

        - Progressive Muscle Relaxation (PMR) – "Muscle relaxation in which each muscle is forcibly contracted, then released in sequence" (Olpin & Hesson, 2021, p. 381).
        - Power Nap – "A means of relaxation that combines deep breathing, mindfulness, and yoga to relax and rejuvenate body and mind" (Olpin & Hesson, 2021, p. 381).
        - Gratitude journal – Writing or listing things one is grateful or thankful for.
        - Social Support – "An individual's knowledge or belief that he or she is cared for and loved, belong to a network of communication, and has a mutual obligation with others in the network" (Olpin & Hesson, 2021, p. 382).
    - Operational definition: The operational definition is determined from results on the Qualtrics questionnaire that appear in the post-treatment assessment from the Qualtrics questionnaire found in Appendix B.3 Specifically questions 24 and 25.

Dependent Variable:

- Total Stress Score (e.g., Sum of Students' Perceived Stress Scores and Physiological Variables)
    - Constitutive definition: For the purpose of the Perceived Stress Scale (PSS-10), Perceived Stress is the subjective view of stress, over events taking place the last month (Cohen, et al., 1983). Lazarus and Folkman noted "Psychological stress is a particular relationship between the person and the environment that is

appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 19).

- Physiological variables are comprised of resting heart rate, respiration rate, and breathing pattern.

- Operational definition: Students' total stress scores will be operationally defined in pre-, mid-, and post-treatment assessment results from the PSS-10 scale and physiological variables in Appendix B.

Intervening Variables:

1. Demographics (Refer to Appendix B.1 Questionnaire Items 16 through 38 for an operational definition).
    a. Gender Identification
    b. Sex at Birth
    c. Age
    d. Race or Ethnic Background
    e. Year in School
    f. Program of Study
    g. First-Generation College Student Status
    h. Athletic Status – eligible, ineligible, not a collegiate athlete
    i. Number of Siblings (if any)
    j. Employment Status During the School Year
    k. Income
    l. Monthly Expenses
    m. Financial Assistance from Parents

   n. Relationship Status
   o. Children or Dependents
   p. Current Level of Physical Activity
2. Level of Familiarity with Coping Strategies
3. How much support do you receive from family?
4. How much support do you receive from peers?
5. How much support do you receive from faculty and or staff?
6. Additional questions for questionnaire (Appendix B)
   a. How stressed do you feel today from 0 being the least to 10 being the most 0-10
   b. In the last month, have you been physically and/or mentally ill?
   c. Has there been a life-changing event or routine altering event in your life in the last month (loss of a loved one, living on your own)?
   d. How would you define your average academic performance in all classes?

      ___A student ___B student ___C student ____D student ___F student
7. On average, how many hours of sleep do you get each night? (Slider scale: 0-14)

Key Terms

1. Psychological stress: “a particular relationship between the person and the environment that the person appraises as taxing or exceeding his or her resources and endangering his or her well-being” (Lazarus & Folkman, 1984, p. 19).
2. Physiological stress: “the non-specific response of the body to any demand made upon it” (Selye, 1974, p. 27). “Any type of demand made on the body” (Selye, 1974, p. 17).
3. Perceived stress: the subjective view of stress (Cohen, et al., 1983).

4. Perceived Stress Scale (PSS): The PSS-10 is based on Lazarus and Folkman's transactional model of stress and includes ten questions asking about perceptions of stress, thoughts, and feelings over the previous month. The answer choices range from 0 (never) to 4 (very often) (Denovan et al., 2019).
5. Stress Management: Not tailored for specific people (like treatment) but made available for people in general (Lazarus & Folkman, 1984); may also include coping strategies and skills to be applied to prevent and manage stress (Olpin & Hesson, 2021).
6. Undergraduate college students: "An undergraduate student in the United States is seeking one of two higher education degrees – an associate degree or a bachelor's degree" (*What is a U.S. undergraduate student?,* 2018).
7. Coping: "Constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141). "The process through which the individual manages the demands of the person-environment relationship that are appraised as stressful and the emotions they generate" (Lazarus & Folkman, 1984, p. 19). Lazarus and Folkman (1984) divided stress coping into two categories: emotion-focused coping and problem-solving.
8. Adaptive Coping Mechanisms or Strategies: "… in general, college students' coping strategies that use action, acceptance, and positive reframing in response to stress were found to be adaptive, while coping strategies that use avoidance and emotional expression in response to stress were found to be maladaptive (Brougham et al., 2009).
9. Stressors: "That which produces stress" (Selye, 1974, p. 141).

   Stressors are defined as three types:

1) major changes affecting a large number of people,

2) major changes affecting one or few people,

3) daily hassles (Lazarus & Cohen, 1977 as cited in Lazarus & Folkman, 1984, p. 12).

Significance of the Study

The significance of this study is that stress has an impact on everyone. As Selye (1977) stated, “Complete freedom from stress is death” (p. 8). Larson (2015) noted that students try to balance multiple aspects of their lives, which implies there is more to college life beyond academics. While trying to maintain life balance, students often struggle with academic performance. If students experience elevated stress levels, they may become dissatisfied with their academic field and choose to drop out of school entirely (Kaya et al., 2015). Some students experience financial stress, which could lead to seeking employment, some struggle with career choices, and others struggle with faith (Larson, 2015). These events can cause not only psychological stress but physiological stress as well. It is crucial to validate the importance of providing available stress assessments and coping strategies for students on campus to prioritize their academic success, health, and well-being. Past studies have been conducted on nursing programs, physical therapy programs, and education programs. This study would allow the general study body to be studied, gaining information beneficial to the university as a whole and not just one department.

The utilization of a valid and reliable instrument to measure perceived stress is especially important for college students not only transitioning from leaving home to being on their own but leaving school to transition to career life. This quantitative study provided information based on the assessment of perceived stress by college students. Having access to this information regarding perceived stress is essential for faculty, campus counseling services, and student

academic success services to provide the proper resources, attention, and treatment necessary to help the students better manage their stress (Denovan et al., 2019).

After assessing perceived stress, information was collected on practiced and preferred adaptive coping strategies that were learned and used over the course of the semester in an Introduction to Stress Management course at a small, regional institution in the upper Midwest. Larson (2015) found that learning and developing a stress management technique overtime benefits more than attending a one-time stress management event. Larson implemented mind-body techniques such as yoga, progressive muscle relaxation, visualization/imagery, tai chi, meditation, or autogenic training with college students participating in stress management theory course in which students practiced coping strategies, or techniques twice a week for eight weeks. Coping strategies utilized in the researcher's study included mindfulness, yoga, progressive muscle relaxation, power napping, keeping a gratitude journal, and social support. Larson concluded that developing the skill and learning when and how to apply the skill appropriately is suitable for undergraduate students over an eight-week period, suggesting that a classroom setting would be appropriate. "Interventions promoting well-being for college students should be considered by higher education institutions, as it has been reported that emotional and social wellness factors are related to college student success and retention" (Pritchard and Wilson 2003, as cited in Işık & Ergüner-Tekinalp, 2017, p. 172).

According to Roskies (1983), as cited in Lazarus and Folkman (1984), many health conditions people encounter, from nail-biting and smoking to suicide, cancer, and heart disease are due to stress. Roskies advised that stress needs a cure or at least a way to control it. Lazarus and Folkman shared their concern that stress management techniques should not be a fad. Treatment can be helpful and bring about change in four ways:

> Feelings can shape thought and action; actions can shape thought and feeling; and thought can shape feeling and action. Feelings, thoughts, and actions are interdependent: if thought is changed, feelings, and actions will probably change too. Similarly, if actions change, thoughts and feelings will too (Lazarus & Folkman, 1984, p. 374).

This quote points out that multiple strategies can lead to change. "To be effective, any stress management program must stimulate the person to appraise the situations and /or cope with their demands in new ways" (Lazarus & Folkman, 1984, p. 375).

Research Ethics

Permission and IRB Approval

The researcher received approval from the Institutional Review Board (IRB) from Minnesota State University Moorhead (MSUM), to ensure protection for all participants involved in the study. The MSUM IRB approval is in Appendix A. The researcher also received onsite permission from the midwestern institution in which research data was collected. This approval letter is in Appendix A.

Informed Consent

As Fraenkel et al. (2019) stated, "It is a fundamental responsibility of every researcher to do all in his or her power to ensure that participants in a research study are protected from physical or psychological harm, discomfort, or danger that may arise due to research procedures" (p. 63). The researcher sought informed consent prior to the study. Students in the study were a part of another instructor's class at a midwestern institution. It was essential to follow ethical procedures to ensure the health and safety of the participants. Students were provided informed consent (Appendix D), notifying them of the reduced risk of participation, benefits, confidentiality, and time commitment. Students were also provided with information stating they

could refrain from participation, or if they chose to participate, they were allowed to withdraw at any time.

Limitations

The potential limitations of the study included the number of sections of the Introduction to Stress Management class offered and the number of participants in each section due to the enrollment cap on the class. Due to the possible number of limited participants, a convenience sample was used as there were not enough participants to utilize a random sample. As of fall 2022 the researcher no longer instructs the course at the midwestern institution, which is an added limitation.

Delimitations

Only undergraduate students in the Introduction to Stress Management class in the fall of 2022 at a small, regional institution in the upper Midwest were included, all of whom are traditional students (i.e., young adults). Additionally, the study exclusively assessed adaptive coping strategies taught and practiced in the Introduction to Stress Management course. Finally, the data was collected from a single semester, which was fall 2022.

Conclusion

This purpose of this study was to analyze whether perceived stress and physiological variables changed in undergraduate students during a stress management course along with identifying students preferred adaptive coping strategies utilized over the course of the semester. Additionally, the study aimed to assess the impact of demographic factors in the students' perception of stress. The next chapter will provide an analysis of the literature and an explanation of the theoretical framework in which the study is based.

CHAPTER 2. LITERATURE REVIEW

This study sought to address levels of perceived stress experienced by undergraduate students and the preferred adaptive coping strategies utilized over the course of the semester. Additionally, this study focused on demographic and physiological variables commonly associated with stress including, heart rate, breathing patterns, and respiration rate. The study's limitations included the number of sections of the Introduction to Stress Management class offered at a small, regional institution in the upper Midwest and the number of participants in each section due to the enrollment cap on the class. A convenience sample was used due to the limited number of course sections (i.e., two). The current literature regarding stress, as it impacts undergraduate college students, often addresses the value of adaptive coping strategies students utilize to mitigate stress. This review will focus on studies that address how contemporary college students, who are young and emerging adults, experience physiological stress, psychological stress and anxiety, and the coping strategies they used. Developing adaptive coping strategies to deal with perceived stress in the undergraduate population is postulated to benefit the students' overall well-being (Nima et al., 2013; Altaher & Runnerstrom, 2018; Pickens et al., 2019). This review will not focus on literature about maladaptive coping strategies used by some college students (e.g., alcohol, substance abuse, disordered eating, procrastination). This chapter will end with a description of the study's theoretical framework as well as an analysis of the existing gaps in the current literature on college students and stress.

Based on the review of the literature, there exists an overrepresentation of qualitative studies addressing this phenomenon. Additionally, most of these qualitative studies have been conducted abroad with students in the field of nursing, physical therapy, or education programs. This study utilized a quantitative research methodology and recruited students enrolled in a

general education course. This study also expanded on the body of knowledge by contributing to fill in the current gaps in the literature by using a quasi-experimental research design, providing quantitative data, and using students in the United States.

Some of the literature reviewed provided contradicting information regarding the students' year of study and perceived stress. "A few past studies found a developmental trend for undergraduate stress (for example [*sic*] Misra et al. 2000). Specifically, freshman and sophomores reported greater stress than juniors and seniors" (Brougham et al., 2009, p. 94). However, Böke et al. (2019) suggested that the students' perceived stress is higher in subsequent years than in the first year, which differs from what other authors concluded. This led the researcher to believe that all students should be encouraged to participate in a stress management activity over the course of their collegiate career as there is research to support benefits for all students, regardless of year, and the current study can help clarify this contradictory matter.

Body of Review

Today's College Student

College students, specifically Generation Z and millennials, experience two to three times increased anxiety and depression levels than the general population (Lane, 2020). The Spring 2019 Health Assessment by the American College of Health Association reported that stress impaired learning for about 1/3 of college students (Graves et al., 2021). Stress is also a common and enduring issue with students: "Undoubtedly, elevated psychological distress is prevalent and persistent within the university student population" (Sharp & Theiler, 2018). Today's college students have a unique set of challenges they face as they transition to becoming more independent and developing a new identity. Some of these challenges include moving away from home, experiencing homesickness, missing friends and established support systems, and

experiencing conflicts with new people as they transition to a new phase of life (Işık & Ergüner-Tekinalp, 2017). Time management can be challenging as college students often try to juggle academics and their social life, affecting sleeping and eating habits. Many students seek full or part-time employment, which can take time and energy away from academics and social life. This often causes an increase in the amount of stress the individual may experience (Işık & Ergüner-Tekinalp, 2017).

Brougham et al., (2009) reinforced the importance of increasing support for college students as they enter a transitional time significant in their development:

> "Given that college years may be a critical period for developing life long [*sic*] coping skills for handling stress and the consistent robust relationship between stress and decreased physical, psychological, social and academic well-being it is imperative that we increase our efforts to teach stress management skills." (p. 95)

Today's college students are influenced by social media, affected by increased parental involvement, and are perceived to have less maturity than college students of the past (Lane, 2020). Social media usage (e.g., Facebook) is often thought to decrease psychological well-being, however, Lane found it contributed to the amount of social support college students perceived, which increased psychological well-being and life satisfaction. During the transition period of emerging adulthood (i.e., ages 18-25) it was found that there is often a decrease in life satisfaction, but it did not affect psychological well-being. The decrease in life satisfaction has to do with several factors, the inability to cope with stress, and unsuccessful achievement of academic goals, which generated feelings of disappointment and reduced motivation (Ates, 2019).

Young & Emerging Adults

As previously mentioned, transitioning from high school to college, then from college to life in the working world provides a unique set of challenges (Işık & Ergüner-Tekinalp, 2017). "University students may be unprepared to face additional stressors associated with family, social, academic and financial burdens unique to this population" (Graves et al., 2021). Many students are vulnerable during this transition and need support (Scales et al., 2016). Scales identified eight dimensions of successful young adult development as possible measures of a healthy transition to adulthood. Included in these are; social, psychological, behavioral, educational, occupational, health, ethical, and civic engagement dimensions. The more positive experiences the college student has in these dimensions, the higher the GPA and the lower levels of occurrence of substance abuse and violence (Scales et al., 2016).

Various definitions for "young adult" have included those ages 18-25, or even up to 30 (Lane, 2020; Arnett, 2000; Arnett, 2007). However, Scales et al. (2016) used the term *young adulthood* to "refer simply to a specific time in the life course, and to allow for what the literature also seems to suggest, that both psychological self-perceptions *and* sociological markers are definitionally salient in this period" (p. 152). Events such as recessions and economic issues affect development into adulthood, forcing some young adults to move in with their parents or find a roommate which often postpones marriage and families. Positive relationships and other developmental assets (i.e., self-esteem, sense of purpose, support, feeling valued, having positive role models) are essential during this phase of development, as many in their final year of high school are still lacking "foundational building blocks of life success" (Scales et al., 2016, p. 155). If this is common across the country, Scales et al. suggested this could affect those transitioning to young adulthood for college, work, or married life and in the

long-run impact their socioeconomic status, which ultimately affects health and levels of stress (Scales et al., 2016). For the purpose of the current study, Arnett's (2000) term *emerging adulthood* will be used as it encompasses those ages 18-25 as described in Chapter 1 and in the body of the literature review (Arnett, 2000). During this adjustment period and time of transition, traditional-age (i.e., 18-24) college students are considered emerging adults. Arnett noted that it takes longer to reach adulthood today for some than in past generations and that this is often a positive time for many, but not for all. This is typically the timeframe for a gradual transition from adolescence into adulthood (i.e., beginning college, moving out of their home, becoming independent, seeking employment, completing college). For incoming first-year students, the demands can be overwhelming, and students will unequivocally benefit from support (Işık & Ergüner-Tekinalp, 2017).

It appears that the more positive experiences associated with the eight dimensions (i.e., social, psychological, behavioral, educational, occupational, health, ethical, and civic engagement) the more successful and positive the transition to young adulthood (Scales et al., 2016). Many of these constructs can be correlated with physical, mental, psychological, or emotional health, which demonstrates their significance to the overall health and well-being of emerging adults (Scales et al., 2016). Successful adults are generally considered positive people who experience self-efficacy, pursue professional goals, display resiliency, and develop a sense of purpose. They are independent, high-functioning individuals, responsible in most aspects of life. Successful adults demonstrate integrity and ethical behavior (Scales et al., 2016). It is crucial to assist emerging adults with coping strategies in college to preserve and improve their well-being so they can become contributing members to society, both financially and socially. Scales et al. focused on the significance of what some would consider holistic health and bares

similarities to Maslow's hierarchy of needs. If individuals are not provided with their most basic needs, they cannot progress—the more support they are given, the better the chance of a successful transition to adulthood.

Gender. Does gender play a role in perceived stress among undergraduate students? Some researchers found that women undergraduate students reported higher levels of perceived stress in certain categories (e.g., program of study, relationships, family, finances, daily hassles, time management) (Böke, et al, 2019; Graves et al., 2021; Adasi et al., 2020), but no difference between cis-gendered men and women students regarding academic issues (Böke, et al, 2019). However, Adasi noted that men also experienced stress over academic requirements (i.e., more so than women), class size, and financial issues. A study conducted by Brougham et al. (2009), confirmed that women do in fact report, "(1) higher overall levels of stress, (2) greater stress for familial relationships, social relationships and daily hassles, and (3) greater overall use of self-help and approach to cope with stress" (Brougham et al., 2009, p. 93). Böke et al. (2019) concluded that women often perceived more stress overall when compared to men, regardless of their year of study. Sharp and Theiler (2018) reviewed psychological distress among university students from the past 30 years and found that, psychological distress (i.e., stress) is more common and severe in university students and that being a woman is associated with higher stress, anxiety, and depression and include an "increased likelihood of a depressive disorder" (Adewuya et al., 2006 as cited in Sharp & Theiler, 2018, p. 204).

Stress and coping mechanisms differ by gender; most women reported choosing different coping strategies, including self-distractions, emotional support, instrumental support, and venting, and emotion-focused coping (e.g., acceptance, humor, emotional support, venting, religion, positive reframing, self-blame) (Graves et al, 2021; Adasi et al., 2020) compared to

most men (e.g., men and substance use) (Böke, et al, 2019). This confirmed that women are more apt to use adaptive coping mechanisms while men are more likely to use maladaptive coping mechanisms (Adasi et al., 2020).

Böke et al. (2019) stated that year of study may be an important factor regarding gender and perceived stress; higher stress is reported in later years of study by women undergraduate students, but they cautioned that the effect size was small. Factors contributing to this may include choosing a major, completing upper-level course work, application and completion internships, application to graduate school, and planning for life after graduation (Böke et al., 2019). Ates' (2019) research contradicted the aforementioned studies and found no significant differences in coping mechanisms, motivation, and satisfaction with life when comparing by gender. However, Ates noted that various studies come to various conclusions regarding gender, stress levels, and coping strategies (as previously reported). It should be noted that the study was conducted in Turkey, and Ates recognized that the patriarchal nature of that society may cause men to experience more anxiety regarding responsibilities related to work life.

Program of Study. Research has indicated that a students' program of study can impact perceived stress (Brougham et al., 2009; Böke et al., 2019). Bernardo et al. (2018) indicated that program of study or specific university courses required for programs might be a cause of stress for students and should be considered when measuring stress in undergraduate students. May and Casazza (as cited in Böke et al., 2019), reported that students enrolled in programs that required six or more math, chemistry, and biology (MCB) courses over the course of the program indicated that perceived stress was higher than those taking less than six math, chemistry, and biology courses. "The difference in students' level of perceived stress based on program of study remained even after controlling for factors such as age, gender, and year in school" (May &

Casazza, 2012, as cited in Böke et al., 2019, p. 90). Undergraduate students enrolled in six or more MCB courses are often students majoring in nursing, dental, pre-med, pharmacy or engineering.

Yehia et al. (2016) found that 85% of nursing students surveyed reported moderate levels of perceived stress and then concluded that stress is common among nursing students and that may impact the student's physiological and psychological well-being. Tollefson et al., (2018) reported that 56% of Health Professions majors reported high levels of stress and of this high stress group, 81% reported they perceived stress to impact academic performance and 85% believed stress impacted health (Tollefson et al., 2018). Tollefson et al. implemented stress reduction techniques (i.e., coping strategies) over the course of the semester, in which 90% of the health-professions students indicated they learned a new coping strategy to implement in the future. Coping strategies included, "yoga, tai chi, stretching, physical exercise, progressive muscle relaxation, mindfulness, guided visualization, self-massage, affirmation, gratitude, mantra, grounding, journaling, coloring, music therapy, humor, pet therapy, aromatherapy, and acupressure" (p. 509). Yehia et al. (2016) noted that nursing students reported using venting, self-distraction, and denial as coping strategies and they expressed the importance of assessing students' perceived stress levels to assist in adaptive coping strategies to manage stress, improve academic performance, and improve learning.

Physiological Stress

Physiological stress is also referred to as biological stress, and it is caused by *stressors* (Salleh, 2008). When exposed to a stressor, the body undergoes physiological changes, often described as a part of the fight or flight response. This response refers to the physiological changes that occur from the activation of the sympathetic nervous system, including the elevated

cortisol levels (stress hormone) that aid in slowing digestion and other non-essential physiological functions in preparation to response to the stressor or threat (Cady Arbeau, 2016, Ferrer et al., 2014). Other physiological responses include the release of adrenaline, which increases blood flow and relaxes blood vessels, the release of glucose into the bloodstream for additional energy, and increased respiration and heart rate that aids in delivery of oxygenated blood to the muscles and tissues (Robinson, 2018). According to Cady Arbeau (2016) our bodies are unable to determine if we are actually in danger, or if we are experiencing stress over a minor incident. Unfortunately, both situations activate the sympathetic nervous system, which increases cortisol levels and leaves individuals in a physiological and psychological state of emergency.

Not all stress is bad. Salleh (2008) noted that studies have proven short-term stress can boost the immune system. Salleh lists factors that play a role in one's susceptibility to stress, including genetics, personality, and coping strategies. While acute bouts of stress can be harmless, chronic stress leaves the body in a constant decreased state of fight-or-flight alertness with elevated levels of cortisol that can ultimately suppress the individual's immune system leaving the body vulnerable to illness (Salleh, 2008). Chronic stress is often associated with daily hassles, work issues, relationship difficulties, financial strain, additional stressors encountered on a daily basis, and health (Salleh, 2008). Chronic stress is linked to specific conditions including asthma, gastrointestinal disease, ulcers, atherosclerosis, coronary heart disease, and migraine headaches (Salleh, 2008). Performing a variety of activities including yoga and meditation, can activate the parasympathetic nervous system and lead to decreased amounts of stress hormones, blood glucose, and catecholamines, which can positively impact health (Cady Arbeau, 2016, Singh et al., 2020).

Psychological Stress (Dependent Variable)

The American Psychological Association (APA) defines stress as "the physiological or psychological response to internal or external stressors. Stress involves changes affecting nearly every system of the body, influencing how people feel and behave" (American Psychological Association, n.d., para. 1). The APA's definition includes the physiological and psychological aspects of stress while Lazarus and Folkman (1984) define psychological stress as a "particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 19). Salleh (2008) referred to psychological stress as emotional stress and noted that the morbidity and mortality rates related to emotional stress (i.e., psychological) are alarming. "Emotional stress is a contributing factor to the six leading causes of death in the United States: cancer, coronary heart disease, accidental injuries, respiratory disorders, cirrhosis of the liver and suicide" (p. 10). Although the relationship between psychiatric illness and stress remains unclear, Salleh stated that "the association between stressful life events and psychiatric illness is stronger than the association with physical or medical illness" (p. 14).

Lazarus and Folkman (1984) described primary appraisal as involving the person and the environment but noted that secondary appraisal addresses what can be done, which is influenced by available resources. Using Lazarus and Folkman's (1984) framework with their qualitative study on undergraduate students, Scribner et al. (2020) clearly defined two functions of coping, problem-focused, and emotion-focused. Participants recognized the following strategies as helpful: spirituality, emotional sharing, and use of supports. They recognized the following strategies as unhelpful: avoiding problems, being alone, disordered eating, and substance use. Scribner et al. concluded that higher education institutions should be providing additional wellness programming for students including both problem-focused and emotion-focused coping

strategies by allowing students to assess and address their stress and educate students on adaptive coping strategies to manage stress. Suggested programs include information on the effects of stress and activities helping students cope with stress (e.g., mindfulness, meditation, creating stress balls, using essential oils, coloring) (Scribner et al., 2020; Mason, 2017).

Mason's (2017) qualitative study focused on coping strategies utilized by first-year students in South Africa undergoing academic stress, which was noted as a prominent occurrence with college students. The author noted the various causes of stress and their contribution to poor academic performance and low retention. The following were identified: 1) Types of stressors (e.g., financial, spiritual, physical, emotional, mental, institutional), 2) Coping strategies to include problem-focused (e.g., problem solving) and emotion-focused (e.g., to deal with stressors, dancing, movie), and 3) Avoidance (e.g., they pretend the problem doesn't exist and they consume alcohol to forget). As previously noted by Scribner et al. (2020) appropriate coping strategies should be utilized. Those who utilized problem-focused coping and meaning-making had better outcomes and while students perceived stress is unfavorable, students lacked appropriate coping strategies or knowledge of where to go for support (Mason, 2017).

Anxiety

The term anxiety originated from the Latin *angustĭa*, or *narrowness*, and has been linked to terms that describe fear or constriction for an event that has yet to happen (López-Ibor and López-Ibor, 2010). "Anxiety is a feeling and consequently it is associated with bodily manifestations, the physiological correlates of emotions—tachycardia, blood pressure modifications, sweating, and so on" (López-Ibor et al., 1999, as cited in López-Ibor, 2010, p. 2). Feelings of anxiety and anxiousness are experienced by many, but excessive anxiety is a clinical symptom of psychiatric illness. According to the American Psychiatric Association (2021),

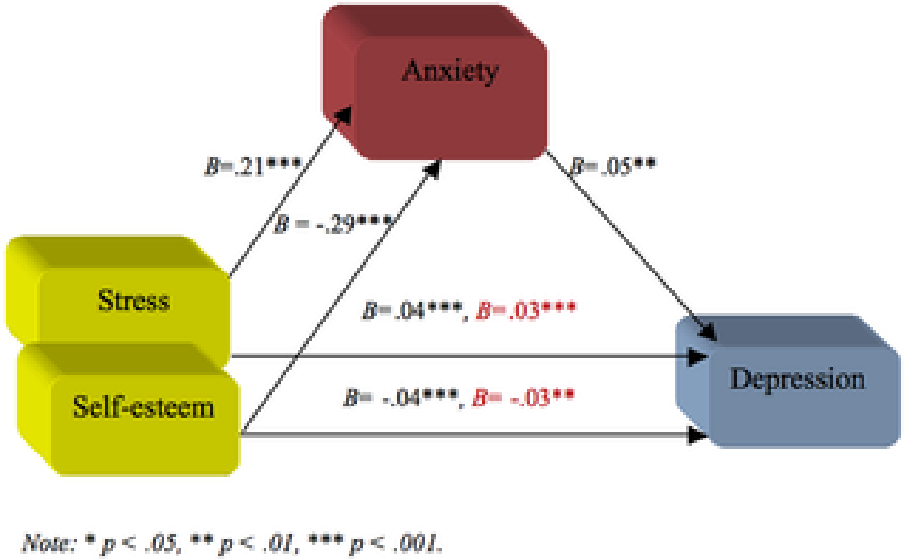
anxiety disorders refer to excessive fear and include more than just feelings of anxiousness. As many as 30% of adults in the United States suffer from anxiety disorders at some point (American Psychiatric Association, 2021).

Today, the terms *anxiety* and *anxious* appear frequently, primarily when referring to psychological stress. In the study conducted by Scribner et al. (2020), many of the undergraduate students included *anxiety* in their definition or description of stress, which is not surprising considering that more students are experiencing feelings of anxiety as negatively impacting their academic performance (American College Health Association-National College Health Assessment III, 2021) and as resulting from overwhelming stress (Scribner et al., 2020).

Figure 1 portrays the correlation of stress and anxiety among college students. The absence of positive emotions appears to be more significant regarding depression than the presence of negative emotions, and successfully coping with anxiety can increase self-esteem, and positively affect ones' overall health and well-being (Nima et al., 2013).

Figure 1

Mediation Model



Note. This model was produced from Nima et al. (2013) and shows the effect of stress and self-esteem (independent variables) on depression (outcome) is mediated by anxiety (mediator). From "Anxiety, Affect, Self-esteem, and Stress: Mediation and Moderation Effects on Depression," by Nima et al., (2013), *PLoS ONE, 8*(9), p. 3.

The National College Health Assessment (ACHA-NCHA III, 2021) "is a nationally recognized research survey that can assist you in collecting precise data about your students' health habits, behaviors, and perceptions" (para 2). The NCHA-III Spring 2021 Undergraduate Reference Group Executive Summary reported on chronic and ongoing conditions for college students in 2021. The results indicated that 19.5% of students experienced feelings of both, depression and anxiety, and more cisgender women reported feelings of both depression and anxiety than cisgender men (i.e., 21.6%; 10%). Regarding anxiety, 32.7% of cisgender women reported higher levels than cisgender men at 15.4%. Among these students that were diagnosed with anxiety, 72.4% reported visiting with a healthcare or mental healthcare professional in the

last 12 months.

Stress Coping Strategies (Independent Variable)

Many studies included in the current literature review note the significant positive impact of coping strategies on stress. For example, Altaher and Runnerstrom (2018) indicated that students gravitate towards social outlets for stress reduction (i.e., coping strategies) and after completing those strategies, they reported feeling accomplished, excited, and confident. Other coping strategies reportedly used by undergraduate students in order of frequency were exercise, cooking, religious activities, watching TV, meditating, yoga, playing an instrument, listening to music, surfing the internet, spending time alone, napping, talking through things, playing video games, and dancing. Altaher and Runnerstrom reported that students scored lower on the Perceived Stress Scale (PSS) supporting the notion that coping strategies lead to improved psychological health and well-being. “Interventions promoting well-being for college students should be considered by higher education institutions, as it has been reported that emotional and social wellness factors are related to college student success and retention” (Pritchard and Wilson 2003, as cited in Işık et al., 2017, p. 172).

The current study tested the effect of six coping strategies (e.g., mindfulness, yoga, progressive muscle relaxation, power napping, gratitude journaling, social support). However, the purpose was to determine which of the six adaptive coping strategies were utilized most by participant college students. While coping strategies are categorized in various ways (e.g., emotion-focused, problem-focused, adaptive, maladaptive, good, bad), it should be acknowledged that the way college students cope with stress impacts their health and well-being (Nima et al., 2013; Pickens et al., 2019). “Depression, anxiety and stress are suggested to influence individuals’ social relations and activities, work, and studies, as well as compromising

decision-making and coping strategies" (Nima et al., 2013, p. 1).

Mindfulness

In the study of adaptive coping strategies, mindfulness practices are seen as effective strategies. "Mindfulness is defined as the awareness that emerges through purposefully paying nonjudgmental attention to present moment experiences" (Bergen-Cico et al., 2013, p. 349). Behan (2020) noted that while *mindfulness* and *meditation* are often used interchangeably, they do differ. Meditation is a broad term that covers a number of practices that develop mindfulness; this can include breathing and mantras, while mindfulness is non-judgmental observation of the moment (Behan, 2020). Meditative practices are implemented in a system called Mindfulness-Based Stress Reduction (MBSR) developed by Dr. Jon Kabat-Zinn in 1979 and was initially intended for pain reduction in clinical use. MBSR is traditionally structured as an eight-week program with 2.5-to-3-hour sessions each week that include body scans, gentle yoga, and seated meditation. In addition, there is an all-day retreat after the sixth week. (Institute of Mindfulness-Based Approaches [IMA], 2022).

While Dr. Jon Kabat-Zinn was the developer of Mindfulness-Based Stress Reduction (MBSR), other researchers confirmed that practicing mindfulness and MBSR techniques are effective. Felver et al. (2018) stated MBSR is particularly effective at decreasing stress among college-age students. Students who participated in an eight-week MBSR course for two hours a day, twice a week, reported decreases in psychological distress that were reportedly maintained after a two-month follow-up. Greene et al. (2019) reported a 63% decrease in stress amongst undergraduate college students who completed eight weeks of MBSR for approximately 13-30-minutes a day, and improvements in sleep were also reported. Bergen-Cico et al. (2013) utilized a brief, modified 5-week program with undergraduate students in which they found increases in

psychological health for mindfulness and self-compassion, but not significant decreases for anxiety or depression and they attributed this to the brief length of the MBSR program. Based on the trends, Bergen-Cico et al. (2013) concluded that change takes time, and they hypothesized that one would see significant changes in students' anxiety and depression with longer MBSR practice. Haschke et al. (2018) conducted a study with undergraduate students in a general education course, and the researchers concurred with Bergen-Cico et al. (2013) in that a brief MBSR program (e.g., one week) will not lead to significant decreases in depression, anxiety, or stress. The review of literature indicated that MBSR is an effective coping strategy. MBSR proved to be more effective when utilized frequently over at least eight weeks, which is how Dr. Jon Kabat-Zinn initially established the practice. Brief (e.g., one week) practice was not found to be as effective in managing stress.

Yoga

Yoga is a traditional discipline that is used to address all dimensions of an individual. "Yoga, an ancient discipline known to be originated in India, is primarily designed to bring balance and health to the physical, mental, emotional, and spiritual dimensions of an individual" (Singh et al., 2020, p. 2029). Yoga is defined as having dimensions or aspects: universal ethics, individual ethics, physical postures, breath control, control of the senses, concentration, meditation, bliss. Most Americans today focus specifically on breathing, posture, and meditation (Singh et al., 2020).

Cady Arbeau's (2016) study incorporated the use of yoga and meditation for traditional and non-traditional students in a first-year experience class at a community college. The author noted that students struggle with stress management, "yoga and meditation are two skills that can be taught to students to help them more successfully manage the many stressors they face" (Cady

Arbeau, 2016, p. 37). Cady Arbeau concluded that coping strategies like yoga and meditation should be implemented in the college classroom to provide students with necessary skills to cope with stress. These skills will help them as they try to manage aspects of life, including academic performance and events in life beyond the classroom. Morgan (2017) found similar results in a stress management class with college students that incorporated yoga. The study noted significant decreases in perceived stress when yoga was incorporated as a stress management technique, although the study concluded that other methods of stress management techniques could be just as effective (e.g., mindfulness hiking, equine-assisted activities).

Singh et al. (2020), however, found yoga to produce more beneficial effects and noted that participating in yoga can increase one's quality of life, decrease anxiety, produce a sense of calmness, and decrease one's blood pressure and heart rate. The researchers concluded that while three methods of stress reduction activities were beneficial (e.g., group who received yoga training, group shown motivational videos, and a group who received both yoga training and motivational videos), those who participated in yoga had immediate and more pronounced results. Those in the yoga training group that performed yoga remained "calm and less anxious in the event of examination stress" (Singh et al. 2020, p. 2031). Park et al. (2017) supported that practicing yoga is an effective stress management technique (i.e., coping strategy) for college students and demonstrated that eight weeks of yoga improved awareness and emotional regulation.

Progressive Muscle Relaxation (PMR)

According to Palkar et al. (2021), PMR "involves contracting and relaxing the muscles to make one feel calmer and helps relieve the symptoms of stress. Although the cause of the anxiety will not disappear, one will probably feel more capable to deal with it once the tension in the

body is released" (p. 10). As described in Chapter 1 (p. 19), Edmond Jacobson developed Progressive Muscle Relaxation (PMR) in the 1920s when he discovered that tensing and relaxing muscles can induce a feeling of relaxation and activate the parasympathetic nervous system (Nair & Meera, 2014; Olpin & Hesson, 2021).

Palkar et al. (2021) conducted a quasi-experimental study on first-year medicine students, collecting information from pre- and post-tests (e.g., Perceived Stress Scale (PSS), Test Anxiety Scale (TAS), and General Health Questionnaire (GHQ)). PMR was practiced for one month and used as a coping strategy in test taking. Results showed reductions in both perceived stress from the PSS scale and the results from the TAS. There were no differences in the baseline of follow-up scores for students that did not participate in the PMR demonstrating that one month of PMR is an effective coping strategy in an academic setting for undergraduate students. Similarly, Toussaint et al. (2021) reported efficacy in college students utilizing PMR in both physiological and psychological measures (e.g., heart rate, and relaxation). When comparing pre-and post-tests, relaxation state increased, and heart rate decreased following the treatment. Toussaint et al. concluded that stress relaxation techniques (i.e., coping strategies) like PMR are effective methods for students to cope with stress and they lead to increased well-being. Likewise, Scholz et al., (2016) implemented PMR and found success with medical undergraduate students. These students participated in elective course offerings with lectures that included background information that was followed by the practice of PMR. Students reported decline (i.e., improvement) in levels of depression and improvement in sense of coherence (i.e., attitude toward surroundings) (Scholz et al., 2016).

Power Napping

As described in Chapter 1 (p. 11), a power nap lasts anywhere from five to 30 minutes and differs from a traditional nap in that it incorporates relaxation methods to activate the parasympathetic nervous system (Olpin & Hesson, 2021). Sleep practices, specifically the practice of napping is culturally defined into three major categories: monophasic, biphasic, and polyphasic (Taylor, 2009). In America, common sleep practice is monophasic which includes one period of sleep. In Latin America and Caribbean communities common sleep practice is biphasic, which includes two bouts of sleep during the day. In countries like Asia, Africa, and Japan, common sleep practice is polyphasic which includes several naps during the day, plus nightly sleep. In polyphasic communities, naps are acceptable due to long workdays or nights in which sleep is often sacrificed (Faraut et al., 2017; Taylor, 2009; Williams et al., 2015). Williams et al. noted that siestas or napping, typically taken during the hottest part of the day, are common in Latin American and Caribbean communities that practice biphasic sleep. "The word *siesta* is Spanish, from the Latin *sexta* or "the sixth hour," indicating midday rest after awakening" (Williams et al., 2015, p. 30). According to Taylor (2009), 1/3 of Americans nap during the day, as napping is not as well accepted or established, due to the monophasic sleep culture (Taylor, 2009).

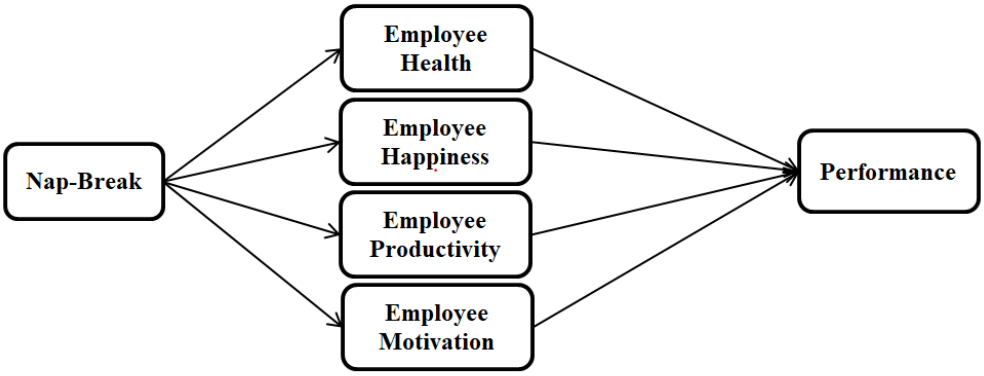
Research on napping has been conducted on college students, athletes, and the working population alike. Sarwar and Tanvir (2020) reviewed literature concerning aspects affected by napping, including employee performance, employee health, employee happiness, employee productivity, and employee motivation in which it was determined that nap breaks are associated with an increase in employee performance and well-being. According to Sarwar and Tanvir (2020),

> In various countries, including China, Italy, Greece, India, Latin America and North Africa, nap-break has been practised [*sic*] for ages. The practice is based on the fact that a chemical is released, after having a meal, from brain [*sic*] which makes an individual tired and thus the person needs a short nap to refresh and recuperate. (p. 39)

Nap breaks are socially acceptable and often mandatory in some organizations during work hours in countries like Japan and China; however, this is not a typical practice in all countries, including the United States and Pakistan (Sarwar & Tanvir, 2020; Williams et al., 2015). Sarwar and Tanvir collected data on perceptions of employee health, happiness, productive, motivation, and performance from four public universities in Pakistan. Data from faculty members concluded that nap breaks would significantly impact the variables measured (i.e., employee health, employee happiness, employee productivity, employee motivation) and that nap breaks should be implemented at universities (Sarwar & Tanvir, 2020).

Figure 2

Nap-break Effect on Performance



Note. This model was produced by Sarwar & Tanvir in 2020 and shows that the effect of employee health, employee happiness, employee productivity, and employee motivation (independent variables) on performance (outcome) could be impacted by nap-breaks. From

"Introducing Nap-break to Increase Work Performance: A case of Business Public Schools in Pakistan," by Sarwar & Tanvir, 2020, *Karachi University Business Research Journal, 1*(1), p. 6.

Short nap breaks lasting 10-30 minutes can improve an individual's mood, fatigue level, accuracy, concentration, and alertness and lead to work productivity by increasing happiness and restfulness, and decreasing illness and stress (Sarwar & Tanvir, 2020; Brooks & Lack, 2006). For college students (i.e., young and emerging adults), lack of sleep can impact health. Young adults sleep less on average during weeknights (i.e., less than seven hours a night) due to their lifestyle (e.g., completing assignments, staying up late) which can impact health and academic performance (Takahashi, 2003; Kamal et al., 2012). Brooks and Lack (2006) concluded that the 10-minute nap provided greater benefits overall for college students in the three hours following the nap; a 30-minute nap in the lab did provide benefits and produced more sleep inertia (i.e., period of disorientation, confusion, sleepiness upon awaking) following the nap. Due to the short period of the naps, they were not expected to impact nightly sleep. However, research on karate athletes indicated that when athletes are sleep deprived, short naps of approximately 30 minutes are beneficial in performance and in being alert (Daaloul et al., 2019). College students reported that their lack of sleep interferes with their daily activities, which would make them ideal candidates for a short nap, or power nap (e.g., a nap lasting 30-minutes or less) (Takahashi, 2003).

According to the literature review by Kamal et al. (2012), the benefits of napping included reductions in stress, and increases in motor learning, productivity, memory, mood, and alertness. Over half of the students surveyed (58.4%) stated they experienced sleep disturbances (e.g., stress, constant waking while sleeping, insomnia). Of the students surveyed, 81.7% said they often napped during the day with 53.4% of those students reporting feeling fresh after

napping. The majority of students surveyed (78.3%) reported that they believed it was advisable to include napping as part of their daily routine. Kamal et al. (2012) concluded that the benefits are many, including an improvement in quality of life and a decrease in stress levels. Furman et al. (2018) established that higher levels of perceived stress (i.e., PSS scale) were associated with poor sleep quality (i.e., from Pittsburg Sleep Quality Index – PSQI) amongst undergraduate students, and that those who had poor sleep may have perceived events to be more stressful, which can lead one to determine that sleep is an important factor often correlated with stress.

The literature reviewed provides overwhelming positive data regarding brief periods of sleep during the day, known in the current study as power napping, in managing stress especially for those who are often sleep deprived (i.e., college students).

Gratitude Journaling

As described in Chapter 1 (p. 19), gratitude journaling includes writing or listing things one is grateful or thankful for. Gratitude is often easier for individuals to experience during pleasant times as opposed to stressful times and is often associated with spirituality or religious beliefs (Rosmarin et al., 2016). Gratitude could exist as an affective trait (i.e., grateful disposition), a mood (i.e., daily fluctuations in gratitude), or an emotion (i.e., a feeling after a positive event) (McCullough et al., 2002; Allen, 2018). Allen (2018) noted that studies correlated increased gratitude and psychological well-being with the practice of gratitude journaling.

"The last three decades have seen a growing trend in positive psychology (Seligman et al., 2005), an area of study that focuses on strengths, virtues, prevention and well-being, rather than on weaknesses and pathology" (Işık et al., 2017, p. 165). Işık et al. designed a study to focus on positive aspects for reflection regarding perception of stress and college students. The importance of gratitude journaling for coping, health, providing growth, encouraging optimism,

enriched relationships, social support, well-being, and enhanced physiological and cognitive function (Işık et al., 2017). First-year education students completed pre-and post-tests using the Perceived Stress Scale (PSS) and the University Life Scale. Students reflected on their day and wrote about events that made them feel good, with results showing that gratitude journaling increased sense of gratitude, university adjustment, life satisfaction, happiness, hope, and positive affect (Işık et al., 2017; McCullough, et al., 2002). Gratitude journaling as a coping strategy provided many benefits for college students including increased well-being, and results from gratitude journaling were negatively correlated with depression and anxiety (Işık et al., 2017; McCullough et al., 2002). However, Kashdan et al., (2009) found that women (e.g., both older and college-age) reported more gratitude for gifts received than men (e.g., both older and college-age) and that women found gratitude to be more advantageous. This information leads the researcher to believe that gender could possibly account for differences in the current study regarding gratitude journaling and preference of coping strategies.

Social Support

Social support includes "having people from whom one receives emotional, informational, and/or tangible support…" (Lazarus & Folkman, 1984, p. 164). While many correlate college-life with academics, the social aspect is a critical part of the college experience in which students often rely on their peers for support.

Altaher and Runnerstrom (2018) stated the importance of transitioning to college life and the stress it carries with it, including the effect it has on college students' personal lives and academic performance. Altaher and Runnerstrom collected perceived stress data (i.e., PSS) from undergraduate students and qualitative data about stress-relieving activities (e.g., socializing with friends, exercise/physical activity, cooking, religious activities, TV, meditation, yoga, playing an

instrument, listening to music, surfing the internet, spending time alone, napping, talking through things, playing video games, dancing). This study was reportedly the first to include preferred stress-relieving activities and environment regarding coping strategies for stress. The authors reported that students perceived stress-relieving activities (e.g., leisure time with friends) as the number one option to lower stress and anxiety (Altaher & Runnerstrom, 2018).

The international study conducted by Pidgeon et al. (2017) indicated that the levels of perceived social support and campus connectedness were impacted by levels of distress and students' satisfaction with their academic experience. Additionally, results showed that students tend to experience academic success and satisfaction with their college experience when they feel supported socially (Pidgeon et al., 2017).

Bledsoe et al. (2018) completed a phenomenological study including focus groups and surveys with college students regarding adaptive coping strategies. Forty percent of participants surveyed noted that they utilized support systems for coping, which included friends and family or those in an academic setting. While this was not the top coping strategy self-reported by students, it did rank third in the results, which differed from other studies which found social support (i.e., family, friends) as their number one choice for coping (Altaher & Runnerstrom, 2018; Bledsoe et al., 2018). Social support directly correlates with students' quality of life (Roming & Howard, 2019) but a small number (e.g., 3%) of respondents sought mentors, professors, and tutors for social support, which led to the conclusion that many students are simply unaware of available campus resources, and awareness needs to be addressed (Bledsoe et al., 2018). College administrators need to "focus on creating and revitalizing campus facilities that can help to foster leisure activities" (p. 231) to help promote social engagement and social

support and make students aware of available social supports on campus (Altaher & Runnerstrom, 2018).

Gender differences were identified in coping strategies regarding social support. College women were inclined to utilize more emotion-focused strategies for coping than men and Brougham et al. (2009) hypothesized it might be due to the "tend and befriend" theory, which proposes that women tend to seek social groups in times of distress (Olpin & Hesson, 2021). Women tend to express their feelings and seek emotional support more than men (i.e., emotion-focused); men and women utilize problem-focused coping (e.g., action and planning) less than emotion-focused coping (e.g., expression emotion) (Brougham et al., 2009). College-aged men tend to disengage and consume alcohol more than their women peers, which would be categorized in the maladaptive category of coping strategies (Brougham et al., 2009).

These studies proved that social support is an adaptive coping strategy for college students as social support has been shown to decrease perceived stress and anxiety and assist in coping with academic stress, which improves the overall college experience. Social support has been shown to be an important factor in the college experience for students.

Theoretical Framework

The theoretical framework for this study is based on two theories, the first is Lazarus and Folkman's (1984) transactional model of stress and coping and the second is Arnett's (2000) theory of emerging adulthood, which is described in the *Young & Emerging Adult* section of Chapter 2. Stress is an inevitable part of life and how one perceives (i.e., appraises) stress and chooses to cope are what influenced Lazarus and Folkman's (1984) transactional model of stress. Lazarus and Folkman's (1984) definition of stress incorporated focus on the perception or appraisal of the event; "a particular relationship between the person and the environment that the

person appraises as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p. 19). The definition Lazarus and Folkman provided allows for individual differences in psychological and physiological responses based on how threatening individuals perceive the stressor to be.

Lazarus and Folkman (1984) identified stimulus and response definitions of stress. Stress as a stimulus is explained as three types of environmental stress or *stressors* in which the situation itself is considered stressful (Lazarus & Cohen, 1977, as cited in Lazarus & Folkman, 1984):

- Major changes affecting a large number of people and about which the individual has no control (e.g., natural disaster)
- Major changes affecting few people and about which the individual has no individual control (e.g., divorce)
- Daily hassles, irritating events that cause distress (e.g., too many responsibilities)

Stress as a response was historically used in biology and medicine which refers to a state of stress, or an individual or animal response to a stressor (e.g., increased heart rate). These definitions lacked the individual's response to the event and environment which is what led Lazarus and Folkman (1984) to develop their theory of cognitive appraisal and coping. They noted that stress is not objective and what is stressful for one individual is not necessarily stressful for another. As previously described under *Psychological Stress*, primary appraisal involves the person and the environment, which is subjective, and secondary appraisal addresses what can be done to cope with the stress, which is influenced by available resources.

Lazarus and Folkman (1984) defined two methods of coping based on previous research literature, one from what they considered the "tradition of animal experimentation" and the other

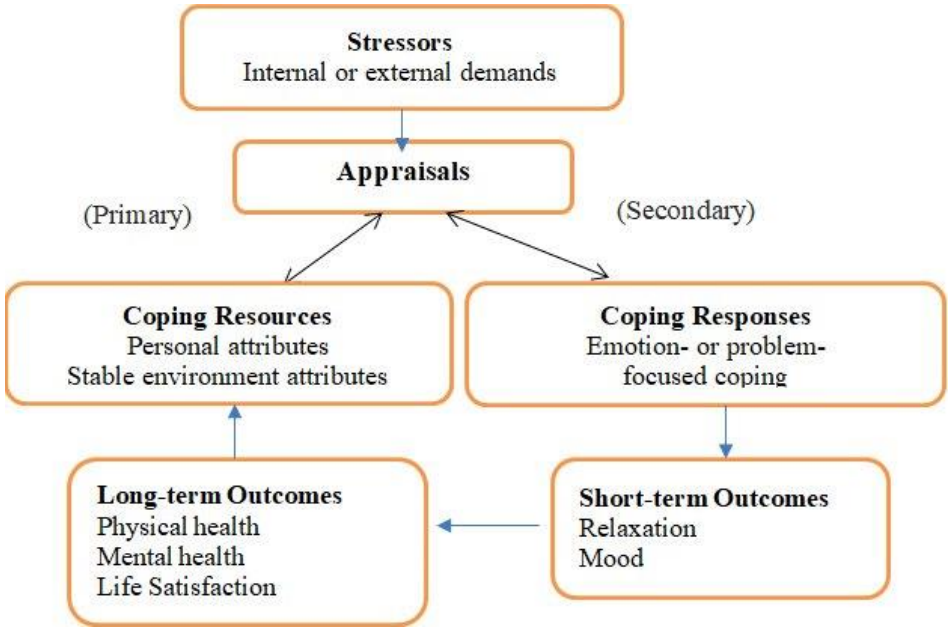
from psychoanalytic ego psychology:

1) The animal model is based on animal research, based in biology, and involves understanding the functioning of the sympathetic nervous system. They found this model to be simplistic and lacking cognitive-emotional intricacy. The animal model involves fighting or fleeing the threat to survive. Activation of the sympathetic nervous system includes an increase in heart rate and blood pressure, respiration, and redirection of blood flow from the digestive system to muscles (Olpin & Hesson, 2021).
2) The Psychoanalytic ego psychology model explains coping as the "realistic and flexible thoughts and acts that solve problems and thereby reduce stress" (Lazarus & Folkman, 1984, p. 118). This model includes the individual's perception and their relationship with the environment and does not involve one's behavior.

The main difference between the two coping models is the significance of the individual's perception of the stressor and environment which influenced Lazarus and Folkman (1984) coping styles. Figure 3 portrays Lazarus and Folkman (1984) Transactional Model of Stress and Coping that includes the stressor, primary (i.e., coping resources) and secondary appraisal (i.e., coping responses) of the stressor, and possible outcomes.

Figure 3

Transactional Model of Stress and Coping (Lazarus & Folkman, 1984).



Note. This model was produced by Margaret et al., (2018) and summarizes Lazarus and Folkman's Transactional Model of Stress and Coping. From "Sources of Occupational Stress and Coping Strategies Among Teachers in Borstal Institutions in Kenya," by Margaret, K., Ngigi, S., and Mutisya, S., 2018. *Edelweiss Psychiatry Open Access, 2*(1), p. 19.

According to Furman et al. (2018), Lazarus and Folkman's (1984) transactional model of stress and coping has dominated research on these subjects. "This theory proposes that an individual's perception of a psychological situation determines whether or not the event is actually stressful" (p. 62). How the individual interprets that threat determines whether they perceive the stress as a threat. During this transition period in a college student's life, students are often unable to cope effectively with stress. In order to effectively cope, students need to recognize the cause of their stressors (Ferrer et al., 2014). Ferrer et al. also suggested that if students lack proper coping skills, they may suffer from inadequate sleep, gastrointestinal issues, high blood pressure, and so on.

As previously mentioned, Lazarus and Folkman (1984) noted that "coping is determined by cognitive appraisal" (p. 157). They described two forms of coping, emotion-focused and problem-focused. Emotion-focused coping includes "changing the meaning of the situation" (Lazarus & Folkman, 1984, p. 150) or "the regulation of distress" (p. 188). Pickens et al. (2019) described emotion-focused coping as the type of strategy utilized when one does not see that change is possible. However, according to Lazarus and Folkman (1984) emotion-focused coping can involve reappraisal of the situation to reduce the threat, or behavioral strategies "such as engaging in physical exercise to get one's minds off a problem, meditating, having a drink, venting anger, and seeking emotional support can lead to reappraisals but are not themselves reappraisals" (p. 151). Problem-focused coping is similar to methods that would be involved in problem-solving (Lazarus & Folkman, 1984). Methods generally included in problem-focused coping include "defining the problem, generating alternative solutions, weighing the alternatives in terms of their costs and benefits, choosing among them, and acting" (Lazarus & Folkman, 1984, p. 152), or more simply stated as managing the problem causing stress within that environment. Lazarus and Folkman described problem-focused coping strategies as limited compared to emotion-focused strategies.

It is evident that Lazarus and Folkman (1984) have influenced the field of stress and coping a great deal. There are numerous studies based on their research which have confirmed their theory. While some researchers posit that adaptive coping strategies tend to be problem-focused, others consider problem-focused or emotion-focused to encompass adaptive strategies (Furman et al., 2018). For the purpose of this study adaptive coping strategies will include the six coping strategies utilized in the study (e.g., mindfulness, yoga, progressive muscle relaxation, power napping, gratitude journaling, social support).

Research Questions and Hypotheses

Primary Research Questions

The primary research questions for this study address the topics of perceived stress and coping strategies.

1. How do Perceived Stress Scores (PSS-10) and physiological measures change in undergraduate students during a stress management course when comparing pre-, mid-, and post-treatment assessments?

2. What are the preferred adaptive coping strategies provided throughout the semester that college students utilize to manage stress?

Secondary Research Questions

The secondary research question addresses demographics.

3. How do demographic factors impact the change in Perceived Stress Scores (PSS-10) and physiological measures among undergraduate students during a stress management course?

Hypotheses

H0: There are no changes in perceived stress scores (PSS-10) and physiological measures in undergraduate college students when comparing perceived stress before and after the Introduction to Stress Management course.

H1: There are changes in Post-Test Perceived Stress Scores (PSS-10) and physiological measures among undergraduate college students when comparing perceived stress before and after the Introduction to Stress Management course.

Conclusions

This chapter reviewed the purpose of this study and provided a review of the research on perceived stress and undergraduate students, along with descriptions for adaptive coping strategies. As mentioned in the introduction, in the literature on stress and coping, there is an overrepresentation of qualitative studies addressing this phenomenon. Additionally, most of these qualitative studies have been conducted abroad with students in the field of nursing, physical therapy, or education programs. This proves to be problematic as not all institutions offer these specific programs; studies that include the general population would better serve a broader array of institutions. A quantitative study conducted in the United States with young and emerging adults will contribute to the literature concerning perceived stress and adaptive coping strategies that could be implemented in the college and university setting. The chapter also provided evidence of the theoretical framework which is based on Lazarus and Folkman's transactional model of stress and coping. The next chapter will provide information on the research design and methodology.

CHAPTER 3 METHODOLOGY

The purpose of the study was to determine if undergraduate students' perceived stress changed during a semester-long Introduction to Stress Management course at a small, regional institution in the upper Midwest, and to establish which of the six adaptive coping strategies are effective when utilized for mitigating stress including mindfulness, yoga, progressive muscle relaxation, power napping, gratitude journaling, social support. The study assessed physiological variables associated with increased stress including heart rate, breathing patterns, and respiration rate and student demographic variables and their correlation with students' perceived stress.

This chapter will provide an overview of the methodology utilized in the study and includes the following sections: research questions and hypotheses, research design, setting, participants, sampling procedures, instrumentation, data collection, data analysis, table of overall research design, procedures, and ethical considerations. The problem to be addressed in this research study relates to the increased prevalence of stress in undergraduate college students and their inability to cope with stress. The consequences of stress and one's inability to cope can lead to physical and psychological issues, such as gastrointestinal issues, lack of sleep, and lack of motivation (Ferrer et al., 2014; Ates, 2019).

Research Questions and Hypotheses

Primary Research Questions

The primary research questions for this study address the topics of perceived stress and coping strategies.

1. How do Perceived Stress Scores (PSS-10) and physiological measures change in undergraduate students during a stress management course when comparing pre-, mid-, and post-treatment assessments?

2. What are the preferred adaptive coping strategies provided throughout the semester that college students utilize to manage stress?

Secondary Research Question

The secondary research question addresses demographics.

3. How do demographic factors impact the change in Perceived Stress Scores (PSS-10) and physiological measures change among undergraduate students during a stress management course?

Hypotheses

The null and alternative hypotheses for this study are as follows:

H0: There are no changes in perceived stress scores (PSS-10) and physiological measures in undergraduate college students when comparing perceived stress before and after the Introduction to Stress Management course.

H1: There are changes in Post-Test Perceived Stress Scores (PSS-10) and physiological measures among undergraduate college students when comparing perceived stress before and after the Introduction to Stress Management course.

Research Design

This study aligns with a positivist paradigm, realist ontology, and objectivist epistemology. According to Patel (2015), a positivist approach involves "a single truth or reality" (para. 6) and the role of science is to discover that reality and how it works (Fraenkel et al., 2019). Using this approach assisted in guiding the collection of data on students' perceived stress and preferred adaptive coping strategies in students enrolled in the Introduction to Stress Management course at a small, regional institution in the upper Midwest. Fraenkel et al. describe this type of research as the one-group pretest-posttest design, shown in Table 1, in which the

class's dependent variable was measured, provided with a treatment, then provided a posttest after exposure to the treatment.

Table 1

The One-Group Pretest-Posttest Design

O	*X*	*O*
Pretest	Treatment	Posttest

Note. Adapted from *How to Design and Evaluate Research in Education* (p. 263), by Fraenkel et al., (2019), McGraw Hill.

The design of this study is quasi-experimental which does "not include the use of random assignment" (Fraenkel et al., 2019, p. 269). Quasi-experimental studies compare the effect of an independent variable or predictor variable, which in this case is coping strategies, on a dependent variable, or outcome variable, which is perceived stress and physiological variables. The purpose of experimental research is to "test hypotheses about cause-and-effect relationships" (Fraenkel et al., 2019, p. 289). The methods used in this study include questionnaires (i.e., PSS-10, demographic variables, ranking of coping strategies, student self-reporting of physiological variables). Data was collected three times over the course of the semester on all participating students in the class. Due to the content of the course, all students received the treatment (i.e., coping strategies) following a pre-treatment assessment. After all coping strategies were introduced and practiced, the students completed a post-treatment assessment.

The first questionnaire (i.e., pre-treatment assessment) was given four weeks into the semester to collect demographic information, physiological variables, PSS-10 scores, and familiarity and usage of the coping strategies. The second questionnaire (i.e., mid-treatment assessment) was given eight weeks into the semester to collect some demographic information (e.g., illness status, relationship status, level of social support), physiological variables, and a

perceived stress score. The final questionnaire (i.e., post-treatment assessment) was provided at 13 weeks to collect some demographic information (e.g., illness status, relationship status, level of social support), physiological variables, PSS-10 scores, and a final ranking of coping strategies. See Appendix B for questionnaires.

The Introduction to Stress Management course offered at a small, regional institution in the upper Midwest was 16 weeks in length. The course was a two-credit class and met twice a week (i.e., Mondays and Wednesdays). In the fall 2022 semester two sections of the course were offered, one from 9:00-9:50 a.m. and the other from 11-11:50 a.m. The pre-treatment assessment was collected during week four of the semester before coping strategies were introduced. The pre-treatment assessment followed two short weeks of class due to one day of class the first week and the Labor Day holiday the second week. During week three, information on stress in today's world was provided along with self-assessments of stress, including the PSS-10 and physiological variables. The mid-treatment assessment was collected during week eight after gratitude journaling and mindfulness were introduced, and the post-treatment assessment was collected during week 13 of the semester at the conclusion of using all six selected coping strategies. Appendix F provides an overview of the semester for the course up to week 13 and the conclusion of the post-treatment assessment.

External validity involves the "extent to which the results of the study can be generalized" (Fraenkel, et al., 2019, p. 103). The current study included non-random convenience sampling. Convenience sampling is a threat to the external validity of the study (i.e., generalizability). However, for the current study and given the fact that this is a course that students can take as a general education course, the participants represent the population of undergraduate students at this institution of higher education. The Introduction to Stress

Management course at a small, regional institution in the upper Midwest is offered both fall and spring semesters, and two sections were offered in the fall semester of 2022 on Mondays and Wednesdays from 9-9:50 am and 11-11:50 am. Students were able to register for the course that best fit their schedule.

Originally the author was a professor at the institution in the study and instructed the Introduction to Stress Management courses at the small, regional institution in the upper Midwest along with a part-time instructor. However, in the fall of 2022, the author did not instruct either section of the Introduction to Stress Management course as the author no longer works for the institution of higher education used in the study. However, the author collected the data in-person from each section of the Introduction to Stress Management course. By virtue of the curriculum, content related to coping strategies was mandatory and no group could play the role of the control group due to the nature of the course.

Threats to Internal Validity of Quasi-Experimental Research

Internal validity "means that observed differences on the dependent variable are directly related to the independent variable, and not due to some other unintended variable" (Fraenkel et al., 2019, p. 161). Fraenkel et al. described many types of threats to the internal validity of quasi-experimental research. Twelve possible threats to internal validity can be found in Table 2 along with how the researcher addressed the threats. Mortality is common, unavoidable, and difficult to control (Fraenkel et al., 2019). It was inevitable that one or more students was absent during one of the three data collection days during the fall semester. History is another uncontrollable threat to the study as the author had no control over instances that occurred outside of the classroom. Testing threat was also of concern as use of pretests can "sometimes make students more alert to or aware of what may be about to take place" (Fraenkel et al., 2019); this could lead students to

be more responsive to the coping strategies or influence students to self-report inaccurate data. All students received the pre-treatment assessment followed by the mid-treatment assessment four weeks later, and the post-treatment assessment approximately eight weeks after the pre-treatment assessment.

Table 2

Effectiveness of Experimental Designs in Controlling Threats to Internal Validity

	Threat											
Design	Subject Characteristic	Mortality	Location	Instrument Decay	Data Collector Characteristics	Data Collector Bias	Testing	History	Maturation	Attitude of Subjects	Regression	Implementation
One group pretest-posttest Threat	Also known as selection bias	Loss of subjects; failure to complete questionnaires	Location of classroom	The Questionnaire & PSS-10	The author will be collecting data from a course taught by another instructor	Unconscious distortion of data by the data collector	Use of pretest and students alerted to what is being studied	Unplanned event that can affect responses of subjects	Change due to passing of time and not necessarily the intervention	Recipients of treatment may perform better knowing they are a part of a study	The possibility that results are extreme during the pretest and then scores to regress toward average regardless of treatment	The possibility that results are due to variation in the implementation of the treatment
Addressing the One group pretest-posttest Threat	All students in both sections of HPER 212 Introduction to Stress Management are the preferred participants for the study as they will all assess stress levels and practice coping strategies regardless of participation in the study; no students in the course will be denied participation	Mortality is unavoidable	Constant location for each course throughout the semester	The Pre-test questionnaire is lengthy, but the PSS-10 is concise. Instrument decay could be of concern on the pre-treatment assessment, but the mid- and post-treatment assessments are shorter in length	The author will remain the data collector for consistency over the 12 weeks	All information will be self-reported by participants	Students will be alerted to the study prior to the pretest and might be sensitive to the results sought on the posttest	History is unavoidable	There is no control group as each participant in class will experience the coping strategies	The author will explain to participants that the treatment is a part of the instruction and not the experiment	This is not a threat as participants are selected regardless of their pretest scores	This is not a threat as all participants in the class and study are exposed to the same treatment (i.e., coping strategies)

Note. This table includes the threats of a One group pre-test-post-test and the methods in which the author will address the threats (Fraenkel et al., 2019).

Setting

The study took place at a small, regional institution in the upper Midwest. The institution of higher education has 13 departments that offer more than 65 undergraduate majors and has been recognized as one of the top public regional colleges in the Midwest for over 20 years. There are 80 full-time faculty and 59 part-time faculty employed in the 2021-2022 academic year. The institution is known for producing quality K-12 teachers in the region. The institution boasts a 13:1 student to faculty ratio and sits on 55 acres located in a town with approximately 6,500 residents (About VCSU, 2022).

In the fall of 2021 enrollment was 1,420 students. Of those students, 84.22% identified as White, 4.69% Hispanic/Latino, 3.14% were two or more races, 2.97% were African-American, 1.66% not specified, 1.30% non-resident alien, .83% Asian, .65% Native Hawaiian or Pacific Islander, and .53% Native American. Fifty-eight percent of the undergraduate population were women and the remaining 42% were men (Student Demographics, 2021). In the fall of 2021, 214 of the 1022 (21%) students indicated they were first-generation college students. Of those, 108 (50.5%) were from North Dakota, 18 (8.4%) were from Minnesota, South Dakota, or Montana (K. Gregoryk, personal communication, March 17, 2022). In-state tuition is $424.27 per credit hour and $742.47 for non-resident tuition (A. Olson, personal communication, February 28, 2022). Table 3 identifies tuition and fees for the midwestern institution discussed in the study.

Table 3

2021-2022 Tuition and Fees per Credit Hour

Tuition*	Cost
North Dakota resident	$6,364
Minnesota resident	$7,128
Resident of Montana, South Dakota, Midwest Student Exchange Program (Illinois, Indiana, Kansas, Missouri, Nebraska, Ohio, Wisconsin), Manitoba, Saskatchewan	$7,955
Resident of Western Undergraduate Exchange (Alaska, Arizona, California, Colorado, Hawaii, Idaho, New Mexico, Nevada, Oregon, Utah, Washington, Wyoming, Republic of the Marshall Islands) or alumni dependent	$7,955
Resident of state/province/country not listed above (Non-Resident/International)	$11,137
Room and Board**	$6,803
University and technology fees***	$1,830

Note. A. Olson, personal communication, February 28, 2022.

The University offers one full-time counselor, a part-time counselor, and one intern in counseling. Counseling services are provided at no additional charge to the student. The University also provides a health services department, again, at no additional charge to the student. The nurse is available part-time most days of the week (Counseling & Health Services, 2022). Students pay a student fee and are provided access to a wellness center that includes a fitness area, group fitness classes, sport courts, an indoor track, swimming pool and hot tub, playground, and coffee and smoothie bar. The Introduction to Stress Management course at a small, regional institution in the upper Midwest, is offered in the wellness center and taught by

faculty in the Kinesiology and Human Performance department as the department is also housed in that facility (Wellness Center, 2022).

Participants

Participants in the study were undergraduate college students enrolled in an Introduction to Stress Management course at a small, regional institution in the upper Midwest. This course is a general education offering under the *Wellness* category. This class is a requirement in the Health Education and Strength and Conditioning majors, the Health Studies minor, and offered as an elective in the Sport Management major. Some of the students in the Introduction to Stress Management courses included those looking to take a general education course, those who were meeting a major requirement or directed elective, or those who were generally interested in the subject matter. The course used in the study is a 200-level course but is available for students to take any year in their program.

All full-time freshmen are required to live on-campus and 32% of all residents on-campus were non-first year students in the fall of 2021 (K. Gregoryk, personal communication, April 5, 2022). In the 2021-2022 academic year, 320 students (i.e., 21%) were non-traditional undergraduates. For the first-time, full-time cohort of students, 95% (175/184) received some form of financial aid, which could include scholarships waivers or other aid (K. Gregoryk, personal communication, April 6, 2022).

Sampling Procedures

A non-random convenience sampling method was used for the current study. This includes a group of subjects that are readily available (Fraenkel et al., 2019). Fraenkel et al. suggested that a sample size of 30 is recommended for experimental studies. The participants of this study were limited to those enrolled in each of the two sections of the course and those who

were willing to participate during the fall of 2022 academic semester. Each of the two sections of Introduction to Stress Management were capped at 25 students for the fall semester. Initially, the COVID-19 pandemic influenced class sizes which could have potentially impacted the number of students enrolled. However, the policy for 2022 was to allow 25 students per section in the face-to-face course. Twenty-two students were enrolled at the beginning of the semester for each section of the course, with 41 completing the pre-treatment assessment. Prior to the COVID-19 Pandemic, sections were averaging 15-16 students. Students enrolled in this course are completing the Wellness requirement for the general education criteria, or those who need the course for the Health Education and Strength and Conditioning majors, the Health Studies minor, or those taking an elective in the Sport Management major.

Instrumentation

After observing students at the University suffering from stress and anxiety over the last six years or so, the author suggested to the Kinesiology and Human Performance department in 2016-2017 that they consider offering a stress management class. It was recommended that the author begin developing a course that would cover that topic. In the fall of 2018, the first Introduction to Stress Management course was offered at the institution. In the fall of 2020, the Introduction to Stress Management was offered as a General Education course option under the Wellness category; there had previously only been one course offering, Concepts of Fitness and Wellness. Before the fall of 2022, approximately 170 students have taken the course thus far.

Instrumentation for the study included manual measurement of physiological variables by the students, demographic information from questionnaires, the Perceived Stress Scale (PSS-10), and level of familiarity with coping strategies and a ranking scale for coping strategies. The

author provided instruction and demonstration of physiological variables which include heart rate measurement with the index and middle fingers at the carotid or radial arteries and time the students for 60 seconds. The author provided instruction on how to count breaths and instructed students to put one hand near their heart and one hand on their stomach for 60 seconds. Students then self-reported the heart rate data, respiration rate, and breathing pattern in the Qualtrics survey on their institution-provided laptop.

Data collection included three assessments over the course of the semester using Qualtrics surveys for data collection. The pre-, mid-, and post-treatment questionnaires used in this study can be found in Appendix B. Surveys possess three major characteristics 1) to describe characteristics of a population, 2) to ask questions that collect information, and 3) to collect information from a sample of the population (Fraenkel et al., 2019). The data collected via Qualtrics included: 1) physiological variables often associated with stress that include manual measurement of heart rate for 60 seconds with the index and middle fingers on the carotid or radial arteries, manual counting of respiration rate for 60 seconds, and self-reporting on breathing pattern by the student to include abdomen/belly breathing, chest breathing, or both, 2) the PSS-10 to measure situations that students perceive as stressful (Cohen & Williamson, 1988), 3) questions exploring demographic information to discover any impact demographic variables (e.g., gender and program of study) potentially have on perceived stress, and 4) questions exploring participants' level of familiarity with the six chosen coping strategies (i.e., yoga, PMR, power nap, social support, mindfulness, gratitude journal) for the pre-treatment assessment or ranking scale for preferred coping strategies (i.e., post-treatment assessment).

Perceived Stress Scale (PSS-10)

The PSS-10 (Appendix G), developed by Cohen et al. (1988) is touted to be a screening tool that is easy to administer but should not be misconstrued as a diagnostic test (Denovan et al., 2019). Again, the purpose of the PSS-10 is to measure situations that individuals perceive as stressful (Cohen & Williamson, 1988). According to Denovan et al. (2019),

> The PSS-10 is versatile and can be used in a number of important educational contexts, for instance, to evaluate progress during counselling [*sic*] and to measure student distress. Conceptually, researchers and practitioners value the PSS-10 because items are non-specific and context free, and it can be used across a range of settings. (p. 122)

The PSS is built on the Transactional Model of Stress by Lazarus and Folkman (Chiu et al., 2016, as cited in Denovan et al., 2019). The PSS-10 includes ten questions asking about perceptions of stress, thoughts, and feelings experienced over the previous month. The answer choices range from 0 [never] to 4 [very often]. The PSS-10 is psychometrically sound compared to other stress measurement instruments and effective in research studies and for use in a practical setting (Denovan et al., 2019). “PSS items were designed to tap the degree to which respondents found their lives unpredictable, uncontrollable, and overloading. These three issues have been repeatedly found to be central components of the experience of stress” (Cohen et al., 1983, p. 387). “Results also indicate that the underlying constructs are interpreted and measured the same way across gender, with configural, metric, and scalar invariance demonstrated between men and women” (Denovan et al., 2019, p. 130). The PSS is meant for use in a group setting, with those who have a junior high education level or above, and it should take approximately 5-10 minutes to complete. It is easy to understand and appropriate for the general population (Cohen, 1994).

Validity and Reliability of the PSS-10 Instrument. According to Liu et al., (2020) "the PSS-10 had adequate convergent validity for stressful life events (number: $r = 0.13$, $p < 0.001$; impact: $r = 0.23$, $p < 0.001$) and could explain incremental variance in predicting anxiety and depression" (p. 1), which Liu et al. suggested led to excellent concurrent validity.

Regarding validity, Liu et al. (2020) also noted:

> The PSS-10 possesses adequate internal consistency with Cronbach's alpha coefficients ranging from 0.67 to 0.91 (e.g., Roberti et al., 2006; Siqueira Reis et al., 2010; Ng, 2013; Taylor, 2015; Denovan et al., 2019; Kaya et al., 2019), moderate convergent validity with stressful life events (e.g., Mitchell et al., 2008), and good concurrent validity with mental health problems such as depression and anxiety (e.g., Örücü and Demir, 2009; Perera et al., 2017; Baik et al., 2019). (p. 2)

The Cronbach's alpha for the PSS-10 is .89 and the instrument was found to be a reliable tool for college students to self-report perceived stress in a non-clinical setting (Roberti et al., 2006).

How the PSS-10 is Administered and Scored. The PSS-10 is comprised of 10 Likert scale questions ranging from 0: never, 1: almost never 2: sometimes 3: fairly often 4: very often (Palkar et al., 2021). Questions one, two, three, six, nine, and 10 are referred to as Factor 1, or Perceived Helplessness and scoring is as follows 0 = 0, 1 = 1, 2 = 2, 3 = 3, 4 = 4 (Olpin & Hesson, 2021, Liu et al., 2020). Perceived Helplessness (i.e., Factor 1) questions are negatively phrased (e.g., "In the last month, how often have you felt nervous and stressed") (Liu et al., 2020, p. 3). Questions four, five, seven, and eight are referred to as Factor 2, or Perceived Self-Efficacy and are scored in reverse (i.e., 0: very often, 1 fairly often, 2: sometimes, 3: almost

never, 4: never) as these items are positively phrased (e.g., “In the last month, how often have you felt things were going your way”) (Liu et al., 2020, p. 3). According to Palkar et al. (2021):

> The PSS construct demonstrates a two-factor structure; the first being “general stressors” and the second being “the ability to cope”. The PSS score is obtained by summing the scores of all the items, with reverse coding for items 4, 5, 7, and 8 as they are positively stated. The PSS score ranges from 0 to 40, with the 40 point score representing the highest perceived stress level. The PSS determines the degree of stress experienced by the participant however it is not a diagnostic scale for anxiety or stress related disorders. (p. 11)

As noted earlier, questions four, five, seven, and eight on the PSS-10 are positively stated items and need to be scored in reverse (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0). “Individual scores on the PSS can range from 0 to 40, with higher scores indicting higher perceived stress” (Olpin & Hesson, 2021, p. 20). Scores between zero and 13 are indicated as low perceived stress, scores ranging between 14-26 are indicated as moderate perceived stress, and scores ranging between 27-40 are indicated as high perceived stress (Olpin & Hesson, 2021).

Physiological Variables

Data was manually collected and self-reported by students on physiological variables during pre-, mid-, and post-treatment assessments. Robinson (2018) explained that Walter Cannon’s research (1927) noted physical responses such as an increase in heart rate and respiration when subjects felt frightened or angry. Cannon attributed this response to the release of epinephrine and the fight or flight response (Robinson, 2018). Typical respiration rates are 12-16 breaths per minute, while typical heart rates for adults average 65-80 beats per minute (Olpin & Hesson, 2021). Chest breathers, otherwise known as thoracic breathers, tend to take shallow

breaths which is often activated during the fight or flight response. However, those who are diaphragmatic, or belly breathers are able to take in more oxygen per breath and are often able to activate the parasympathetic nervous system through this method of breathing (Olpin & Hesson, 2021).

Demographic Variables

A variety of demographic variables were included as part of data collection from the undergraduate students in the Qualtrics questionnaire. The variables selected are those that are noted in the literature to contribute to stress, or variables that have been found to be relevant to increased levels of stress in undergraduate students. Demographic variables noted in the literature are program of study (i.e., major), and gender. These variables are described in detail in Chapter 2. Additional demographic variables included in the study are age, race/ethnic background, year in school, first-generation college student, college varsity athletic status, number of siblings, employment status, income, expenses, financial support from parents, relationship status, number of dependents, level of physical activity, academic performance, and level of social support from peers, family, and faculty and staff.

Ranking Scale

During the posttreatment assessment, students were asked to rank the six coping strategies (i.e., yoga, PMR, power nap, gratitude journal, social support, mindfulness) in order from most effective (i.e., 1) to least effective (i.e., 6). Refer to Appendix B.3 for the Post-Treatment Assessment that includes the rank-order question as found in the Qualtrics Survey.

Data Collection

A short statement was provided in each course syllabus at the beginning of the semester regarding participation in the study (Appendix H). Informed consent was provided to the

participants and included in the Pre-Treatment Assessment on the Qualtrics survey (Appendix B.1). The author collected data on three separate occasions over the course of the Introduction to Stress Management course at the small, regional institution in the upper Midwest. The two Introduction to Stress Management courses were scheduled to meet on Mondays and Wednesdays for 50-minutes. Section one was offered from 9:00 – 9:50 a.m. and Section two was offered from 11:00 – 11:50 a.m. Data collection took place during weeks four, eight, and 13 of the Fall 2022 semester. Data from participants was collected using an online questionnaire gathered through use of a Qualtrics survey link provided in the Learning Management System (LMS) in the Introduction to Stress Management class. The institution of higher education is a laptop university, so all students had computer and internet access. The author was present on each of the three scheduled occasions to demonstrate and instruct the students on manual collection of the physiological variables, the PSS-10, and other questions included on the Qualtrics survey (e.g., familiarity with coping strategies, social support, ranking of coping strategies). Participants are identified by the last four digits of their cell phone number. All information was collected in person in the Introduction to Stress Management courses.

The current study obtained participant surveys on three occasions over the course of the semester, the pre-treatment assessment in week 4 of the semester, the mid-treatment assessment in week eight of the semester, and lastly the post-treatment assessment in week 13 of the semester. Each Qualtrics survey varied in information collected. See Appendix B for specific data collected in questionnaires.

Pre-treatment Assessment

The Pre-treatment assessment was provided to the students during week 4 of the semester (i.e., September 12th). The Qualtrics link was posted in the course Learning Management System

(LMS) and the author was present to demonstrate and instruct the students on manual collection of the physiological variables, the PSS-10, and other questions included on the Qualtrics survey including familiarity with the six coping strategies (e.g., yoga, Progressive Muscle Relaxation, power nap, gratitude journal, social support, mindfulness). Participants identified themselves by the last four digits of their cell phone number. All information was collected in person in the Introduction to Stress Management courses at the small, regional institution in the upper Midwest.

Demographic data included questions about gender, sex, age, race, year in school, program of study, first-generation college student, varsity athletic status, number of siblings, employment status, income, monthly expenses, financial support from parents, relationship status, children/dependents, current level of physical activity, social support, academic performance, and illness status (Appendix B.1).

Mid-treatment Assessment

The mid-treatment assessment was provided to the students during week eight of the semester (i.e., October 10th). The Qualtrics link was posted in the course Learning Management System (LMS) and the author was present to demonstrate and instruct the students on manual collection of the physiological variables, the PSS-10, and other questions included on the Qualtrics survey (e.g., relationship status, social support received from faculty/staff, peers, family, level of stress they feel today, any life changing event in the last month, recent illness, academic performance). Again, the students identified themselves by the last 4 digits of their cell phone number. All information was collected in person in the Introduction to Stress Management courses at the small, regional institution in the upper Midwest (Appendix B.2).

Post-treatment Assessment

The Qualtrics link was posted in the course Learning Management System (LMS) and the author was present to demonstrate and instruct the students on manual collection of the physiological data, the PSS-10, and other questions included on the Qualtrics questionnaire (e.g., relationship status, social support received from faculty/staff, peers, family, level of stress they feel today, any life changing event in the last month, recent illness, academic performance). Again, the participants identified themselves by the last 4 digits of their cell phone number. All information was collected in person in the Introduction to Stress Management courses at the small, regional institution in the upper Midwest.

The Post-treatment assessment was provided during week 13 of the semester (i.e., November 14th). By this time in the course all six coping strategies had been covered. Additional coping strategies were introduced after this point in the course, along with student-led class projects. The Qualtrics link was posted in the course Learning Management System (LMS) and the author was present to demonstrate and instruct the students on manual collection of the physiological variables, the PSS-10, a ranking scale for the preferred coping strategies and demographic questions to include: relationship status, social support received from faculty/staff, peers, family, level of stress they feel today, any life changing event in the last month, recent illness, academic performance, and whether they felt their stress level increased, decreased, or stayed the same over the course of the semester. There was one final open-ended question regarding the effectiveness of the coping strategies introduced during the semester, their effectiveness in stress management, and the probability of usage from the student going forward. Again, the participants identified themselves by the last 4 digits of cell phone number.

Data Analysis

Data analysis included descriptive statistics: measures of central tendency, measures of dispersion, frequencies, and percentages. Descriptive information was used for comparing pre-, mid-, and post-treatment assessments and for preferred adaptive coping strategies. Additionally, data analysis included a one-way ANOVA to determine any significant differences in perceived stress scores among undergraduate college students when comparing perceived stress (i.e., PSS-10 scale), and physiological variables before, during, and after coping strategies were introduced in the Introduction to Stress Management course at the small, regional institution in the upper Midwest. The author believed that the chance of using a parametric test decreased due to convenience sampling and the size of the sample and was prepared to use the Kruskal-Wallis non-parametric test.

Statistical Assumptions

"In order to run a one-way ANOVA, there are six assumptions that need to be considered" (Laerd, 2018, para. 1). Assumptions one through three relate to study design while four through six relate to how data fits the one-way ANOVA model (Laerd, 2018). According to Laerd (2018), the six assumptions include:

- Assumption 1. The dependent variable should be measured at the interval or ratio level
- Assumption 2: The dependent variable should consist of two or more categorical independent groups
- Assumption 3: There should be dependence of observations
- Assumption 4: There should be no significant outliers

- Assumption 5: The dependent variable should be approximately normally distributed for each category of the independent variable as well as the mean differences (i.e., pre- post-treatment data)
- Assumption 6: There should be homogeneity of variances

Once assumptions 1, 2, and 3 are confirmed, Assumptions 4, 5, and 6 can be checked using SPSS statistics (Laerd, 2018).

Table of Overall Research Alignment

Table 4 describes the alignment between the research questions and methods used in the current study.

Table 4

Table of Overall Research Alignment

Research (RQ) Questions & Hypothesis	Variables	Design	Instrument	Items	Statistical Analysis	Source
H0 There are no changes in Perceived Stress Scores (PSS-10) and physiological measures in undergraduate college students when comparing perceived stress before and after the Introduction to Stress Management course	H0 Dependent Variable PSS-10 Scores, physiological measures[1] (i.e., pre-, mid-, and post-treatment) H0 Independent Variable is the stress management course	Quasi-experimental	Qualtrics Questionnaire, Self-reported manual measurements for physiological data	DV Questionnaire items 3-5 (physiological), and 6-15 (PSS-10) on Pre-Treatment Assessment and 3-5 (physiological) and 6-15 (PSS-10) on Post-Treatment Assessment IV Pre, Mid-, and Post-treatment data identified by date as provided in Qualtrics	One-way ANOVA	Convenience Sample: Students in Introduction to Stress Management course
RQ1 How do Perceived Stress Scores (PSS-10) and physiological measures change in undergraduate students during a stress management course when comparing pre-, mid-, and post-treatment assessments?	RQ1 Dependent Variables: PSS-10 Stress Scores, physiological measures[1] on (i.e., pre-, mid-, and post-treatment) RQ1 Independent Variable is the stress management course	Quasi-experimental	Qualtrics Questionnaire Self-reported manual measurements for physiological data	Questionnaire items 3-5 (physiological), and 6-15 (PSS-10) on Pre-Treatment Assessment and 3-5 (physiological) and 6-15 (PSS-10) on Mid- and Post-Treatment Assessment Questionnaire item Post-Treatment data only	One-way ANOVA; Descriptive Statistics: measures of central tendency, measures of dispersion, frequencies & percentages	Convenience Sample: Students in Introduction to Stress Management course
RQ2 What are the preferred adaptive coping strategies provided throughout the semester that college students utilize to manage stress?	RQ2 Dependent Variable Preferred adaptive coping strategies (e.g.,	Quasi-experimental	Qualtrics Questionnaire	Questionnaire item DV# 24 IV Post-Treatment data only	Descriptive Statistics: measures of central tendency, measures of dispersion,	Convenience Sample: Students in Introduction to

Research (RQ) Questions & Hypothesis	Variables	Design	Instrument	Items	Statistical Analysis	Source
	mindfulness, yoga, PMR, power nap, gratitude journal, social support) IV the stress management course				frequencies, percentages, & rank order	Stress Management course
Secondary RQ						
RQ3 How do demographic factors impact the change in Perceived Stress Scores (PSS-10) and physiological variables among undergraduate students during a stress management course?	Dependent Variable Scores[1] from PSS-10 and physiological variables (i.e., pre-, mid-, and post-treatment) Independent Variables: Demographics (e.g., Gender, age, race, program of study, first-generation college student, athletic status, current level of physical activity)	Quasi-experimental	Qualtrics Questionnaire	Questionnaire items # 16-38 on Pre-Treatment Assessment, and 16-22 on Mid- and Post-Treatment Assessment	Descriptive Statistics: measures of central tendency, measures of dispersion, frequencies & percentages One-way ANOVA	Convenience Sample: Students in Introduction to Stress Management course

Note: This instrument is composed of a variety of demographic variables and the PSS-10 by Cohen et al., (1983).

[1] The scores (i.e., PSS-10), physiological variables (i.e., HR, breathing pattern, respiration rate)

Procedures

Students in Introduction to Stress Management class at a small, regional institution in the upper Midwest were notified during the first week of class regarding the current study being conducted (e.g., information posted in the course syllabus), then data was collected during class sessions over the course. As described under Data Collection, Pre-, Mid-, and Post-treatment assessments were administered during weeks four (i.e., September 12th), eight (i.e., October 10th), and 13 (i.e., November 14th) to students enrolled in an Introduction to Stress Management class. The researcher met face to face with participants for Pre-, Mid-, and Post-treatment assessments to discuss self-reporting and provided instruction on manual measurement of physiological variables. The PSS-10 is used to reflect on perceived stress over the course of the last month which is why it was utilized three times during the semester. Once questionnaire responses were received, results were compiled in Qualtrics and uploaded into SPSS for further analysis by the researcher.

Prior to the Fall of 2022 the author was a professor at the institution for 12 years and instructed courses in the Kinesiology and Human Performance (KHP) department. The author accepted a position at another institution of higher education beginning in the Fall of 2022. Prior to leaving, the author requested authorization to gain access to participants in the Introduction to Stress Management courses via the Vice President for Academic Affairs (VPAA) and the KHP department chair. Permission was granted. The author coordinated with the current qualified instructor of the Introduction to Stress Management courses to ensure face-to-face entry in the courses along with agreement to distribute the Qualtrics questionnaire survey link via the institutions learning management system (i.e., LMS). The researcher met with the current instructor regarding dates (e.g., weeks four, eight, thirteen) and data collection to ensure that the

instructor would follow content as outlined and agreed upon to provide treatment for the six coping strategies (i.e., yoga, Progressive Muscle Relaxation, power nap, gratitude journal, social support, mindfulness). The researcher was present in order to guide the students for all data collection.

Ethical Considerations

Participants were students enrolled in an Introduction to Stress Management course at a small, regional institution in the upper Midwest. All students in the course used the PSS-10 scale to assess perceived stress levels during the course, but those who agreed to participate in the study were assessed three times throughout the course. Using a rank order scale following the PSS allowed for collection of data regarding adaptive coping mechanisms introduced in the Introduction to Stress Management course and practiced throughout the semester by the participants. There was no harm or discomfort for the participants. Questions asked of participants were not expected to trigger any emotional or psychological discomfort.

Participants were provided an informed letter of consent (Appendix D) for their review electronically in which they agreed to participate or deny participation with no ramifications. Confidentiality was assured as the researcher does not have access to the participants cell phone numbers. The participants identified themselves by the last four digits of their cell phone number. Information from the questionnaire was not shared with other individuals. Participants' identity was kept anonymous. All individual information was tracked under an identification number (e.g., last four digits of cell phone number) and submitted anonymously. In this case participants used their cell phone number for ease of use. Information regarding informed consent can be found in Chapter 1 and in Appendix D. The author underwent training through the Collaborative Institutional Training Initiative (CITI) Program in Social &

Behavioral Research (Appendix E).

Considering participants were college students, all were of legal age (i.e., 18) in North Dakota. However, participants were able to drop out of the study at any time as explained in the Consent Form.

Subjects were identified by codes that did not link them to the study. Data collected will be kept on a secured laptop and information will be destroyed after 3 years.
This research included assessing perceived stress levels in undergraduate college students and their preferred adaptive coping mechanisms, which is a major focus in the Introduction to Stress Management course. This study did not adversely impact students' opportunity to learn required educational content or impact the assessment of educators who provided instruction.

Conclusions

This chapter contained the methodology for the research study. The chapter began by restating the research questions and hypothesis of the study followed by the details of the research design. The threats to internal validity are addressed for a quasi-experimental study that utilized a one group pre-test-post-test. The setting and participants are described in detail to provide the audience with a thorough description of factors affecting the study. Sampling procedures are detailed as the researcher is no longer employed by the institution of higher education in which the study took place. The pre-, mid-, and post-treatment assessments are clarified and information on instruments used are provided. Specifics on the PSS-10 and its scoring are included along with the instrument’s validity. All variables of the study are outlined and include physiological variables, demographic variables, and the ranking scale. Data collection and data analysis are outlined and includes specifics on statistical assumptions. The Table of Overall Research Alignment provides a summary of all variables, instruments, and

statistical analyses. Finally, the chapter concludes with procedures and ethical considerations taken by the author. Chapter 4 will provide the results from the study.

CHAPTER 4 RESULTS

This study measured physiological and psychological variables of undergraduate students, specifically resting heart rate, respiration rate breathing patterns, and perceived stress during a semester-long Introduction to Stress Management course at a small, regional institution in the upper Midwest. In addition, the study analyzed the effectiveness of six adaptive coping strategies in order of most to least effective for mitigating stress (e.g., power nap, social support, mindfulness, yoga, gratitude journaling, progressive muscle relaxation). This chapter highlights characteristics of the participants who took part in the study, including the participant demographic variables and their impact on perceived stress over the course of the semester.

The researcher implemented a positivist paradigm, realist ontology, and objectivist epistemology. Information presented in Chapter 4 includes findings from the quasi experimental, quantitative study. The chapter provides a brief summary of the purpose of the study, and data supporting the two primary research questions and one secondary research question, along with demographic information on the participants.

Purpose of the Study

The purpose of this study was to determine if college students' Perceived Stress Scores (PSS-10) and physiological variables changed during an Introduction to Stress Management course and to identify participant's preferred adaptive coping strategies utilized to manage stress. This study collected data on students' perceived stress and physiological variables before, during, and after the treatment (i.e., six adaptive coping strategies) which were introduced during the Introduction to Stress Management course. Demographic information was collected on participants along with basic physiological variables during pre-, mid-, and post-treatment assessments including resting heart rate, respiration rate, and breathing patterns. The

physiological variables aided in providing a measure of stress-related physiological responses. Due to a decreased number of participant responses from the mid-treatment assessment (i.e., 28) the researcher compared results from pre- to post-treatment assessments. Analysis of data is presented in this chapter.

Pilot Study

A pilot study was conducted on a group of doctoral students in July, approximately two months before the survey was sent to the study participants. The Pre-Treatment Assessment was sent to a group of 27 doctoral students, and the Post-Treatment Assessment was sent to a different group of 27 other doctoral students. See copies of emails sent in Appendix I.

Changes to Pre-, Mid-, and Post-Treatment Assessments After the Pilot Study

Feedback from the pilot study suggested confusion with the scoring of the PSS-10 scale, specifically, the positively stated questions in which stress is not an issue (i.e., Qualtrics items 9,10, 12, 13; PSS-10 items 4, 5, 7, 8) As stated in Chapter 3, questions four, five, seven, and eight are referred to as Factor 2, or Perceived Self-Efficacy and are scored in reverse (i.e., 0: very often, 1 fairly often, 2: sometimes, 3: almost never, 4: never) as these items are positively phrased (e.g., “In the last month, how often have you felt things were going your way”) (Liu et al., 2020, p. 3). After the researcher received feedback on the pilot study, it was determined that the best option was to remove the reverse scoring option and have the researcher manually reverse the scores during data analysis in SPSS. These changes were made in the Pre-, Mid-, and Post-Treatment Assessment surveys. Changes pertaining to the Pre-, Mid-, and Post-Treatment Assessments following the pilot study are summarized in Appendices J-L.

Research Questions and Hypotheses

Primary Research Questions

The primary research questions for this study address the topics of perceived stress and coping strategies.

1. How do Perceived Stress Scores (PSS-10) and physiological measures change in undergraduate students during a stress management course when comparing pre, mid-, and post-treatment assessments?
2. What are the preferred adaptive coping strategies provided throughout the semester that college students utilize to manage stress?

Secondary Research Question

The secondary research question addresses demographics.

3. How do demographic factors impact the change in Perceived Stress Scores (PSS-10) and physiological measures among undergraduate students during a stress management course?

Hypotheses

The null and alternative hypotheses for this study are as follows:

H0: There are no changes in perceived stress scores (PSS-10) and physiological measures in undergraduate college students when comparing perceived stress before and after the Introduction to Stress Management course.

H1: There are changes in Post-Test Perceived Stress Scores (PSS-10) and physiological measures among undergraduate college students when comparing perceived stress before and after the Introduction to Stress Management course.

Participants

Participants in two face-to-face sections of an Introduction to Stress Management course were invited to participate in the current research study. As mentioned in Chapter 3, participants were chosen using a non-random convenience sampling method. Only those participants who volunteered participated in the study at a small, regional institution in the upper Midwest. There were not enough participants to utilize a random sample. A total of 41 students participated in the study; 41 participants completed the pre-treatment assessment, and 30 participants completed the post-treatment assessment. The following demographics are arranged into several tables (i.e., personal, school, academics, social wellness, family, income) that represent the 41 participants who began the study. The comparisons following the demographics will compare only the 30 individuals with complete data in the pre- and post-treatment assessments. As reported in Table 5, of the 41 total participants, 21 (51.2%) were men, 18 (43.9%) were women, one (2.4%) preferred not to say, and one reported non-binary/third gender (2.4%). When disaggregated by race/ethnicity, the sample was composed of primarily White/Caucasian students (87.8%).

Table 5

Personal Demographics

Participant Characteristic	*n*	Total %	Men	% Men	Women	%Women
Gender						
Men	21	51.2%	21	100.0%	19	90.4%
Women	18	43.9%	-	-	-	-
Non-binary/third gender	1	2.4%	-	-	-	-
Prefer not to say	1	2.4%	-	-	-	-
Total	41	100.0%	-	-	-	-
Race/Ethnicity						
African American/Black	2	5.0%	2	100.0%	0	0%
Native-Hawaiian or Pacific Islander	1	2.4%	1	100.0%	0	0%

Participant Characteristic	*n*	Total %	Men	% Men	Women	%Women
White/Caucasian	36	87.8%	16	76.2%	19	100%
Mixed White and Black	1	2.4%	1	100.0%	0	0%
White and Hispanic	1	2.4%	1	100.0%	0	0%
Total	41	100.0%	21	-	19	0%

Note. n = total number of participants.

Table 6 provides data regarding specific school demographic variables including age, year in school, athletic status, and first-generation college student status. Of the 41 participants, 14 (34%) were 18 years of age, 11 (27%) were 19, 7 (17%) were 20, 5 (12%) were 21, 3 (7%) were 22, and one student reported 26 years of age. Fifty-one percent were student athletes and 12% were first generation college students. Most participants reported their age as 18 (34.1%) and 19 (26.8%) with 19.46 (*Mdn* = 19.00, *SD* = 1.65) as the mean age of all participants. These percentages showed that approximately 61% of the students enrolled were underclassmen (i.e., first-year, sophomores). The mean age of men was 20.05 (*SD* = 1.86) and the mean age of women was 18.84 (*SD* = 1.17). More men (19%) were first-generation college students than women (5.3%). Less than half (31.6%) of the women were college athletes compared to the men participants (66.7%).

Table 6

School Demographics

Demographic Categories	*n*	Total %	Men	% Men	Women	% Women
Age						
18	14	34.1%	4	28.6%	10	71.4%
19	11	26.8%	5	45.5%	5	45.5%
20	7	17.1%	5	71.4%	2	28.6%
21	5	12.2%	4	80.0%	1	20%
22	3	7.3%	2	66.6%	1	33.3%
26	1	2.4%	1	100.0%	0	0.0%
Total	41	100.0%	21	-	19	-
Year in School						

Demographic Categories	*n*	Total %	Men	% Men	Women	% Women
1st	16	39.0%	4	25.0%	12	75.0%
2nd	11	27.0%	7	63.3%	3	27.3%
3rd	9	22.0%	7	77.8%	2	22.2%
4th	3	7.0%	2	66.7%	1	33.3%
5th	2	5.0%	1	50.0%	1	50.0%
Total	41	100.0%	21	-	19	-
Athletic Status						
Collegiate Athlete	21	51.0%	14	66.7%	6	28.5%
Non -Athlete	20	49.0%	7	35.0%	13	65.0%
Total	41	100.0%	21	-	19	-
First-Generation College Status						
First-Gen Student	5	12.0%	4	80.0%	1	20.0%
Not First-Gen Student	36	88.0%	17	47.2%	18	50.0%
Total	41	100.0%	21	-	19	-

Note. The participant who preferred not to identify sex is an athlete, 19 years of age, in their 2nd year of school, and is not a first-generation college student.

Table 7 provides academic demographic information on the students self-reported academic performance and major. Students disclosed their average academic performance in all classes, in which 37 (90.2%) report being ‘A’ or ‘B’ students. More women (64.7%) chose ‘A’ student performance compared with men (41.5%). Approximately 12 students (29.3%) were majors in the Kinesiology and Human Performance department, while the remaining 29 (70.7%) were students in other majors (see Table 7).

Table 7

Academic Demographics

Demographic Categories	*n*	Total %	Men	% Men	Women	% Women
Academic Performance						
‘A’ Student	17	41.5%	5	29.4%	11	64.7%
‘B’ Student	20	48.8%	13	65.0%	7	35.0%

Demographic Categories	*n*	Total %	Men	% Men	Women	% Women
'C' Student	4	9.8%	3	75.0%	1	25.0%
'D' Student	0	0.0%	0	0.0%	0	0.0%
'F' Student	0	0.0%	0	0.0%	0	0.0%
Total	41	100.0%	21	51.2%	19	46.3%
Major						
Biology	1	2.4%	0	0.0%	0	0.0%
Business	8	20.0%	4	50.0%	4	50.0%
Communication	1	2.4%	0	0.0%	1	100.0%
Education	10	24.0%	5	50.0%	5	100.0%
Education: Health & Physical*	5	12.0%	4	80.0%	1	20.0%
Education: Math	1	2.4%	0	0.0%	1	100.0%
Education: Music	1	2.4%	0	0.0%	1	100.0%
Ex Sci & Rehab Studies*	2	5.0%	1	50.0%	1	50.0%
Health Science	2	5.0%	0	0.0%	2	100.0%
Human Services	1	2.4%	0	0.0%	1	100.0%
Music	1	2.4%	1	100.0%	0	0.0%
Psychology	1	2.4%	0	0.0%	1	100.0%
Psychology, Human Services	1	2.4%	0	0.0%	1	100.0%
Sport Management*	4	10.0%	4	100.0%	0	0.0%
Strength & Conditioning*	1	2.4%	1	100.0%	0	0.0%
Undecided	1	2.4%	1	100.0%	0	0.0%
Total	41	100%	21	-	19	-

Note. *n* = total number of participants. * Denotes participants from majors in the Kinesiology & Human Performance (KHP) department.

Table 8 includes social wellness demographics with self-reported information on average hours of sleep each night, physical activity levels, and relationship status. Most participants (*n* = 17; 41.5%) reported sleeping seven hours a night, while only four (9.8%) reported sleeping five hours. Most participants in the study (*n* = 28; 68.3%) reported meeting minimum physical activity guidelines of 150 minutes or more of moderate-intensity physical activity each week. Men reported higher levels of physical activity (*n* = 14; 73.7%) than women (*n* = 4; 21.1%), which seemed to closely match the percentage of men (*n* = 14; 66.7%) vs. women (*n* = 6; 28.5%)

who identified themselves as college athletes. Most participants (70.7%) also reported being single.

Table 8

Social Wellness Demographics

Demographic Categories	*n*	Total %	Men	% Men	Women	% Women
Hours of Sleep						
5	4	9.8%	3	75.0%	1	25.0%
6	7	17.1%	3	42.9%	4	57.1%
7	17	41.5%	10	58.8%	7	41.2%
8	8	19.5%	2	25.0%	5	62.5%
9	5	12.2%	3	60.0%	2	40.0%
Total	41	100.0%	21	-	19	-
Physical Activity						
No Physical Activity	3	7.3%	1	33.3%	2	66.7%
150 min/week (moderate)	9	22.0%	3	33.3%	6	66.7%
<150 min/week (moderate)	10	24.4%	3	30.0%	7	70.0%
>150 min/week (moderate)	19	46.3%	14	73.7%	4	21.1%
Total	41	100.0%	21	-	19	-
Relationship Status						
Single	29	70.7%	14	48.3%	14	48.3%
In a Relationship	11	26.8%	6	54.5%	5	45.5%
Living with Partner	1	2.4%	1	100.0%	0	0.0%
Total	41	100.0%	21	-	19	-

Note. n = total number of participants. One participant who preferred not to identify sex reported eight hours of sleep, > 150 min/week of moderate-intensity activity, and they were single.

Table 9 presents demographics regarding family. One participant (2.4%) reported having a child or dependent. Twelve participants (29%) reported having one sibling, while 11 (27%) reported having two siblings.

Table 9

Family Demographics

Demographic Categories	*n*	Total %	Men	% Men	Women	% Women
Children/Dependents						
0	40	97.6%	20	50.0%	19	47.5%
1	1	2.4%	1	100.0%	0	0.0%
Total	41	100.0%	21	-	19	-
Number of Siblings						
0	2	5.0%	1	50.0%	1	50.0%
1	12	29.0%	6	50.0%	6	50.0%
2	11	27.0%	5	45.5%	6	54.5%
3	7	17.1%	2	28.6%	5	71.4%
4	1	2.4%	1	100.0%	0	0.0%
5	1	2.4%	0	0.0%	1	100.0%
6	3	7.0%	3	100.0%	0	0.0%
Missing	4	9.8%	3	75.0%	0	0.0%
Total	41	100.0%	21	-	19	-

Note. n = total number of participants. One participant who preferred not to identify sex reported no children/dependents and did not report information regarding number of siblings along with three men participants.

Demographic information represented in Table 10 includes participant information on income and employment status. Most participants (n = 24; 58.5%) reported incomes of less than $9,999, while five (12.2%) reported $0. Twenty-four participants (58.5%) reported working part-time during the school year, while 15 (36.6%) reported not working during the school year. Twenty participants (48.9%) reported that their income covers 50% or less of the cost of school, and 16 participants (39%) reported that their parents pay for 51% or more of the cost of school. When comparing men and women, 11 (73.3%) men do not work at all during the school year compared with only four (26.7%) women. More women (n = 15; 62.5%) reported working at least part-time during the school year. The percentage of income that covered the cost of school varied when comparing men and women. The means were 61.05% and 49.89%, respectively.

When comparing the percentage of school costs that the participant's parents covered, the difference was relatively low (*M* = 1.93) with women reporting slightly higher financial support (48.26%) received from parents compared with men (46.33%). Three participants (e.g., men) did not report financial information regarding the percentage of school costs covered by their income or their parent's income, and one participant who preferred not to identify sex selected less than $9,999 for income, part-time work status during the school year, and their parents covered 0% of costs associated with school.

Table 10

Income Demographics

Demographic Categories	*n*	Total %	Men	% Men	Women	% Women
Employment Status						
Do Not Work During School	15	36.6%	11	73.3%	4	26.7%
Work Part-time During School	24	58.5%	8	33.3%	15	62.5%
Work Full-time During School	2	4.9%	2	100.0%	0	0.0%
Total	41	100.0%	21	-	19	-
Income						
$0	5	12.2%	4	80.0%	1	20.0%
< $9,999	24	58.5%	9	37.5%	14	58.3%
$10,000 - $19,000	4	9.8%	2	50.0%	2	50.0%
I do not know	7	17.1%	5	71.4%	2	28.6%
Missing	1	2.4%	1	100.0%	0	0.0%
Total	41	100.0%	21	-	19	-
% Of School Cost Covered by Income						
<25%	7	17.1%	3	42.9%	4	57.1%
25-50%	13	31.7%	6	46.2%	7	54%
51-75%	6	14.6%	3	50.0%	3	50.0%
76-100%	12	29.3%	7	58.3%	4	33.3%
Missing	3	7.3%	2	66.7%	1	33.3%
Total	38	100.0%	21		19	

Demographic Categories	*n*	Total %	Men	% Men	Women	% Women
% Of School Cost Covered by Parents						
<25%	13	32.0%	5	38.5%	7	53.8%
25-50%	9	22.0%	6	66.7%	3	33.3%
51-75%	6	15.0%	2	33.3%	4	66.7%
76-100%	10	24.0%	5	50.0%	5	50.0%
Missing	3	7.0%	3	100.0%	0	0.0%
Total	38	100	21	-	19	-

Note. n = total number of participants.

Demographic information represented in Table 11 includes information on income and employment status, split by athletic status. Thirteen athletes (61.9%) reported incomes of less than $9,999, while two (9.5%) reported $0, which closely matched participants who were non-athletes. Ten athletes (47.6%) reported working part-time during the school year, while 11 (52.4%) athletes reported not working during the school year. When comparing non-athletes, 14 (70%) reported working part-time and two (10%) non-athletes reported working full-time during the school year. Eleven athletes (52.4%) reported that their income covers 50% or less of the cost of school, and 10 athletes (47.6%) reported that their parents pay for 51% or more of the cost of school. When comparing athletes and non-athletes, 11 (52.4%) athletes do not work at all during the school year compared to only 4 (20%) non-athletes.

Table 11

Income Demographics – Split by Athletic Status

Demographic Categories	*n*	Total %	Athlete	% Athlete	Non-Athlete	% Non-Athlete
Income						
$0	5	12.2%	2	9.5%	3	15%
< $9,999	24	58.5%	13	61.9%	11	55%
$10,000 - $19,000	4	9.8%	1	4.8%	3	15%
I do not know	7	17.1%	4	19.0%	3	15%
Missing	1	2.4%	1	4.8%	0	0
Total	41	100%	21	100%	20	100%

Demographic Categories	*n*	Total %	Athlete	% Athlete	Non-Athlete	% Non-Athlete
% of School Cost Covered by Income						
<25%	7	17.1%	3	14.3%	4	20%
25-50%	13	31.7%	8	38.1%	5	25%
51-75%	6	14.6%	2	9.5%	4	20%
76-100%	12	29.3%	6	28.6%	6	30%
Missing	3	7.3%	2	9.5%	1	5%
Total	41	100%	21	100%	20	100%
% of School Cost Covered by Parents						
<25%	13	31.7%	4	19%	9	45%
25-50%	9	22%	6	28.6%	3	15%
51-75%	6	14.6%	3	14.3%	3	15%
76-100%	10	24.4%	7	33.3%	3	15%
Missing	3	7.3%	1	4.8%	2	10%
Total	41	100%	21	100%	20	100%
Employment Status						
Do Not Work During School	15	36.6%	11	52.4%	4	20%
Work Part-time During School	24	58.5%	10	47.6%	14	70%
Work Full-time During School	2	4.9%	0	0%	2	10%
Total	41	100%	21	100%	20	100%

The overall participant characteristic included Caucasian (*n* = 36; 87.8%), traditional-aged college students (i.e., 18-21) (*n* = 40; 97.6%), of which approximately half (*n* = 21; 51%) were collegiate athletes and men (*n* = 21; 51.2%). The majority of participants (*n* = 37; 90.3%) considered themselves ‘A’ or ‘B’ students, were single (*n* = 29; 71%), slept at least 7 hours (*n* = 30; 73.7%), met minimum recommendations for moderate-intensity physical activity guidelines of 150-minutes (*n* = 28; 68%), reported incomes of less than $9,999 (*n* = 29; 71%), and had half or less of the cost of school covered by their parents (*n* = 22; 54%).

Research Question 1: How do Perceived Stress Scores (PSS-10) and physiological measures change in undergraduate students during a stress management course when comparing pre, mid-, and post-treatment assessments?

Participants were asked to complete three questionnaires over the course of 14 weeks during the fall 2022 semester in an Introduction to Stress Management course. Included on each questionnaire were physiological variable measurements and the PSS-10. Due to participant response rates, the researcher opted to address only the pre- and post-treatment assessments to meet the recommended sample size of 30 participants for experimental studies (Fraenkel, et al., 2019). As described in Chapter 3, physiological variables (e.g., resting heart rate, respiration rate, breathing pattern) were measured in class. The PSS-10 consisted of 10 questions on a Likert scale. Scores were totaled for each participant with ranges indicating three different levels of perceived stress as illustrated in Table 12:

Table 12

Indicated Levels of Perceived Stress

PSS-10 Score	Perceived Stress
0-13	Low
14-26	Moderate
27-40	High

Table 13 provides information regarding the mean, median, and standard deviation values of the stress variables for the participants in the Introduction to Stress Management course in the fall of 2022. The total stress variable was composed of the PSS-10, resting heart rate (RHR), respiratory rate, and breathing pattern, which when combined form the total stress score. The PSS-10 is the only instrument that had a reliability coefficient (e.g., Cronbach's alpha) as other methods of physiological variables were collected manually by each participant.

Table 13

Descriptive Statistics for Dependent Variable

	Mean			Median		SD		Reliability α
	Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	
PSS-10 Perceived Stress Score	16.10	15.50	0.60	16.50	14.50	6.14	6.80	0.89
RHR	72.93	70.47	2.53	74.00	67.00	15.19	14.39	-
Respiratory Rate	15.07	14.20	0.87	15.00	13.00	3.81	4.18	-
Breathing Pattern	1.93	1.77	0.16	2.00	2.00	.52	.57	-
Total Physiological Score (i.e., Sum of Resting HR, Respiratory Rate, Breathing Pattern)	89.93	86.43	3.5	90.50	84.50	16.43	15.53	-
Total Stress Score (i.e., Sum of PSS-10, total Physiological score)	106.03	101.93	4.10	111.00	104.00	19.82	19.14	-

Note: Scores on the PSS-10 indicate low (0-13), moderate (14-26), or high (27-40) perceived stress levels. The PSS-10 was found to be a reliable tool for college students to self-report perceived stress in a non-clinical setting (Roberti et al., 2006).

Pre- and Post-treatment values are summarized in Table 14 for the PSS-10 and physiological variables (e.g., resting heart rate, respiration rate, breathing pattern). Note that PSS-10 scores increased (n = 3; 10.0%) in the 0-13 range which constitutes low-perceived stress. The 27-40 range (i.e., high perceived stress) also increased (n = 1; 3.3%) by one participant on the post-treatment assessment. The moderate stress level, ranging from 14-26 on the PSS-10 decreased (n = 4; -13.3%) from the pre- to post- treatment assessment. As reported in Table 14, resting heart rate (RHR) values increased from the pre- to post-treatment assessment, however, respiration rates decreased overall. One participant (3.3%) reported a PSS-10 score higher than 27 (e.g., high perceived stress level) on the pre-treatment assessment and two (6.7%) participants on the post-treatment assessment.

Table 14

Stress Variables Pre- to Post-Treatment Assessment

Assessment	Pre *n* (%)	Post *n* (%)	Difference *n (%)*
PSS-10			
0-13 Low	10 (33.3)	13 (43.3%)	3 (10%)
14-26 Moderate	19 (63.3%)	15 (50.0%)	-4 (13.3%)
27-40 High	1 (3.3%)	2 (6.7%)	1 (3.3%)
Total	30 (100.0%)	30 (100.0%)	-
RHR			
<65 bpm	12 (40.0%)	13 (43.3%)	+1 (3.3%)
65-80 bpm	10 (33.3%)	7 (23.3%)	-3 (-10.0%)
81-100 bpm	8 (26.7%)	10 (33.3%)	+2 (6.7%)
Total	30 (100.0%)	30 (100.0%)	-
Respiration Rate			
<12	5 (16.7%)	8 (26.7%)	+3 (10.0%)
12-16	13 (43.3%)	14 (46.7%)	+1 (3.3%)
≥16	12 (40.0%)	8 (26.7%)	-4 (-13.3%)
Total	30 (100.0%)	30 (100.0%)	-
Breathing Pattern			
Belly	5 (16.7%)	9 (29.0%)	+4 (13.3%)
Chest & Belly	22 (73.3%)	19 (64.5%)	-3 (10.0%)
Chest	3 (10.0%)	2 (6.5%)	-1 (3.3%)
Total	30 (100.0%)	30 (100.0%)	-

Note. Resting heart rate is abbreviated to RHR, bpm indicates beats per minute. Respiration rates are expressed in breaths per minute.

In summary, the mean of all stress variables decreased from pre- to post-treatment assessments. The Perceived stress (i.e., PSS-10) scores decreased (M = .60), resting heart rates (i.e., RHR) decreased in beats per minute (bpm) (M = 2.53), respiratory rates decreased in breaths per minute (bpm) (M = 0.87), and breathing patterns shifted as less participants became chest breathers and more became belly breathers. Breathing pattern was coded to reflect the physiological stress response, with belly breathers receiving a "1," chest and belly breathers receiving a "2" and chest breathers receiving a "3." Breathing patterns were impacted as participants received treatment over the course of the semester; more people (n = 3; 9.7%)

became belly breathers and less (*n* = 1; 3.2%) became chest breathers as compared to chest only in the pre-treatment assessment. Decreased respiration rates and breathing patterns that include more abdominal (i.e., diaphragmatic) breathing indicate decreased physiological stress levels. Overall, the total stress score decreased; the stress score is a combination of the physiological variables and the PSS-10 scores.

H0: There are no changes in perceived stress scores (PSS-10) and physiological measures in undergraduate college students when comparing perceived stress before and after the Introduction to Stress Management course.

H1: There are changes in Post-Test Perceived Stress Scores (PSS-10) and physiological measures among undergraduate college students when comparing perceived stress before and after the Introduction to Stress Management course.

As reported in Chapter 3 (pp. 79, 80), the researcher planned to complete a one-way ANOVA, however, due to obtaining only 30 participants with complete pre-/post-treatment sets of data, the researcher had to compare the means of two groups instead of three.

Two Group Mean Comparison – Checking Assumptions for T-Test for Total Stress Score Difference from Pre- to Post Assessment

A report of the procedure to check for the statistical assumptions for the paired samples t-test (i.e., dependent samples t-test) is listed below. According to Laerd Statistics (2016), the assumptions for the dependent samples t-test are as follows:

- Assumption 1: The dependent variable (DV) was measured on a continuous scale (i.e., ratio or interval). The assumption was met. The DV was the total stress score, which consisted of a combination of participant scores from the Perceived Stress Scale (i.e., PSS-10), and physiological variables comprised of resting heart rate, respiration rate, and

breathing pattern. Each of these variables are described in Chapter 3 (pp. 72, 73). The PSS-10 is comprised of 10 Likert scale questions with five answer choices ranging from 0: never, 1: almost never 2: sometimes 3: fairly often and 4: very often (Palkar et al., 2021). Resting heart rates average between 65-80 beats per minute for adults and typical respiration rates are 12-16 breaths per minute (Olpin & Hesson, 2021). Breathing patterns were coded based on the following: 1: belly breathing, 2: chest and belly breathing, 3: chest breathing only. The data collection procedure is described in detail beginning on page 73 in Chapter 3.

- Assumption 2: The independent variable (IV) was categorical with two related groups. The independent variable was nominal (i.e., participation in Introduction to Stress Management course). The Wilcoxon-signed rank test used two groups (e.g., pre-, post-test) of the same individuals, before receiving treatment and after receiving treatment. The assumption was met.
- Assumption 3: The distribution of differences in the dependent variable between the two related groups should be approximately normally distributed. The assumption was met. The researcher checked for assumptions and data on two variables and found the assumption of normality was met and both variables were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$) (see Table 15) (Laerd Statistics, 2016). Distribution of pre- and post-treatment difference scores for the 30 participants are shown in Figure 4.

Table 15

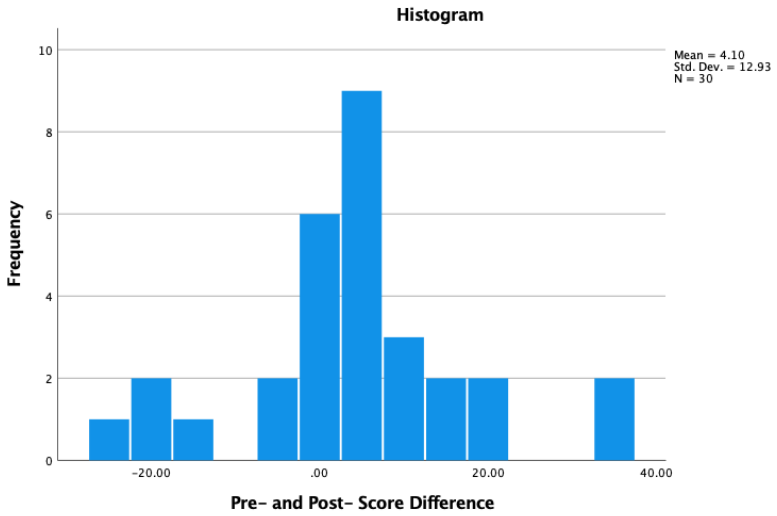
Normality Criteria for Total Stress Scores

Instrument: Sum of PSS-10 and Total Physiological Stress Score	Skewness	Kurtosis	Shapiro-Wilk Significance Level
Score Difference Pre- and Post-Treatment	.072	1.111	.163

Note. The Shapiro-Wilk test of normality was used to determine normality due to the sample size (i.e., lower than 50).

Figure 4

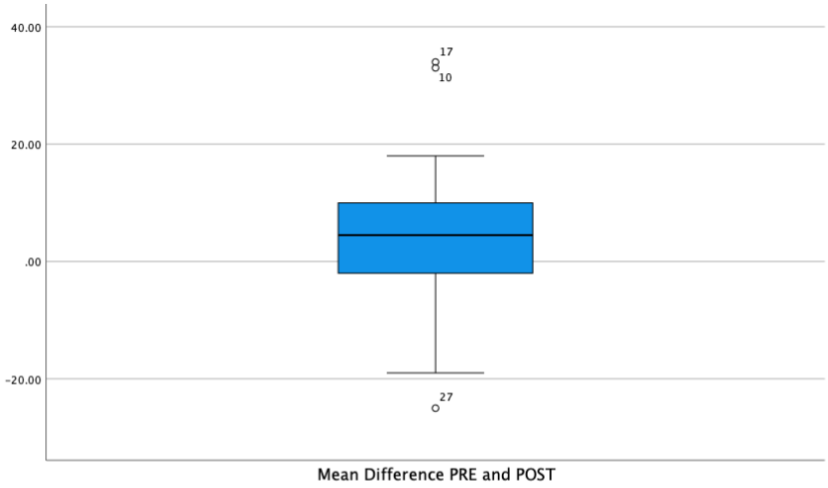
Pre- and Post-Treatment Score Difference for Participants



- Assumption 4: There should be no significant outliers in the pre- and post-treatment scores mean differences. The assumption was not met (see Figure 5). The researcher opted to keep the three outliers due to the sample size of 30 participants and used a non-parametric test (i.e., Wilcoxon-signed rank test) to compare the pre- and post-treatment scores.

Figure 5

Pre- Post-Treatment Mean Difference Participants Score Distribution Boxplot



Null Hypothesis Testing

A Wilcoxon-signed rank test was conducted to determine whether there was a median difference between the participants' pre- and post-treatment total stress scores. As displayed in Table 16, the significance of .045 (2-sided *p*) was reported which indicated that the treatment (e.g., coping strategies) provided in the Introduction to Stress Management course impacted participants' post-treatment total stress scores. It was concluded that the scores decreased and consequently the null hypothesis was rejected.

Table 16

Wilcoxon-Signed Rank Test

	Median Difference	*Z*	Sig. 2-Sided	Decision
Total Stress Score Pre- Minus Post-Treatment	5.5	2.005	.045	Reject the null hypothesis

The Wilcoxon-signed rank test indicated that there was a statistically significant median decrease in the post-treatment total stress score (*Mdn* = 104.0, *n* = 30) from the pre-total stress score (*Mdn* = 109.5, *n* = 30), *z* = 115.0, *p* < .05, *r* = 0.37. As stated previously, the null hypothesis was rejected, and the alternative hypothesis was accepted showing that participants total stress scores (i.e., sum of PSS-10, physiological variables) moderately decreased over the course of the semester when comparing pre- and post-treatment assessments.

Two Group Mean Comparison – Checking Assumptions for T-Test for Difference in PSS-10 Score Pre- to Post-Treatment Assessment

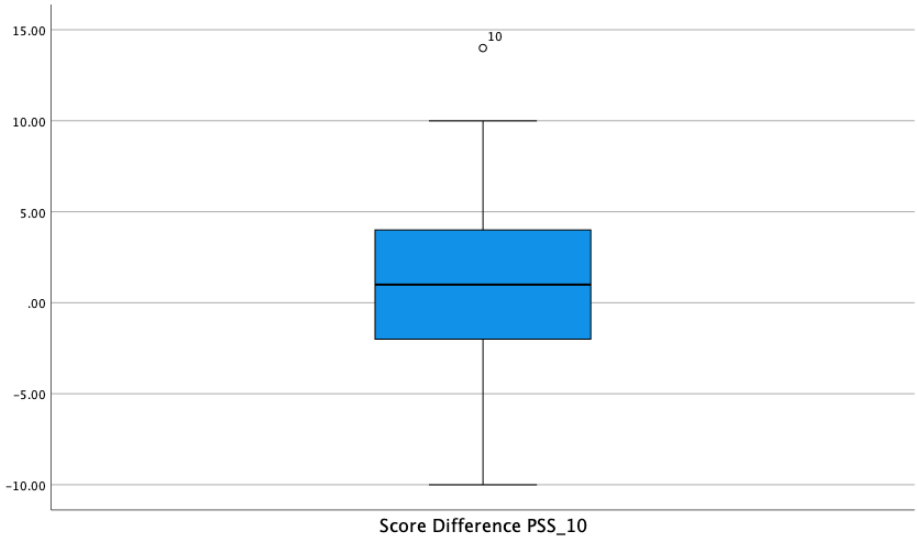
A report of the procedure to check for the statistical assumptions for the paired samples t-test (i.e., dependent samples t-test) is listed below. According to Laerd Statistics (2016), the assumptions for the dependent samples t-test are as follows:

- Assumption 1: The dependent variable (DV) was measured on a continuous scale (i.e., ratio or interval). The assumption was met. The DV was the PSS-10 score. The PSS-10 is comprised of 10 Likert scale questions with five answer choices ranging from 0: never, 1: almost never 2: sometimes 3: fairly often and 4: very often (Palkar et al., 2021) The PSS-10 items yield a total PSS-10 score that ranges from 0-40, with a score of 40 representing the highest level of perceived stress (Palkar et al. (2021).
- Assumption 2: The independent variable (IV) was categorical with two related groups. The assumption was met. The independent variable was nominal (i.e., participation in Introduction to Stress Management course). The paired samples t-test used two groups (e.g., pre-, post-treatment) of the same individuals, before receiving treatment and after receiving treatment.

- Assumption 3: There should be no significant outliers in the distribution of score differences between the two related groups. The assumption was not met; there were outliers in the data (see Figure 6).

Figure 6

Post-PSS-10 Score Difference Distribution Boxplot



No additional assumptions were explored and the decision to use a non-parametric (i.e., Wilcoxon-signed rank test) test was made. Due to the number of participants that completed the pre- and post-treatment PSS-10 (i.e., 30) the researcher decided to keep the outlier.

A Wilcoxon-signed rank test was conducted to determine whether there was a difference between the participants' pre- and post-treatment PSS-10 scores. As displayed in Table 17, the significance of .468 (2-sided *p*) was reported, consequently the null hypothesis must be retained, indicating that the median difference of pre- to post-treatment PSS-10 scores did not significantly decrease from the pre-treatment PSS-10 (*Mdn* = 16.1, *n* = 30) to the post-treatment PSS-10 (*Mdn* = 15.5, *n* = 30), *z* = 0.73, *p* = .468, r = 0.132.

Table 17

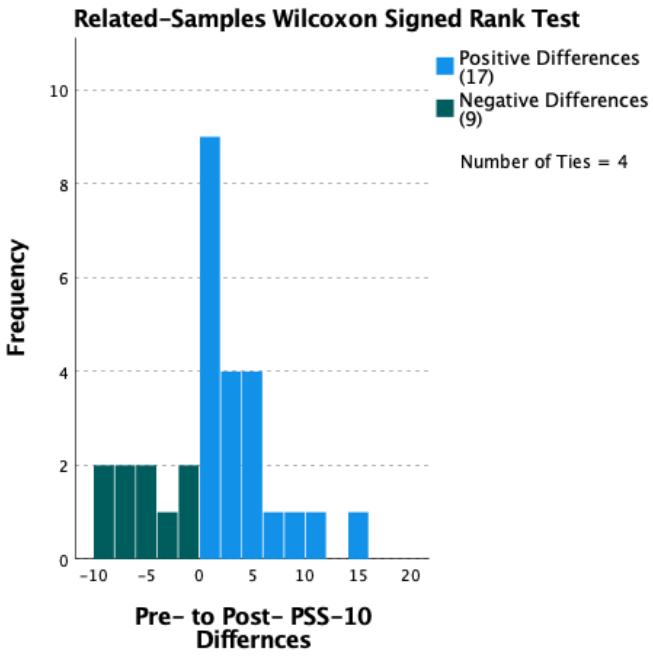
Wilcoxon-Signed Rank Test

	Median Difference	*Z*	Sig. 2-Sided	Decision
Total PSS-10 Score Pre- Minus Post-Treatment	0.6	0.73	.468	Retain the null hypothesis

Of the 30 participants in the study, results showed that 17 participants' PSS-10 scores decreased from pre- to post-treatment, nine participants' scores increased from pre- to post-treatment, and four participants' PSS-10 scores remained the same from pre- to post-treatment (see Figure 7).

Figure 7

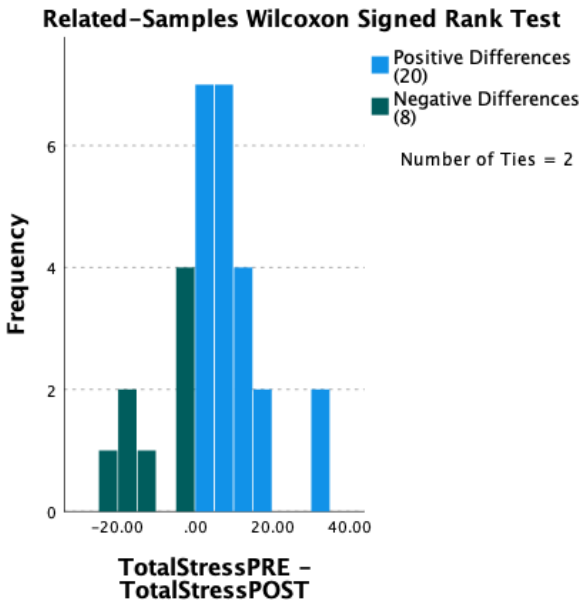
Pre- to Post-Treatment Score Differences in PSS-10 Assessments



When examining differences between total stress scores (i.e., sum of PSS-10, physiological variables) from pre- to post-treatment assessments, the total stress scores from 20 participants decreased (66.7%), the scores from two participants remained the same (6.7%), and the scores from eight participants increased (26.7%) (see Figure 8).

Figure 8

Total Stress Scores Difference from Pre- to Post-Treatment Assessment



The researcher conducted a non-parametric test when comparing pre- and post-treatment stress score means. Data were normally distributed from RHR, respiration rate, the PSS-10, the physiological score, and the total stress score, but the data regarding breathing pattern was not normally distributed. The researcher found that recoding the breathing patterns (i.e., belly breathers "1," chest and belly breathers "2," chest breathers receiving a "3" skewed the total stress scores distribution. Therefore, the researcher conducted a non-parametric Wilcoxon Signed Rank test, splitting the data by sex to compare each of the variables described in Table 13. This

allowed the researcher to compare the total stress scores between men (n = 13) and women (n = 17) from pre- to post-treatment assessments. Retaining the null hypothesis indicates no statistically significant difference between men and women, while rejecting the null hypothesis indicates a difference between the sexes. As noted in Table 18 under "Practical Significance," the p value was close to .05 (p = .052) for women regarding RHR, and while that may not be statistically significant it shows a practical significance in that women's RHR decreased from pre- (M = 81.24) to post-treatment (M = 75.76) assessments. Women also experienced changes in breathing patterns, shifting from either chest breather to chest and belly breather or chest breather to belly breather. The total physiological score decreased for women, indicating that resting heart rate (RHR), breathing rates, and/or breathing patterns changed from pre- to post-treatment assessments. Additionally, the total stress scores decreased from pre- to post-treatment assessments for women, indicating that the combination of perceived stress and/or physiological variables decreased from pre- to post-treatment assessment data collection.

Table 18

Wilcoxon-Signed Rank Test Split by Sex – Women

n = 17	Reject Null Hypothesis	Retain Null Hypothesis	Practical Significance	Pre-Treatment M	Post-Treatment M	M difference
PSS-10 Perceived Stress Score	No	$p > .05$	-	-	-	-
RHR	-	$p > .05$	$p = .052$ for women	81.24	75.76	5.46
Respiratory Rate	-	$p > .05$	-	15.53	15.59	-0.06
Breathing Pattern	$*p < .05$ $p = .025$ for women		-	1.94	1.65	0.29

n = 17	Reject Null Hypothesis	Retain Null Hypothesis	Practical Significance	Pre-Treatment *M*	Post-Treatment *M*	*M* difference
Total Physiological Score (i.e., Sum of Resting HR, Respiratory Rate, Breathing Pattern)	*$p < .05$ $p = .011$ for women		-	98.71	92.00	6.71
Total Stress Score (i.e., Sum of PSS-10, total Physiological score)	*$p < .05$ $p = .009$ for women		-	116.88	108.24	8.64

Note. A non-parametric test (e.g., Wilcoxon-Signed Rank Test) was used instead of a dependent samples t-test due to lack of normality regarding breathing pattern in which the data were not normally distributed. *M* was included only if the null hypothesis was rejected to show the change from pre- to post-treatment assessments in women.

The researcher considered disaggregating the data according to more relevant demographic variables, but the sample did not allow for further disaggregation in most cases because of the small number in the sample subsets.

Research Question 2: What are the preferred adaptive coping strategies provided throughout the semester that college students utilize to manage stress?

The results for Research Question 1 showed that there was a statistically significant difference between pre- and post-treatment total stress scores, indicating that the independent variable (i.e., coping strategies) introduced and used in the Introduction to Stress Management course may have been effective. Research Question 2 looked at the appraised effectiveness of the coping strategies used by participants. The participants ranked the coping strategies (e.g., power

nap, social support, yoga, mindfulness, gratitude journal, PMR) in order of effectiveness from 1-6. The instructor of the course did not take attendance formally but noted that 37 of the 42 enrolled in the fall 2022 semester "consistently attended" the Monday/Wednesday course.

Ranked Coping Strategies

Rank order frequencies are reported in Table 19 which provides the overall rank order for each of the preferred coping strategies for the total participants in the sample (N = 30). Results for rank order coping strategies were completed by 12 (40%) men, 17 women (56.7%), and one that preferred not to say (3.3%). Each of the preferred coping strategies are broken down by sex. Forty percent of all participants chose power napping as the preferred coping strategy utilized during the course in the fall 2022 semester. When comparing power napping and social support, power napping was chosen as the most effective practiced coping strategy, but overall, power napping and social support received the same number of rankings (n = 14; 46.7%) when looking at the top two most utilized effective coping strategies. The main difference between sexes included more men chose power napping (n = 7; 58.3%) than women (n = 5; 29.4%) and gratitude journaling (n = 4; 33.3%) than women (n = 4; 23.5%) and more women chose yoga (n = 5; 29.4%) than men (n = 2; 16.7%). Results on mindfulness show that it was ranked as the third most utilized coping strategy, yoga was fourth, gratitude journaling ranked fifth, while PMR was ranked 6th overall by participants for the fall 2022 semester.

Table 19

Rank Order Coping Strategies – All Participants and By Sex

Participant Characteristic	Rank Order	*n*	Valid Total %	Men *n* = 12	% Men	Women *n* = 17	%Women
Power Nap	1	12	40.0%	7	58.3 %	5	29.4%
Social Support	2	8	26.7%	3	25.0%	5	29.4%
Mindfulness	3	8	26.7%	3	25.0%	4	23.5%
Yoga	4	7	23.3%	2	16.7%	5	29.4%

Participant Characteristic	Rank Order	*n*	Valid Total %	Men *n* = 12	% Men	Women *n* = 17	%Women
Gratitude Journal	5	8	26.7%	4	33.3%	4	23.5%
PMR	6	8	26.7%	3	25.0%	5	29.4%

Note. Valid Total % includes those participants that responded.

Preferred Coping Strategy by Sex

Of the men participants, seven of the 12 (53.8%) respondents chose power napping as the preferred coping strategy (see Table 20) compared to five of the 17 (29.4%) women respondents (see Table 21). Women ranked social support as their most effective preferred coping strategy (n = 6), while power napping was ranked just one participant below social support (n = 5). Women also ranked social support as their second most effective coping strategy (n = 5) (e.g., power nap, social support, yoga, mindfulness, gratitude journal, PMR). Five women (*n* = 5; 29.4%) chose power napping as the most effective coping strategy, but that fell short of the six women (*n* = 6; 35.3%) who chose social support as the most effective. More men (*n* = 4; 33.3%) chose yoga as the second most effective coping strategy compared to women who ranked yoga as the fourth most effective (*n* = 5; 29.4%).

Table 20

Frequencies of Rank Order Coping Strategies by Sex - Men

Coping Strategy	Men Rank Order	*Men n =12*	Men Valid Total %
Power Nap	1	7	58.3%
Yoga	2	4	33.3%
Social Support	3	3	25.0%
Mindfulness	3	3	25.0%
Social Support	4	4	33.3%
Gratitude Journal	5	4	33.3%
PMR	5	4	33.3%
PMR	6	3	25.0%
Gratitude Journal	6	3	25.0%

Note. Because each participant could choose their own rank order for effectiveness of coping strategies, the same number of men participants (*n* = 3; 25.0%) chose Mindfulness and Social Support for third, four subjects (33.3%) chose social support for fourth, Gratitude Journal and PMR for fifth (*n* = 4; 33.3%), and Gratitude Journal and PMR for sixth (*n* = 3; 25.0%).

Table 21

Frequencies of Rank Order Coping Strategies by Sex - Women

Coping Strategy	Women Rank Order	Women *n* = 17	Women Valid Total %
Social Support	1	6	35.3%
Social Support	2	5	25.0%
Gratitude Journal	3	4	23.5%
PMR	3	4	23.5%
Mindfulness	3	4	23.5%
Yoga	4	5	29.4%
Gratitude Journal	5	4	23.5%
Mindfulness	5	4	23.5%
PMR	6	5	29.4%
Power Nap	*	*	*

Note. * Power nap received five votes from women participants (*n* = 5; 29.4%) for the *most* effective coping strategy but fell short of the six women participants (*n* = 6; 35.3%) who chose social support as most effective in the rank order from one to six.

When coping strategies were disaggregated by athletic status, both athletes (see Table 22) and non-athletes (see Table 23) chose power napping at the most effective coping strategy and PMR was chosen as the least effective coping strategy by both athletes (*n* = 4; 30.5%) and non-athletes (*n* = 4; 23.5%). Differences appear for the remainder of the coping strategies, as yoga was selected as the second most effective by athletes (*n* = 5; 38.5%) and fourth by non-athletes (*n* = 4; 23.5%)

Table 22

Rank Order Coping Strategies by Athletic Status - Athlete

Coping Strategy	Athlete Rank Order	Athlete *n* = 13	Total %
Power Nap	1	6	46.2%
Yoga	2	5	38.5%
PMR	3	3	23.1%
Social Support	3	3	23.1%
Mindfulness	3	3	23.1%
Mindfulness	4	4	30.8%
Gratitude Journal	5	5	38.5%
PMR	6	4	30.8%

Note. Because each participant could choose their own rank order for effectiveness of coping strategies, the same number of athlete participants (*n* = 3; 23.1%) chose PMR, Mindfulness, and Social Support as the third most effective coping strategies.

Table 23

Rank Order Coping Strategies by Athletic Status – Non-Athlete

Coping Strategy	Non-Athlete Rank Order	Non-Athlete *n* = 17	Total %
Power Nap	1	6	35.3%
Social Support	2	5	29.4%
Mindfulness	3	5	29.4%
Yoga	4	5	29.4%
PMR	5	6	35.3%
Yoga	6	4	23.5%
PMR	6	4	23.5%

Note. Because each participant could choose their own rank order for effectiveness of coping strategies, the same number of non-athlete participants (*n* = 4; 23.5%) chose Yoga and PMR as the sixth most effective coping strategies.

When coping strategies were disaggregated by total stress scores, both those whose total stress scores decreased (see Table 24) and those whose total stress scores increased (see Table 25) from pre- to post-treatment assessment chose power napping as the most effective coping strategy. Gratitude journaling was the only other similarity between both groups receiving a

fifth-place rank order. Differences appeared for the remainder of the coping strategies. Those whose total stress scores decreased, ranked yoga as second (*n* = 6; 30%), followed by gratitude journaling and social support at third (*n* = 5; 25%), power napping and mindfulness tied for fourth (*n* = 4; 20%), gratitude journaling and mindfulness tied for fifth, and PMR ranked last as in effectiveness for coping strategies with those whose total stress scores decreased. In those whose total stress scores increased, social support ranked second (*n* = 4; 50%), followed by mindfulness (third), yoga (fourth), gratitude journaling (fifth), and an even split for ranking last in effectiveness between social support, power napping, and yoga (*n* = 2; 25%).

Table 24

Rank Order Coping Strategies by Total Stress Score - Decrease

Coping Strategy	Rank Order	Decreased Total Stress Score *n* = 20	Total %
Power Nap	1	8	40.0%
Yoga	2	6	30.0%
Gratitude Journal	3	5	25.0%
Social Support	3	5	25.0%
Power Nap	4	4	20.0%
Mindfulness	4	4	20.0%
Gratitude Journal	5	5	25.0%
Mindfulness	5	5	25.0%
PMR	6	7	35.0%

Note. Because each participant could choose their own rank order for effectiveness of coping strategies, the same number of participants whose total stress scores decreased (*n* = 20; 66.7%) chose Gratitude Journal and Social Support as the third most effective coping strategies (*n* = 5; 25.0%), Power Nap and Mindfulness as the fourth most effective coping strategies (*n* = 4; 20.0%), and Gratitude Journal and Mindfulness as the fifth most effective coping strategies (*n* = 5; 25.0%).

Table 25

Rank Order Coping Strategies by Total Stress Score - Increase

Coping Strategy	Rank Order	Increased Total Stress Score *n* = 8	Total %
Power Nap	1	3	37.5%
Social Support	2	4	50.0%
Mindfulness	3	4	50.0%
Yoga	4	4	50.0%
Gratitude Journal	5	3	37.5%
Social Support	6	2	25.0%
Power Nap	6	2	25.0%
Yoga	6	2	25.0%

Note. Because each participant could choose their own rank order for effectiveness of coping strategies, the same number of participants whose total stress score increased (*n* = 8; 26.7%) chose Social Support, Power Nap, and Yoga as the sixth most effective coping strategies (*n* = 2; 25.0%).

Coping strategies shared one commonality amongst all participants, except women, in that power napping was ranked the most effective coping strategy used by participants in the fall 2022 semester. Women chose social support as the first and second most effective coping strategies, with power napping receiving one less ranking vote for first place than social support. PMR also ranked lower on the list for participants other than athletes who ranked PMR as the third most effective coping strategy.

***Research Question 3*: How do demographic factors impact the change in Perceived Stress Scores (PSS-10) and physiological variables among undergraduate students during a stress management course?**

Demographic variables were explored in relation to total stress scores (i.e., sum of PSS-10, physiological variables), comparing pre- and post-treatment assessments. Specific demographics were disaggregated similar to those explored under *Participants* in Chapter 4.

Categories of demographics included, personal demographics (i.e., sex, race/ethnicity), school demographics (i.e., age, year in school, athletic status, first-generation student status), academic demographics (i.e., grades, major), social wellness (i.e., relationship status, hours of sleep, physical activity, life changing event, illness), family demographics (i.e., siblings), income demographics (i.e., employment status, income, percentage of school income covers, percentage of school parents cover), and athletic status.

Disaggregated Analysis for Pre- and Post-Treatment Scores by Selected Demographic Variables

Athletic Status and Major

Due to the high percentage (51%) of athletes that completed the pre-treatment assessment, the researcher disaggregated data by athletic status. The researcher conducted a nonparametric Wilcoxon Signed Rank test to examine participants by athletic status and additionally by major to see if differences occurred between pre- and post-treatment physiological variables and PSS-10 scores. The nonparametric test was utilized due to the lack of normality.

Of the 30 total participants who completed the pre- and post-treatment assessment, 13 (43.3%) were athletes, the remaining 17 (56.7%) were non-athletes. There were no significant differences ($p > .05$) to report for athletes and non-athletes for differences between physiological variables and PSS-10 scores (see Table 29).

From the 30 participants, eight were majors from Kinesiology and Human Performance (i.e., KHP), nine were majors from Education, and 14 were majors from other departments (i.e., Business, Psychology, Biology, Human Services). The researcher conducted a nonparametric Wilcoxon Signed Rank test to split participants by major to see if differences occurred in the

total stress score from pre- to post-treatment measurements. There were no significant differences ($p > .05$) to report for participants by major for changes between physiological variables and PSS-10 scores.

Participants Whose Stress Scores Increased from Pre- to Post-Treatment

As shown in Figure 8 (p. 108), there were eight participants whose PSS-10 scores increased from the pre- to post-treatment assessment. Those whose total stress scores increased ($n = 8$) over the course of the semester, reported increased scores on the PSS-10 from a mean of 14.50 on the pre-treatment assessment to a mean of 19.13 on the post-treatment assessment (see Table 26). Increases from their pre- to post-treatment assessments are shown in Table 26. Those whose total stress score increased over the semester started with a lower mean score for the Pre-treatment assessment on the PSS-10 ($M = 14.50$) compared with those whose total stress score decreased over the semester ($M = 17.10$). Those whose stress increased, began the course with scores on the lower end of moderate perceived stress (e.g., 14-26) with a pre-treatment mean of 14.50 and ended with moderate perceived stress with a post-treatment mean of 19.13. Participants whose total stress scores decreased over the semester, began with higher levels of perceived stress on the PSS-10 ($M = 17.10$) and ended near the lower end of moderate stress ($M = 14.35$).

Table 26

Descriptive Statistics- Pre- to Post-Treatment PSS-10 Scores for Participants Whose Stress Scores Increased

Assessments	*n*	*M*	Median	*SD*	Min	Max
Pre-Treatment PSS-10	8	14.50	12.50	6.48	7	25
Post-Treatment PSS-10	8	19.13	20.50	8.90	6	31
Total Increase	-	4.63	8.0	2.42	-1	6

Note. The Min and Max categories represent the minimum and maximum PSS-10 scores from the PSS-10 given during the pre-treatment and post-treatment assessment.

Upon further review, the researcher discovered that the eight participants also reported increases in some of the physiological variables, including RHR values from pre-treatment (*M* = 70.63) to post-treatment (*M* = 76.131), respiration rates, and increases on the total physiological scores (i.e., sum of RHR, respiration rate, breathing pattern) (see Table 27). The participants reported an increase in hours of sleep from pre- to post-treatment assessments.

Table 27

Physiological Variables – Pre- to Post-Treatment for Those Whose Stress Scores Increased

Assessments	*M* RHR	*M* Respiration Rate	*n* Breathing Pattern	Total Physiological Score	*M* Sleep hrs.
Pre-Treatment	70.63	16.0	2 Belly 5 Chest/Belly 1 Chest	88.5	6.88
Post-Treatment	76.13	16.88	3 Belly 4 Chest/Belly 1 Chest	94.75	7.00
M Total Difference	5.50	0.88	1 Belly -1 Chest/Belly No Change Chest	6.25	.12

Note. RHR is measured in beats per minute; respiration rate is measured in breaths per minute. Total physiological score is the sum of RHR, respiration rate, and breathing pattern. Sleep is measured in hours.

Comparison of Demographic Variables for Participants Whose Total Stress Scores Increased or Decreased

To answer Research Question 3 (i.e., RQ 3), the researcher disaggregated demographic variables similar to those described at the beginning of Chapter 4 under *Participants* to identify variables that could potentially impact stress scores in undergraduate students. Variables for

participant demographics are summarized in tables 28-33. They are broken down into six demographic variables (e.g., personal, school, academic, social wellness, family, income demographics). Information provided in the demographic tables summarizes comparisons between participants whose total stress scores decreased with participants whose total stress scores increased during the fall 2022 semester. Approximately 27% (*n* = 8) of the participants showed an increase in the total stress score, approximately 67% (*n* = 20) showed a decrease in the total stress score, and approximately 6% (*n* = 2) showed no change in the total stress score.

Personal Demographics. Table 28 summarizes the comparison of personal demographic data for the participants whose stress levels increased (*n* = 8; 26.7%) and participants whose stress level decreased (*n* = 20; 66.7%) over the course of the semester from pre-treatment to post-treatment assessments. Of the eight participants whose stress levels increased, all were Caucasian, and half were men. Two of the 30 participants had total stress scores that did not change and are therefore not reported in the table.

Table 28

Personal Demographics of Participants Comparing Total Stress Scores from Pre- to Post-Treatment

Demographics	Increased *n = 8*	Increased %	Decreased *n = 20*	Decreased %
Sex				
Men	4	50.0%	6	30.0%
Women	3	37.5%	14	70.0%
Prefer Not to Say	1	12.5%	-	-
Total	8	100.0%	20	100.0%
Race/Ethnicity				
White/Caucasian	8	100.0%	19	95.0%
Other	-		1	5.0%
Total	8	100.0%	20	100.0%

School Demographics. Many of the demographic variables, including school demographics align closely with the Theoretical Framework of Emerging Adults. Looking at demographic variables can help identify commonalities amongst undergraduate students that can cause perceived stress. Table 29 summarizes the comparison of school demographics for the participants whose stress levels increased and participants whose stress level decreased over the course of the semester from pre-treatment to post-treatment assessments. Two of the three athletes whose stress increased from pre- to post-treatment were men and one preferred not to say. Half of the participants were in their second year of school.

Table 29

School Demographics of Participants Comparing Total Stress Scores from Pre- to Post-Treatment

Demographics	Increased *n*	Increased %	Increased *M*	Decreased *n*	Decreased %	Decreased *M*
Age			19.50			19.0
18	2	25.0%	-	8	40.0%	-
19	2	25.0%	-	6	30.0%	-
20	2	25.0%	-	2	10.0%	-
21	2	25.0%	-	2	10.0%	-
22	-	-	-	1	5.0%	-
26	-	-	-	1	5.0%	-
Total	8	100.0%	-	20	100.0%	-
Year in School						
1st year	2	25%	-	10	50.0%	-
2nd year	4	50%	-	4	20.0%	-
3rd year	1	12.5%	-	2	10.0%	-
4th year	1	12.5%	-	2	10.0%	-
5th year	-	-	-	2	10.0%	-
Total	8	100.0%	-	20	100.0%	-
Athletic Status						
Athlete	3	37.5%	-	10	50.0%	-
Non-athlete	5	62.5%	-	10	50.0%	-
Total	8	100.0%	-	20	100.0%	-

Demographics	Increased *n*	Increased %	Increased *M*	Decreased *n*	Decreased %	Decreased *M*
First Gen Status						
First Gen Student	1	12.5%	-	0	0.0%	-
Not a First Gen Student	7	87.5%	-	20	100.0%	-
Total	8	100.0%	-	20	100.0%	-

Academic Demographics. Table 30 summarizes the comparison of academic demographics for the participants whose total stress scores increased and participants whose total stress scores decreased over the course of the semester from pre-treatment to post-treatment assessments. Academic performance remained relatively similar from pre- to post-treatment assessments, other than one participant whose stress level decreased who reported that their overall academic performance was an F. Questions regarding academic demographics were asked on pre- and post-treatment assessments as that variable could change over the semester.

Table 30

Academic Demographics of Participants Comparing Total Stress Scores from Pre- to Post-Treatment

Demographics	Increased *n*	Increased %	Decreased *n*	Decreased %
Academics Pre-				
A student	2	25.0%	13	65.0%
B student	5	62.5%	6	30.0%
C student	1	12.5%	1	5.0%
Academics Post-Treatment				
A student	2	25.0%	12	60.0%
B student	4	50.0%	6	30.0%
C student	2	25.0%	1	5.0%
F student	-	0.0%	1	5.0%
Major				
KHP	2	25.0%	5	25.0%
Education	3	37.5%	5	25.0%
Other	3	37.5%	10	50.0%
Total	8	100.0%	20	100.0%

Social Wellness Demographics. Table 31 summarizes the comparison of social wellness demographics (i.e., relationship status, physical activity, sleep) for the participants whose total stress scores increased and participants whose stress level decreased over the course of the semester from pre-treatment to post-treatment assessments. On the Post-Treatment assessment, three participants (37.5%) indicated they had a life changing or routine altering event take place within the last month and 75% indicated they had been physically and/or mentally ill within the last month which greatly varies from those participants whose total stress scores decreased. All participants indicated an increase in overall amount of sleep over the fall 2022 semester.

Table 31

Social Wellness Demographics of Participants Comparing Total Stress Scores from Pre- to Post-Treatment

Demographics	Increased *n*	Increased %	Decreased *n*	Decreased *%*
Relationship Status Pre-				
In Relationship	3	37.5%	3	15.0%
Living with Partner	-	-	1	5.0%
Single	5	62.5%	16	80.0%
Total	8	100.0%	20	100.0%
Relationship Status Post-Treatment				
In Relationship	4	50.0%	5	25.0%
Single	4	50.0%	15	75.0%
Total	8	100.0%	20	100.0%
Hours of Sleep Pre-Treatment				
6 or less	2	25.0%	4	20.0%
7-9	6	75.0%	16	80.0%
10 or more	-	-	-	-
Total	8	100.0%	20	100.0%
Hours of Sleep Post-Treatment				
6 or less	2	25.0%	1	5.0%
7-9	5	62.5%	18	90.0%
10 or more	1	12.5%	1	5.0%
Total	8	100.0%	20	100.0%
Physical Activity				
No physical activity	1	12.5%	2	10.0%
≤ 150 min	3	37.5%	5	25.0%

Demographics	Increased *n*	Increased %	Decreased *n*	Decreased *%*
150 min per week	-	-	4	20.0%
> 150 min	4	50.0%	9	45.0%
Total	8	100.0%	20	100.0%
Life Changing Event Pre-Treatment				
Yes	3	37.5%	13	65.0%
No	5	62.5%	7	35.0%
Total	8	100.0%	20	100.0%
Life Changing Event Post-Treatment				
Yes	3	37.5%	1	95.0%
No	5	62.5%	19	5.0%
Total	8	100.0%	20	100.0%
Illness Pre-Treatment				
Yes	4	50.0%	7	35.0%
No	4	50.0%	13	65.0%
Total	8	100.0%	20	100.0%
Illness Post-Treatment				
Yes	6	75.0%	6	30.0%
No	2	25.0%	14	70.0%
Total	8	100.0%	20	100.0%

Family Demographics. Table 32 summarizes the comparison of family demographics for the participants whose stress levels increased and participants whose stress level decreased over the course of the semester from pre-treatment to post-treatment assessments. None of the participants whose total stress scores increased or decreased had any dependents. Those whose total stress scores decreased had less siblings than those whose total stress scores increased.

Table 32

Family Demographics of Participants Comparing Total Stress Scores from Pre- to Post-Treatment

Demographics	*Increased n*	*Decreased n*
Number of Siblings		
0	-	-
1	2	1
2	2	8
3	2	6
5	1	3

Demographics	*Increased n*	*Decreased n*
6	-	1

Income Demographics. Table 33 provides a comparison of income demographics for the participants whose total stress scores increased and participants whose total stress scores decreased over the course of the semester from pre-treatment to post-treatment assessments. Data showed that 62.5% (*n* = 5) of those who worked part-time during the school year reported an increase in total stress scores compared to 65% (*n* = 13) of those who work part-time during the school year and experienced a decrease in their total stress scores. Regarding cost of school, 62.5% (*n* = 5) of participants whose total stress scores increased stated that at least half or more of their school costs are covered by their income which is 12.5% more than those whose total stress scores decreased (*n* = 8; 40%). However, 75% (*n* = 6) of participants whose total stress scores increased stated that their parents cover less than 50% of their costs associated with school, compared with 40% (*n* = 4) of those whose total stress score decreased. Those whose total stress scores decreased reported receiving 55% (*n* = 11) financial support towards the cost of college covering 51%-100% of total costs.

Table 33

Family Demographics of Participants Comparing Total Stress Scores from Pre- to Post-Treatment

Demographics	Increased *n*	Increased %	Increased *M*	Decreased *n*	Decreased %	Decreased *M*
Employment Status						
Do Not Work	3	37.5%	-	6	30.0%	-
During School Year						
Work Part-time	5	62.5%	-	13	65.0%	-
During School Year						
Work Full-Time	-	-	-	1	5.0%	-
Total	8	100.0%	-	20	100.0%	-
Income						

Demographics	Increased *n*	Increased %	Increased *M*	Decreased *n*	Decreased *%*	Decreased *M*
$0	2	25.0%	-	1	5.0%	-
Less than $9,999	3	37.5%	-	14	70.0%	-
$10,000-$19,000	-	-	-	2	10.0%	-
I do not know	3	37.5%	-	3	15.0%	-
Total	8	100.0%	-	20	100.0%	-
% of School Income Covers			52.13			55.28
<25%	3	37.5%	-	4	20.0%	-
25-50%	0	0.0%	-	6	30.0%	-
51-75%	3	37.5%	-	2	10.0%	-
76-100%	2	25.0%	-	6	30.0%	-
Missing	-	-	-	2	10.0%	-
Total	8	100.0%	-	20	100.0%	-
% of School Parents Cover			29.75			57.26
<25%	5	62.5%	-	4	20.0%	-
25-50%	1	12.5%	-	4	20.0%	-
51-75%	0	0.0%	-	4	20.0%	-
76-100%	2	25.0%	-	7	35.0%	-
Missing	-	-	-	1	5.0%	-
Total	8	100.0%	-	20	100.0%	-

Familiarity With Coping Strategies. Table 34 shows the level of familiarity with six coping strategies that were introduced and used in the fall of 2022 and compared the data between those whose total stress scores increased with those whose total stress scores decreased. Familiarity with coping strategies occurred with the two groups for yoga, gratitude journal, and social support. Those whose total stress scores decreased were less familiar with power napping and mindfulness and more familiar with PMR than those whose total stress scores decreased.

Table 34

Level of Familiarity with Coping Strategy

Familiarity With Coping Strategies	Stress Score Increased *n* = 8	Increased %	Stress Score Decreased *n* = 20	Decreased %
Yoga				
Yes	6	75.0%	15	75.0%
No	2	25.0%	5	25.0%
Total	8	100.0%	20	100.0%
PMR				
Yes	3	37.5%	2	10.0%
No	5	62.5%	18	90.0%
Total	8	100.0%	20	100.0%
Power Nap				
Yes	6	75.0%	18	90.0%
No	2	25.0%	2	10.0%
Total	8	100.0%	20	100.0%
Gratitude Journal				
Yes	3	37.5%	9	45.0%
No	5	62.5%	11	55.0%
Total	8	100.0%	20	100.0%
Social Support				
Yes	6	85.7%	17	85.0%
No	1	14.3%	3	15.0%
Total	7	100.0%	20	100%
Mindfulness				
Yes	4	50.0%	15	75.0%
No	4	50.0%	5	25.0%
Total	8	100.0%	20	100.0%

Note. PMR is progressive muscle relaxation.

Effective Coping Strategies Practiced. Table 35 summarizes the comparison of effective coping strategies practiced by participants whose total stress scores decreased and those whose total stress scores increased. Yoga was practiced significantly more (*n* = 8; 27.6%) by those whose total stress scores decreased, along with mindfulness (*n* = 9; 25.7%), and gratitude journaling (*n* = 3; 15.8%). PMR was the only coping strategy practiced more (9%) by those whose total stress scores increased.

Table 35

Effective Coping Strategy Practiced by Participants During Semester

Practiced Coping Strategies	Total Stress Score Increased *n* = 8	Increased %	Total Stress Score Decreased *n* = 19	Decreased %
Yoga				
Yes	2	25.0%	10	52.6%
No	6	75.0%	9	47.4%
Total	8	100.0%	19	100.0%
PMR				
Yes	1	14.3%	1	5.3%
No	7	85.7%	18	94.7%
Total	8	100.0%	19	100.0%
Power Nap				
Yes	5	62.5%	13	68.4%
No	3	37.5%	6	31.6%
Total	8	100.0%	19	100.0%
Gratitude Journal				
Yes	0	0	3	15.8%
No	8	100.0%	16	84.2%
Total	8	100.0%	19	100.0%
Social Support				
Yes	6	75.0%	15	78.9%
No	2	25.0%	4	21.1%
Total	8	100.0%	19	100.0%
Mindfulness				
Yes	3	37.5 %	12	63.2%
No	5	62.5%	7	36.8%
Total	8	100.0%	19	100.0%

Note. While 20 participants total stressed scores decreased, only 19 students had valid responses regarding effective coping strategies used during the semester.

Perceived Social Support. Table 36 shows the level of perceived social support by participants from peers, family, and faculty/staff. Results indicate that those whose total stress scores decreased have a higher perception of social support from peers, family, and faculty/staff both pre- and post-treatment. However, the mean difference indicated that all levels of perceived social support decreased from pre- to post-treatment, except for those whose total stress scores

increased regarding faculty/staff (*M* = + 0.50). Perceived social support from family remained the same for those whose total stress scores decreased.

Table 36

Participants' Perceived Levels of Social Support Pre- and Post-Treatment for Those Whose Stress Scores Decreased and Increased

Social Support	*M* Pre-Stress Scores Increased	*M* Post-Stress Scores Increased	*M* Difference	*M* Pre-Stress Scores Decreased	*M* Post-Stress Scores Decreased	*M* Difference
Peers	5.63	4.63	-1.00	6.90	6.85	-0.05
Family	7.25	6.71	-0.54	8.30	8.30	-
Faculty/Staff	3.63	4.13	+0.50	5.85	4.75	-1.10

Note. *M* represents the Mean. Scales for peers, family, faculty/staff were from 0-10.

Perceived Stress Level. The post-treatment assessment asked participants to respond to the following question: "Over the course of the semester, I feel my stress level: increased, decreased, or stayed the same." Table 37 summarizes participant responses, split by total stress trend (e.g., those whose total stress scores decreased, those whose total stress scores increased, those whose total stress scores stayed the same). The mean stress level reported by those whose total stress scores increased is the same as the post-treatment result by those whose total stress scores decreased, indicating that those whose total stress scores increased began the semester with less stress.

Table 37

Participants' Perceived Stress Level, Pre- to Post-Treatment

Stress Level	Pre-Treatment *M*	Post-Treatment *M*	Difference *M*
Stress Increased	3.35	5.13	+1.78
Stress Decreased	4.30	3.35	-0.95

Table 38 compares the total stress scores of participants with responses received on the post-treatment assessment regarding whether they believed their stress levels increased, decreased, or stayed the same over the semester. Participant responses indicated that 40% (n = 8) of those whose total stress score decreased believed that their stress decreased during the semester, but 15% (n = 3) whose total stress score decreased believed that their stress levels increased during the semester. For participants whose total stress score increased, the majority (n = 6; 75%) believed that their stress levels increased. Results for the two participants whose stress scores stayed the same indicated they felt their stress levels stayed the same during the semester.

Table 38

Comparing Total Stress Scores with Participant Response to Stress Level Over Semester

Participant Response to Stress Level Over Semester	Total Stress Score Increased n = 8	Total Stress Score Decreased n = 20	Total Stress Score Stayed the Same n = 2
Response: Decreased	1 (12.5%)	8 (40%)	-
Response: Increased	6 (75%)	3 (15%)	-
Response: Stayed the Same	-	9 (45%)	2 (100%)
Missing	1 (12.5%)	0	0
Total	8 (100%)	20 (100%)	2 (100%)

Open-ended Participant Responses. Table 39 summarizes participant characteristics and participant responses to three open-ended questions for those whose total stress scores increased (n = 8) from pre- to post-treatment assessments. The following open-ended questions were asked:

1. Share/Explain how the coping strategies provided in this course helped you deal with your stress.
2. Did you find these coping strategies effective for management of your stress?
3. Will you continue to use these coping strategies in the future?

All but one participant found the coping strategies to be effective or somewhat effective and commented that they would use at least some of the coping strategies in the future, stating that the coping strategies were “kind of” effective and they “might” use some of the coping strategies in the future. Some commented that they liked being introduced to the coping strategies, but that they might seek out additional coping strategies to use in the future. Themes that emerged from the comments included describing the coping strategies as calming, effective, somewhat effective, and unsure if coping strategies were effective or if they would use them in the future.

Table 39

Participant Demographics, Themes, and Sample Quotes for Participants Whose Total Stress Scores Increased

ID	Sex	Athletic Status	Major	Themes	Sample Quotes
3	W	Not	Ed	Calming	*Power nap allowed me to stop a lot of rambling that goes on in my head and helps me calm down. I did find them [coping strategies] effective. Yes I will continue to use them [coping strategies] in the future.*
4	M	Athlete	KHP	Calming Effective Coping Strategies	*1.) This coursed allowed me to relax and not allow my body to be so tense. 2.) Yes I did find these coping strategies effective for management of my stress. 3.) Yes I will continue to use these strategies in the future.*
7	M	Not	Other	Calming	*I haven't really used any of these techniques outside of class other than the meditating. Thats [sic] the only one that helps in the moment. Helps calm me down. I'll probably keep using meditating as a stress management helper [sic]. Since I can just do it on the spot.*
13	W	Not	Ed	Effective Coping Strategies	*The coping strategies provided I [sic] this course helped me deal with my stress, as they where [sic] assignments so we had to do them, but being forced to do them actually helped you become relax [sic] so that was nice. I found that the Gratitude Journal, Social Support and a little bit [sic] yoga helped me feel relaxed. I will try to use some of these coping strategies in the future, but I may also find some of my own.*
34	W	Not	Other	Effective Coping Strategies	*1. The coping strategies gave me a different perspective on how to cope with different types of stress in my life and helped me realize what I rely most on for my stress. 2. I did find that they were effective for managing my stress and that it made me feel calmer and gave me a feeling like I had better control on my stress. 3. I will try to continue doing different mindfulness exercises to bring me more into the moment and not get ahead of myself with my brain. I will also be more aware of my social supports and make sure to ask for help from them when I need it.*
22	M	Athlete	KHP	Effective Coping Strategies	*1. This course taught me that stress is ok, but managing it is the difference between be [sic] able to keep my composure and not. 2. Yes, I found that most of them are beneficial for me to do. 3. I will continue to use my top 3 strategies listed above in the future.*
29	M	Not	Ed	Somewhat Effective	*1) Power napping and thinking about small, good things did help in elevating [sic] some stress. 2) Kind of. 3) I might.*
17	Prefer not to say	Athlete	Other	Unsure Coping Strategies Worked	*While I am not sure how much it helped me, it was nice having something like PMR assigned as homework. Otherwise I don't think I would do them [coping strategies]. The one I am most likely to use in extreme situations would be gratitude journal.*

Note. Sex was abbreviated to *M* for men and *W* for women. Majors were shortened to KHP for Kinesiology and Human Performance and Ed for Education.

Table 40 summarizes participant characteristics and responses to three open-ended questions for those whose total stress scores decreased (n = 20) from pre-treatment to post-treatment assessments. There were 20 participants whose total stress scores decreased, but the table provides six randomly chosen from the data the researcher received. All participants whose total stress scores decreased reported that at least some of the coping strategies were effective and they would use them again.

1. Share/Explain how the coping strategies provided in this course helped you deal with your stress.
2. Did you find these coping strategies effective for management of your stress?
3. Will you continue to use these coping strategies in the future?

Themes that emerged from the comments included describing the coping strategies as effective and beneficial and most participants stated they would use some of the coping strategies (e.g., yoga, mindfulness, powernap) in the future.

Table 40

Participant Demographics, Themes, and Sample Quotes for Participants Whose Total Stress Scores Decreased

ID	Sex	Athletic Status	Major	Themes	Sample Quotes
14	W	Athlete	KHP	Effective	*1. These coping strategies helped me with my stress as it was time for me to just forget about was going on around me and focus on what I was doing. 2. I think they were effective in ways as it truly did help me find other ways to manage my stress and feel better about what was going on. 3. I may continue to use yoga and social support as I found the most out of those.*
18	M	Athlete	KHP	Effective	*This has helped me find new ways to relax, as well as learning new ways to try out. I did find these coping strategies effective, and I will continue to do most of them, or at least try to practice them.*
30	W	Not	Other	Effective	*1. Most forced me to take time out of my day to just be in the moment and not worry about things that I'll have to deal with in the future or have no control over. 2. I mainly found mindfulness to be the most effective, probably because I enjoyed the time it gave me to just be for once instead of always thinking of what I need to do. 3. I think I'll try to use the power nap and mindfulness for sure, if I'm super stressed I may look to the other strategies as well.*
31	W	Not	Ed	Effective	*1. Family and friends always help with stress. I also use the [sic] mindfulness now to help me calm down and relaxed [sic] if I'm stressed or can't fall asleep. 2. Yes, I am more mindful and fall asleep better. 3. The first two [coping strategies]and maybe the 3rd I will use.*
32	W	Not	Ed	Effective/Beneficial	*1. I had never heard of most of these strategies. I have been through a lot of changes this semester so I found it very beneficial to be learning strategies to handle my stress. 2. I found social support and yoga the most useful as I somewhat overthought every other technique. 3. I definitely see myself continuing to use these.*
33	W	Not	Other	Effective	*1.) The coping mechanisms that I learned over the course helped me deal with stress as it became easier to realize when I was stressed and what I can do to help cope. The most helpful coping mechanism I learned was the power nap as I realized how tired I truly was and how much rest I truly needed. 2.) I did find these coping strategies effective as I was able to pinpoint when and where I was stressed and how I could cope. 3.) Yes, I will continue to learn and practice these coping mechanisms, especially the power nap and muscle relaxer, those were my favorite.*

Note. Sex was abbreviated to *M* for men and *W* for women. Majors were shortened to KHP for Kinesiology and Human Performance and Ed for Education.

Table 41 summarizes participant characteristics and responses to three open-ended questions for those whose total stress scores stayed the same (n = 2) from pre-treatment to post-treatment assessments. Responses are included below. Themes that emerged were "effective" and "somewhat effective" regarding reducing participants' stress.

Table 41

Participant Demographics, Themes, and Sample Quotes for Participants Whose Total Stress Scores Stayed the Same

ID	Sex	Athletic Status	Major	Themes	Sample Quotes
15	M	Not	KHP	Somewhat Effective	*1. I found that being mindful and the Social Support technique were both very important factors in helping to reduce my stress because it made me look at life in a different and more positive light. 2. I found some of them effective for managing my stress, but some of them were not as effective. Overall though, they did help with my stress in different ways. 3. I think that I would continue to use some of the coping strategies like being mindful and using my social support group to help my stress levels stay low.*
28	M	Not	Ed	Effective	*1.They helped me deal with my stress because it helps calm me and release that stress that I have. 2.Yes, I found them effective because they helped me stay focused throughout the day. 3.Yes, I will continue to use these strategies.*

Note. Sex was abbreviated to *M* for men and *W* for women. Majors were shortened to KHP for Kinesiology and Human Performance and Ed for Education

Participants whose total stress scores stayed the same were non-athletes and majors from the Education and Kinesiology and Human Performance departments who indicated that coping strategies were effective/somewhat effective.

Summary of Research Questions

Primary Research Questions

1. How do Perceived Stress Scores (PSS-10) and physiological measures change in undergraduate students during a stress management course when comparing pre, mid-, and post-treatment assessments?

PSS-10 scores and physiological variables were combined into a total stress score. The mean of all stress variables decreased from pre- to post-treatment assessments. PSS-10 scores decreased (M = .60), RHR decreased in beats per minute (M = 2.53), respiratory rates decreased in breaths per minute (M = 0.87), and breathing patterns shifted as less participants (n = 1; 3.3%) became chest breathers and more became belly breathers (n = 4; 13.3%). Even though the mean score decreased from pre- to post-treatment on the PSS-10, when comparing scores, results showed that 17 participants' PSS-10 scores decreased from pre- to post-treatment, nine participants scores increased from pre- to post-treatment, and four participants PSS-10 scores remained the same. This does not match up with the total stress scores as 20 participants decreased, eight increased, and two remained the same. Participants' perception of stress was slightly increased from pre- to post-treatment compared to total stress scores which included physiological variables that decreased from pre- to post-treatment. Overall, participants total stress scores decreased (n = 20; 66.7%). Eight (26.7%) participants total stress scores increased, and two participants (6.7%) total stress scores stayed the same.

2. What are the preferred adaptive coping strategies provided throughout the semester that college students utilize to manage stress?

Overall, most participants (n = 12; 40%) ranked power napping as an effective adaptive coping strategy to manage stress. The only demographic that did not choose this as the most

effective strategy were women. Women ranked social support as both the first and second most effective coping strategies. Power napping and social support were chosen as effective coping strategies by both those whose total stress scores increased and decreased (see Table 35).

Secondary Research Question

3. How do demographic factors impact the change in Perceived Stress Scores (PSS-10) and physiological measures among undergraduate students during a stress management course?

There were eight (26.7%) participants whose total stress scores increased from pre- to post-treatment assessments. All physiological variables (i.e., RHR, respiration rate, breathing pattern) increased from pre- to post-treatment (see Table 27). All (*n* = 8) participants whose total stress scores increased were Caucasian, half (*n* = 4) were men, three (37.5%) were athletes, and half (*n* = 4) were in their second year of school. Three (37.5%) were education majors, three (37.5%) were other majors, and two (25%) were majors from the Kinesiology and Human Performance department. Half (*n* = 4) of the participants were in a relationship, all slept at least 7 hours each night, which increased from pre- to post-treatment assessments (i.e., 0.12 hours). Half (*n* = 4) completed > 150 minutes of physical activity each week, while one (12.5%) did not participate in any physical activity. Six (75%) reported recently being physically or mentally ill, which did increase by 25% from the pre-treatment assessment. Participants whose total stress scores increased worked part-time (*n* = 5; 62.5%), made less than $9,999 (*n* = 5; 62.5%), and reported that their parents covered less than half of their cost of school (n = 6; 75%).

Regarding coping strategies, participants whose stress levels increased ranked social support (*n* = 6; 75%) and power napping (*n* = 5; 62.5%) as the most effective coping strategies.

Participants also reported less perceived support from peers (M = -1.00) and family (M = -0.54), but more from faculty and staff (M = 0.50) from pre- to post-treatment assessments.

Conclusion

This chapter provided a summary of the data collected from participants in the Introduction to Stress Management class in the fall 2022 semester. Results indicated a statistically significant difference from pre- to post-treatment assessments regarding the total stress score (i.e., sum of PSS-10 scores and physiological measures), suggesting that the coping strategies utilized in the class were effective. The data also showed that as a group, participants favored the following coping strategies in order: power nap, social support, yoga, mindfulness, gratitude journal, and progressive muscle relaxation. Preferred coping strategies differed by sex. Comparisons were made between those whose total stress score increased (n = 8; 26.7%) over the semester with those whose total stress scores decreased (n = 20; 66.7%) over the semester. The eight participants whose total stress scores increased were Caucasian, 50% were men, they worked part-time, did not receive full financial support from their parents, and reported physical or mental illness within the last month. Chapter 5 will provide an interpretation of the findings and suggestions and recommendations for future research regarding undergraduate students perceived stress levels and coping strategies.

CHAPTER 5 DISCUSSION

Experiencing stress is a commonality among most college students. The construct of stress can affect individuals both physiologically and psychologically. Moreover, while it is not the event itself that is stressful, it is one's appraisal of the event that activates the stress response (Lazarus & Folkman, 1984). Traditional-age college students (i.e., 18-24) depict the definition of young and emerging adults, comprising those aged 18-25 who tend to transition from adolescence into adulthood (Arnett, 2000; Scales et al., 2016). Just as one's appraisal of an event determines one's stress response, coping strategies vary based on individual preference and access. Adaptive coping strategies assist in managing and mitigating stress. The methods by which college students cope with stress heavily impact their health and well-being (Nima et al., 2013; Pickens et al., 2019).

The inspiration for this research study arose from the researcher's experience teaching in Higher Education. Around 2014, the researcher observed an increase in students experiencing stress and anxiety. Through the collection of physical activity readiness questionnaires (PAR-Qs) in class, the author realized that an increasing number of students were reporting consuming medications for anxiety and depression. Out of concern for the students' health and well-being, the researcher began teaching an Introduction to Stress Management course in 2018. The course was required for Health Education and Strength and Conditioning majors, the Health Studies minor, and an elective in the Sport Management major. In 2020, the General Education committee approved the course to be taught as a general education requirement. The researcher sought to focus only on adaptive coping strategies for the purpose of this study. Today's college students, specifically Generation Z and millennials, are experiencing increased anxiety and depression levels, more so than the general population (Lane, 2020). Although students develop

independence and a new sense of identity during the transition from adolescence to adulthood, navigating a new environment may generate stress for young adults who would benefit from learning how to utilize adaptive coping strategies. This chapter provides a summary of the research study conducted in an Introduction to Stress Management class at a small regional institution in the upper Midwest, a synopsis of major findings, unexpected findings, and it concludes with recommendations for further research.

Purpose of the Study

The purpose of the study was to determine if undergraduate college students' PSS-10 scores and physiological variables were impacted after introducing and practicing coping strategies in an Introduction to Stress Management course. Additionally, the researcher wanted to determine the most effective coping strategies utilized by the students and determine how demographic variables influenced PSS-10 scores and physiological variables. As previously discussed in Chapter 2, the researcher discovered an overrepresentation of qualitative studies conducted abroad that addressed stress as a phenomenon and the individuals' ability and strategies to cope; many of the qualitative studies conducted abroad utilized students in nursing, physical therapy, or education programs. Not all institutions offer these specific programs, and it was determined that a study to include the general undergraduate population would better represent a broader array of institutions. It was expected that by conducting a quantitative study in the United States with young and emerging adults would contribute to the literature on perceived stress and adaptive coping strategies that could be easily implemented in a college and university setting with students in any academic program.

Summary of Study Methodology

This quasi-experimental, quantitative study aligned with a positivist paradigm, realist ontology, and objectivist epistemology. The null hypothesis for the study proposed that there would be no change in Perceived Stress Scores (PSS-10) and physiological measures in undergraduate college students when comparing perceived stress before and after completing the Introduction to Stress Management course. The study included two primary research questions and one secondary research question. The first research question (RQ1) ultimately measured whether perceived stress and physiological measures changed from pre-treatment to post-treatment after introducing and practicing adaptive coping strategies. The second research question (RQ2) aimed to determine the participants' preferred coping strategies by having them rank in order the most effective methods from one to six. The secondary research question (RQ3) intended to explain how demographic factors impact changes in perceived stress and physiological variables during the Introduction to Stress Management course.

Participants included undergraduate students enrolled in two sections of an Introduction to Stress Management course at a small regional institution in the upper Midwest. Initially, 41 participants agreed to partake in the study and completed the pre-treatment assessment in week four of the fall 2022 semester. The pre-treatment assessment can be found in Appendix B.1. The researcher again assessed the students during week eight of the semester and had participants complete the mid-treatment assessment (see Appendix B.2). Due to a lower number of participants (i.e., 28), data from the mid-test were not analyzed in order to maintain the suggested sample size of 30 for experimental studies (Fraenkel et al., 2019). During week 13 of the semester, the researcher again assessed the participants (i.e., 30) using the post-treatment assessment (see Appendix B.3). Each assessment (i.e., pre-, mid-, and post-treatment) included a

varying number of questions, with all assessments containing the same ten questions from the Perceived Stress Scale (i.e., PSS-10) to assess perceived stress. During each assessment, the researcher gathered participants' physiological variables that could be impacted by stress. Physiological variables included resting heart rate, respiration rate, and breathing patterns taken manually by the participant. The researcher timed participants for 60 seconds while they measured, collected, and recorded their data via the Qualtrics questionnaire. The PSS-10 was the valid and reliable instrument used to assess perceived stress scores, this was designed by Cohen et al. (1988) and it consists of 10 Likert scale questions ranging from 0 (never) to 4 (very often). Six questions (e.g., 1, 2, 3, 6, 9, 10) measured perceived helplessness, while four questions (e.g., 4, 5, 7, 8) measured perceived self-efficacy and were scored in reverse (Liu et al., 2020).

The researcher met face-to-face with participants four times over the fall 2022 semester (e.g., week one, week four, week eight, and week 13). The initial meeting between the researcher and participants occurred on the first day of class to introduce and explain the study. The researcher then notified participants of the assessment days scheduled during weeks four, eight, and thirteen during the semester as outlined in the course syllabi (see Appendix F). The pre-treatment assessment consisted of 38 questions (e.g., including the PSS-10, physiological variables) and was used to collect various demographic variables to assist in answering RQ3 to ascertain the possible factors that impact perceived stress and physiological variables. The researcher included demographic questions described in the literature as contributing to stress and questions that responded to the researcher's curiosity as a practitioner. The mid-treatment assessment consisted of 22 questions, including the PSS-10 and physiological variables. Other demographic questions included variables that could easily change during a college student's semester (e.g., relationship status, hours of sleep). The post-treatment assessment consisted of 25

total questions, which included the PSS-10 and physiological variables, and assessed preferred coping strategies by rank order to assist in answering RQ2 regarding undergraduate college students' effective and preferred adaptive coping strategies utilized during the semester. The researcher utilized non-parametric tests due to violations of data assumptions. The Wilcoxon-signed rank test was used to compare mean differences between participants' pre- and post-treatment scores. Additional data analysis included descriptive and inferential statistics.

Summary and Discussion of Findings

This quasi-experimental study examined levels of perceived stress in undergraduate college students, physiological variables associated with stress, and preferred adaptive coping strategies demonstrated and practiced in an Introduction to Stress Management course. Additionally, the study sought to determine the role demographic factors played in PSS-10 scores and physiological variables from pre- to post-treatment assessments. The study was built on the framework of Lazarus and Folkman's (1984) transactional model of stress and coping and Arnett's (2000) theory of emerging adulthood.

Total Stress Score, PSS-10, and Physiological Variables (RQ1)

The study's null hypothesis proposed there would be no change in Perceived Stress Scores (PSS-10) and physiological measures (i.e., dependent variable) in undergraduate college students when comparing perceived stress before and after completing the Introduction to Stress Management course (i.e., independent variable). Findings from the present study concerning the null hypothesis demonstrated statistically significant differences in pre- and post-treatment assessments; therefore, the null hypothesis for the study was rejected, and the alternative hypothesis was accepted. Results from the Wilcoxon-signed rank test confirmed that median total stress scores (i.e., sum of PSS-10, physiological variables) moderately decreased from pre-

to post-treatment assessments taken in week four (e.g., pre-treatment) and week 13 (e.g., post-treatment assessment). Additionally, the Wilcoxon-signed rank test confirmed that participants' mean PSS-10 scores decreased from pre- to post-treatment assessments, showing that perceived stress decreased overall for participants over the semester. As discussed in the literature, developing adaptive coping strategies to manage perceived stress in undergraduate students is postulated to benefit the students' overall well-being (Altaher & Runnerstrom, 2018; Nima et al., 2013; Pickens et al., 2019).

The study included two primary research questions and one secondary research question. The purpose of the first research question (RQ1) was to ultimately measure whether perceived stress and physiological measures (i.e., dependent variable) changed from pre-treatment to post-treatment after introducing and practicing adaptive coping strategies in the Introduction to Stress Management course (i.e., independent variable). Results from RQ1 demonstrated a decrease in the total stress score, including totals from the PSS-10, resting heart rate values, respiratory rates, and breathing patterns (e.g., belly breather, chest breather, or both). A composite score (i.e., total stress score) was devised that combined the physiological variables and the PSS-10 score. The decrease in participants' total stress scores from pre- to post-treatment assessments was statistically significant ($p < .05$), from a mean score of 106.03 to a mean score of 101.93. Participants' total stress scores decreased by a mean difference of 4.10 from pre- to post-treatment assessments. Participants' mean PSS-10 scores also decreased by .60, from 16.10 to 15.50, but this did not indicate a statistically significant change. PSS-10 scores of 0-13 indicate low perceived stress, 14-26 indicate moderate stress, and 27-40 indicate high perceived stress levels (Palkar et al., 2021). The mean change in PSS-10 scores indicated moderate stress levels for participants pre- and post-treatment. Three additional participants (10%) lowered their

perceived stress score from pre- to post-treatment after receiving the intervention (i.e., coping strategies). Findings showed that students in this study began the course with lower PSS-10 scores (M = 16.10) than those reported in other studies (Morgan, 2017; Gabrielli et al., 2021) however, those in the current study ended with lower PSS-10 scores (M = 15.50) compared to other studies (Morgan, 2017; Gabrielli et al., 2021). Other studies (Morgan, 2017; Gabrielli et al., 2021) reported significant decreases in scores, but again, students in the current study began with lower levels of perceived stress. All studies reported differences that would categorize participants in the moderate stress level from pre- to post-treatment.

While it should be noted that overall, the mean total stress scores decreased, some physiological variables also decreased. The two most substantial reported changes in physiological variables included decreases in respiration rates and changes in breathing patterns. From pre- to post-treatment, three additional participants (10%) decreased their respiration rates to less than 12 breaths per minute, and four additional participants (13.3%) improved from 16 or more breaths per minute in the pre-treatment assessment to less than 12 or 12-16 on the post-treatment assessment. While the literature was not reported on specific changes in respiration rates, it should be noted that one does not need conscious effort to breathe, but respiration rate can be altered; lowering respiration rate can serve as a coping mechanism by increasing stress tolerance, improving sleep quality, and causing positive psychological benefits (Balban et al., 2023). There was an increase in the number of participants that transitioned from a combination of chest and belly breathers or chest breathers to belly breathers (n = 4; 13.3 %). As discussed in Chapter 2 (p. 73), a shift in this breathing pattern indicates that diaphragmatic, or belly breathers are able to take in more oxygen per breath and are often able to activate the parasympathetic nervous via the vagus nerve through this method of breathing. Diaphragmatic breathing, also

known as abdominal or belly breathing, involves slow deep breathing with minimal involvement of the chest (Hamaski, 2020). Diaphragmatic breathing can decrease respiration and heart rates and cortisol levels (Hamasaki, 2020; Toussaint et al., 2021). Deep breathing while activating the diaphragm can improve stress and anxiety and decrease heart rate and oxidative stress after exercise (Hamasaki, 2020; Olpin & Hesson, 2021; Toussaint et al., 2021). Additionally, diaphragmatic breathing can increase cardiac output (the amount of blood pumped by the heart each minute), and increase blood oxygen levels, which are added physiological benefits (Toussant et al., 2021).

Sex Differences. When disaggregated by sex, women saw more improvements or decreases in total stress scores compared to men due to changes in physiological variables. However, differences in PSS-10 scores were not significant, which is similar to findings in the literature (Gabrielli et al., 2021; Kaya et al., 2015). The researcher reported findings (see page 104 (in Chapter 4) that retaining the null hypothesis indicated no statistically significant difference between men and women ($p > .05$), so the null hypothesis was retained signifying no difference in PSS-10 scores between the sexes. Resting heart rates average between 65-80 beats per minute for adults (Olpin & Hesson, 2021). For women participants, mean resting heart rate (RHR) decreased by 5.46 beats per minute from $M = 81.24$ to $M = 75.76$ beats per minute, which is of practical significance ($p = .052$) considering RHR is a significant physiological variable influenced by stress. Women saw a significant shift from the number of chest breathers to chest and belly breathers, and chest breathers to belly breathers, which again is another physiological variable influenced by stress. In women, respiration rate increased from pre- to post-treatment, but not significantly ($M = 0.06$). The findings support the alternative hypothesis that participants will experience a change in total stress scores (i.e., PSS-10, physiological variables); when

disaggregated by sex, the findings shown that women experience greater decreases in physiological variables compared to men.

Athletic Status and Major. When data were disaggregated, there were no significant differences to report in athletic status and total stress score or program of study and total stress score. Findings from the study suggest that athletic status is not a factor in increasing PSS-10 scores or increases in physiological variables. There were no significant differences ($p > .05$) to report for athletes and non-athletes for differences between physiological variables and PSS-10 scores.

Findings also suggest that the program of study is not significant regarding total stress score either. There were no significant differences ($p > .05$) to report for participants by major for changes between physiological variables and PSS-10 scores. These findings contradict the literature from Brougham et al. (2009), Böke et al. (2019), and Bernardo et al. (2018), all of whom indicated that programs of study should be considered when measuring stress in undergraduate students and that those enrolled in six or more math, chemistry, and biology (MCB) courses were at-risk for higher levels of perceived stress. Participants in the current study reported programs of study. The researcher coded participants by those in majors in the Kinesiology and Human Performance department ($n = 8$; 26.7%), Education ($n = 9$; 30.0%), and other ($n = 14$; 46.7%). As stated in Chapter 4 (p. 117), there were no significant differences ($p > .05$) to report for participants by major for changes between physiological variables and PSS-10 scores. The findings from the current study indicate that majors in the Kinesiology and Human Performance department (i.e., Health, Physical Education, Exercise Science, Strength and Conditioning, Sport Management), Education (i.e., Education, Math Education, Music Education), and other (i.e., Biology, Business, Communication, Health Science, Human

Services, Psychology) do not have increased total stress scores and PSS-10 scores due to their program of study. It should be noted that the separation of major did not include those who had at least six MCB courses as there was not enough data to disaggregate.

Theoretical Framework. The theoretical framework for this study is based on the works of Lazarus and Folkman (1984) and their transactional model of stress and coping and Arnett's (2000) theory of emerging adulthood. As previously mentioned in Chapter 2 (p. 54), Lazarus and Folkman's (1984) transactional model of stress and coping involves an individual's appraisal of the environment or stressor and the individual's determination if the event is threatening or causing distress. Appraisal of situations differs, as each individual's perception of the event and environment affects their response. Once the individual appraises an event or an environment as a stressor, they utilize available effective coping strategies to deal with it so they can employ available effective coping strategies (Robinson, 2018). While there are a variety of coping strategies, for the purpose of this research, coping strategies were identified as adaptive or maladaptive, and only six adaptive coping strategies were included (e.g., mindfulness, yoga, progressive muscle relaxation, power napping, gratitude journaling, social support).

As noted in Chapter 1 (p. 1-3), college students today are experiencing increased levels of stress and mental health issues as they undergo a period of transition from minors to becoming young and emerging adults. Arnett (2000) observed that students in their late teens to early twenties are in a period of exploration and noted that this has changed from the past half century when many in their late teens and early twenties were assuming adult roles and responsibilities, including jobs and marriage. Arnett described the ages 18-25 as a time of "relative independence from social roles and from normative expectations" (p. 469), a time of exploration, free from some responsibilities and a time full of possibilities. While this can be exciting for some, it can

also be a time of full of disappointment, failure, and the unknown. During ages 18-25, emerging adults have the "highest rates of residential change of any age group" (Arnett, 2000, p. 471). According to Arnett, emerging adults do not feel like adolescents or adults, possibly due to pursuing an education, marital status (i.e., unmarried), or the lack of homeownership. Arnett noted that the American media coined this period "quarter-life crisis" (p. 70) as 18–25-year-olds search for their purpose in life. Emerging adulthood can be an exciting or an anxious period; it is subjective and determined by the individual's appraisal of events. Some may find financial independence and self-sufficiency taxing after relying on parents and caregivers. According to Arnett (2007), taking on adult roles often includes marriage, a family, full-time employment, and financial independence from parents.

Students who struggle with mental health problems and cannot efficiently cope with stress are at an increased risk of not successfully completing their education, which prevents them from fully developing their talents and depriving society of their contributions. Morgan (2017) noted the relationship between a lack of coping skills and mental health issues. Mental health issues can lead to suicide, the second leading cause of death in those ages 10-14 and 25-34 (Centers for Disease Control [CDC], 2022). Böke et al. (2019) reported that several studies have shown the prevalence of stress in college and university students. Böke et al. (2019) reported that many studies on college and university students showed an increased prevalence of stress and mental health disorders compared to the general population. Stress and mental health issues can impact their academic performance, physical health, and well-being (Asikainen et al., 2019). The perception of this stress can manifest into physical symptoms, including hypertension, ulcers, anxiety, among others (Kwaah & Essilfie, 2017). This can be a vulnerable time for students as they search for methods to cope with stress which can include both adaptive and maladaptive

strategies (Brougham et al., 2009; Arnett, 2000; Lane, 2020). Affording students adaptive coping strategies during this transitional time provides a healthy avenue for college students to manage their stress.

As young and emerging adults, participants may experience unique stressors due to some reliability on parents for financial stability, housing, food, among other necessities. Demographic characteristics were evaluated and participants whose stress increased from pre- to post-treatment were predominantly Caucasian/White (100%), men (50%). Half were in their second year of college, 62.5% worked part-time and had incomes of less than $9,999. Seventy-five percent of participant's parents covered less than half of the costs associated with college. The majority (75%) had experienced physical or mental illness within the last month.

Effective Coping Strategies (RQ2)

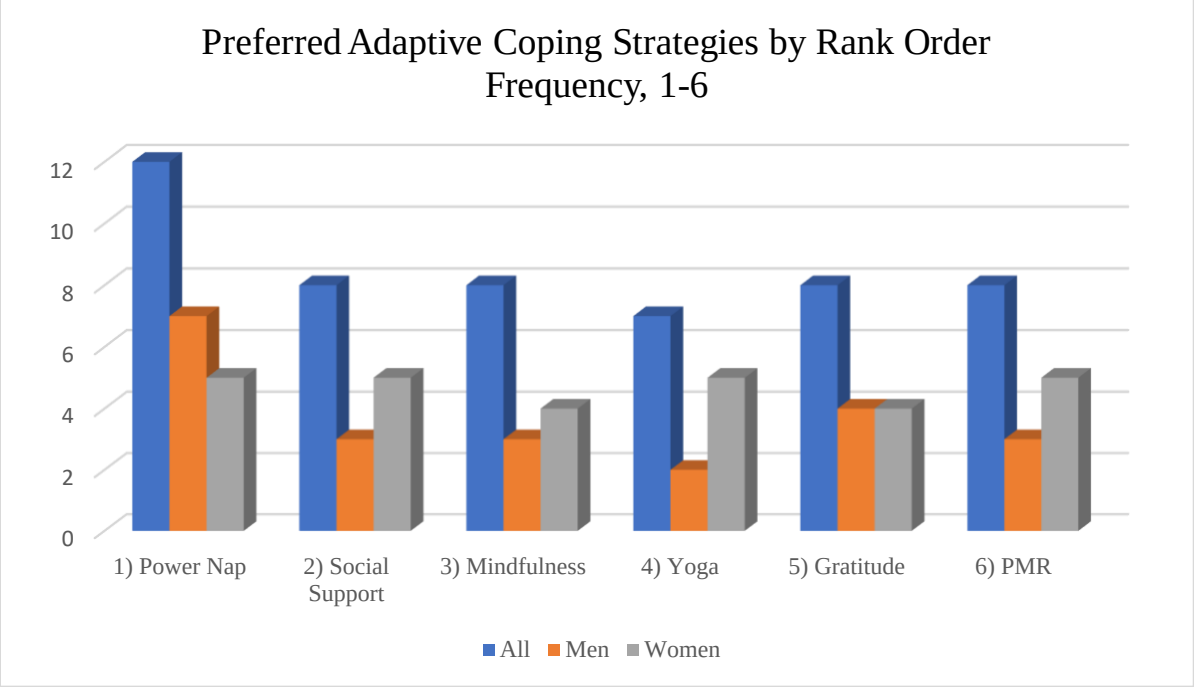
Results RQ2 were generated from participant responses on the post-treatment assessment in which each participant ranked their appraisal of the most effective, practiced adaptive coping strategy used over the course of the semester. Thirty participants completed the pre- and post-treatment assessments. The Introduction to Stress Management Course was a two-credit class offered Mondays and Wednesdays from 9:00-9:50 a.m. or 11:00-11:50 a.m. during the fall 2022 semester, with the same instructor for each section. The course outline is posted in Appendix F and reflects the curriculum covered each week. Typically, the course had been instructed with a lecture and experiential learning format, spending approximately one week on each topic. Historically, lab homework was assigned on a weekly basis to ensure student participation in coping strategies outside of class time. Participants were also expected to read the chapter and complete a low-stakes quiz over each chapter. During week 13 participants were surveyed via Qualtrics regarding post-treatment assessment data. The researcher was present and gave a brief

review of each coping strategy before students began the survey. Students then completed the post-treatment assessment and effective adaptive coping strategies were ranked by all participants from one through six and are listed in order from highest to lowest rank. Overall, participants' frequency of responses ranked the following in order: 1) power nap, 2) yoga, 3) social support and mindfulness, 4) social support, 5) gratitude journal and PMR, and 6) gratitude journal and PMR.

Figure 9 shows all participants preferred adaptive coping strategies by rank order from 1-6 and is also separated by sex.

Figure 9

Undergraduate Students Rank Order Agreement on Preferred Adaptive Coping Strategies, Ranked 1-6



Note. Coping strategies by rank order agreement, 1-6 by all participants (e.g., 12 agreed that power nap was number one, eight agreed that mindfulness was number three).

Power Napping. Power napping was ranked as the number one most effective coping strategy by 30 participants who completed the post-treatment assessment. Because each participant was allowed to choose their own rank order, some coping strategies received equal votes and tied for rank. The power nap introduced in the Introduction to Stress Management course included an audio file with relaxation methods and was meant to activate the parasympathetic nervous system (Olpin & Hesson, 2021). A study conducted by Daaloul et al. (2019) proved that power napping was effective for fatigued and sleep-deprived participants and noted it can also serve as an ergogenic effect for athletes. While the researcher did not collect findings on participants after napping, literature affirmed that the 10-minute nap provided greater benefits overall for college students in the three hours following the nap (Brooks & Lack, 2006). Findings from the study concurred with one study (Kamal et al., 2012) in that power napping can provide benefits and reduce stress. Those who are sleep-deprived tend to have higher levels of perceived stress, and sleep deprivation is often common among undergraduate college students as young adults often sleep less than seven hours a night (Furman et al., 2018; Kamal et al., 2012; Takahashi, 2003). Short nap breaks lasting less than 30-minutes can improve mood, fatigue level, concentration, alertness, and increase work productivity by increasing happiness and restfulness, and decreasing illness and stress (Sarwar & Tanvir, 2020; Brooks & Lack, 2006). The literature on napping provided overwhelming positive evidence of health benefits for sleep-deprived individuals, which may often include undergraduate students.

Social Support. Social Support was ranked second overall in effectiveness for coping strategies. Chapters 1 and 2 introduced the importance of this time in a college student's transition to young and emerging adulthood; social support can be a critical aspect of a college student's experience. Social support is often associated with academic success and satisfaction of

a college student's overall college experience (Pidgeon et al., 2017). College students often seek peers and family for social support, but this support can also include that of people in an academic setting (e.g., faculty, staff) (Altaher & Runnerstrom, 2018; Bledsoe et al., 2018). Social support can include many forms but was defined by Lazarus and Folkman (1984) as "having people from whom one receives emotional, informational, and/or tangible support…" (p. 164). Many studies (Altaher & Runnerstrom, 2018; Bledsoe et al., 2018; Brougham et al., 2009; Pidgeon et al., 2017) indicated the importance of social support and its efficacy regarding stress management. The findings from the Bledsoe et al. coincide with the findings from this study in that 40% of participants surveyed in both studies indicated the effectiveness of social support as a coping strategy. In those whose total stress scores decreased, findings shown that participants had a lower perception of social support from peers, the same perception of support from family, and decreased social support from faculty/staff. What speaks loudly to the researcher and is clearly imperative in supporting students in higher education were the findings in those whose total stress scores increased, showing that the mean difference of perceived social support from peers and family decreased from pre- to post-treatment (M = -1.00, M = - .54, respectively) *except* from faculty/staff (M = + .50). The researcher cannot fully understand the results, but questions whether participants whose total stress scores increased found available social support in faculty and staff. Faculty should be mindful of the optics they portray regarding their supportive role of the students and understand the significance of sharing campus support information (i.e., counseling centers, advisor information, emergency financial assistance, food assistance) as a method of social support, which is known to function as a coping mechanism (see Table 36). Half of the students were in their second year and ranged in age from 18 to 21. The researcher wonders if the information provided in the Introduction to Stress Management

class helped students to realize the supportive role that faculty and staff offer. While the amount of perceived support from faculty and staff increased in those whose stress scores increased, it was still perceived less than peers (M = 4.63) and family (M=6.71). The course the participants were enrolled in included assignments and labs (i.e., the treatment for the study) that helped the students to explore the role of social supports. For example, interviewing grandparents or family members who had been married for at least 25 years and spending a class period destressing with dogs (which explored the role pets play in supporting one's health and helping to manage stress).

Mindfulness. Results on mindfulness showed that it ranked third by participants as most effective, however, the literature in Chapter 2 noted that for mindfulness to be effective in decreasing anxiety, depression, or stress, it needs to be utilized for more extended periods as time progresses (e.g., 2.5 – 3 hours per week), or utilized for at least eight weeks. Again, the Introduction to Stress Management course included a brief introduction to mindfulness as one of many coping strategies to be used for stress management and mindfulness was not practiced for this extended period of time. Participants spent one week on each topic, and class included lecture and experiential learning. The homework and labs were to be completed outside of class each week in which the participants completed the coping strategy outside of class. New research conducted during the COVID-19 pandemic compared the effectiveness of mindfulness meditation with breathwork and found that breathwork was more effective in enhancing mood and reducing physiological stress variables (e.g., respiratory rate, heart rate, heart rate variability) in college students than mindfulness meditation (Balban et al., 2023). Some studies showed the efficacy regarding decreases in stress (Bergen-Cico et al., 2013; Greene et al., 2019), and while results from the current study show decreases in total stress scores, this study also coincides with

a recent study (Balban et al., 2023) showing that mindfulness meditation is not as effective as other modes of adaptive coping strategies used by college students.

Yoga. Yoga was ranked fourth overall in effectiveness for coping strategies. As discussed in Chapter 2, yoga has been in existence for centuries, and is often used by Americans as a practice to focus on breathing, posture, and meditation and can be used with college students in the classroom as a coping strategy for stress. The efficacy of yoga has been shown to decrease perceived stress, blood pressure, and heart rate; studies have shown that yoga could be just as effective as other coping strategies (Cady Arbeau, 2016; Morgan, 2017; Singh et al., 2020). Park et al. (2017) noted the efficacy of yoga as a coping strategy and recommended eight weeks of practice. The findings from this study coincide with some of the literature in that perceived stress scores did decrease, along with physiological variables; however, participants in the Introduction to Stress Management course were provided a brief introduction on yoga (i.e., one week) as just one of many coping strategies to be used for stress management.

Gratitude Journal. Gratitude journaling was described in Chapters 1 and 2 (pp. 19, 48) as writing or listing things one is grateful or thankful for. Işık et al. (2017) noted that "gratitude can be cultivated, resulting in positive emotions, which in turn will help individuals build resilient capacities" (p. 172). Işık et al. study determined that engaging in three weeks of daily gratitude journaling demonstrated gains in positive affect and satisfaction with life. Bono et al. (2020) determined that gratitude was a more significant factor in participants they considered in the low-education group which separated/defined those students whose parents had little to no college education. The findings from their study determined that students in the low education group began the semester with lower levels of gratitude, but those levels increased by the end of the semester, which was the first year of the COVID-19 pandemic. Bono et al. also noted that

gratitude interventions are “universally valuable for helping support and protect the wellbeing of incoming freshmen during the COVID-19 pandemic” (p. 40). Gratitude was found to contribute to subjective wellbeing and lead to increased resilience, especially in those from low socioeconomic backgrounds and those whose parents had little to no higher education (i.e., first-generation college students). The findings from this study demonstrated that participants did not find gratitude journaling to be the most effective adaptive coping strategy and participants’ data were not disaggregated by socioeconomic status as that information was not collected. This study also did not disaggregate by first-generation college student status as only one participant whose stress level increased of the eight was a first-generation college student.

Progressive Muscle Relaxation (PMR). Progressive muscle relaxation (PMR) was defined in Chapter 2 (p. 43) as “contracting and relaxing the muscles to make one feel calmer and helps relieve the symptoms of stress” (Palkar et al., 2021, p. 10). As described in Chapter 2, findings from studies by Palkar et al. (2021), Scholz et al. (2016), and Toussaint et al. (2021) demonstrated the efficacy of PMR in reducing test anxiety, perceived stress, and improvement in levels of depression. While Palkar et al. utilized PMR for one month, the current study provided an introductory session to PMR (i.e., one week) during the semester. While findings from the current research study did show decreases in total stress scores, the findings did not align with research (Palkar et al., 2021; Scholz et al., 2016; Toussaint et al., 2021) regarding effectiveness, as participants ranked PMR sixth in effectiveness out of six.

Preferred Coping Strategies by Sex. There were differences between sexes regarding preferred adaptive coping strategies reported in Chapter 4 (see Tables 20, 21). Men ranked power napping, yoga, and social support/mindfulness as their top three coping strategies. On the other hand, women ranked social support as first and second and gratitude journal/PMR/mindfulness

as the third most effective adaptive coping strategies. When the sample was disaggregated by demographic variables (e.g., sex, athletic status, those whose total stress increased), every sub-set of the population chose power nap as the first-ranked coping strategy, with the exception of sex, because women preferred social support as both their first and second most effective coping strategy. As alluded to in Chapter 2, women tend to gravitate towards social support for an adaptive coping strategy to deal with stress. Brougham et al. (2009) hypothesized that the difference between sexes was due to the "tend and befriend" theory which proposes that women seek solace from social groups and others in times of distress (Olpin & Hesson, 2021). Historically, women have also been shown to seek emotional support over problem-focused coping compared to men (Brougham et al., 2009). However, it should be noted that while social support received the highest number of rank-order votes by women for the number one position, power napping received five votes and only fell short by one vote. According to Altaher and Runnerstrom (2018), students identified stress-relieving activities (e.g., leisure time with friends) as the number one option to lower stress and anxiety, social interactions with friends were also shown to lower PSS-10 scores. The study conducted by Altaher and Runnerstrom closely aligned with the first and second-ranked most effective coping strategy reported by women. However, Bledsoe et al. (2018) reported that social support was not the top coping strategy self-reported by students, but social support did rank third for men, which differed from other studies which found social support (i.e., family, friends) as students' number one choice for coping (Altaher & Runnerstrom, 2018; Bledsoe et al., 2018). The findings from studies reported in the literature (e.g., Chapter 2) closely aligned with the findings from the current study, which demonstrated that men selected social support as third and fourth in the rank order of most effective coping strategies used during the semester, while women favored social support.

Again, there were differences when disaggregated by sex, as women ranked gratitude journaling as third while men ranked it as fifth most effective out of six coping strategies. The findings of this study coincide with Kashdan et al. (2009) cited in Chapter 2 (p. 49) in that sex could account for differences regarding gratitude journaling and preferred effective coping strategies. Kashdan et al. affirmed that women reported more gratitude for gifts received than men did (e.g., both older and college-age) and that women found gratitude to be more advantageous while men may find gratitude to be uncomfortable and challenging, thus obtaining fewer benefits from it.

What Happened to Total Stress Scores? (RQ3)

While the results demonstrated a decrease in total stress scores (i.e., sum of PSS-10, physiological variables) for the majority of participants (n = 20; 66.7%), the scores of two participants (6.7%) stayed the same from pre- to post-treatment and the scores from eight participants (26.7%) increased from pre- to post-treatment. The researcher disaggregated the total stress score by demographic variables with the purpose of comparing the characteristics of participants whose total stress scores increased with those whose total stress scores decreased.

Demographic Variables for Participants Whose Total Stress Increased. As noted in Chapter 4, eight participants' total stress scores increased from pre- to post-treatment assessments. Pre-treatment PSS-10 scores increased from a mean of 14.50 to a mean of 19.13, which meant that participants still began the course and finished the course at the moderate-stress level based on the perceived stress scale’s score interpretation. The practical significance of these results is that the group whose stress increased reported lower levels of perceived stress to begin with (i.e., pre-treatment assessment). The researcher continued to disaggregate data to explore specific characteristics about the eight participants whose stress scores increased. First, those

whose total stress scores increased began the semester with lower total stress scores (e.g., *M* = 14.50) than those participants whose stress scores decreased (e.g., *M* = 17.10). While the researcher cannot delineate the cause of the increase in perceived stress and total stress scores, participants whose stress increased also experienced increases in mean resting heart rates and respiration rates. Only one of these eight participants (12.5%) was a first-generation college student, indicating that this demographic variable did not significantly impact total stress scores. When examining social wellness, half of those whose total stress scores increased did not meet the minimum requirements for physical activity (i.e., 150 minutes of moderate-intensity physical activity); 12.5% reported participating in no physical activity, and 37.5% did not meet the minimum recommendation of 150 minutes of moderate-intensity activity. Seventy-five percent (*n* = 6) reported having experienced physical or mental illness within the last month, which had increased by 25% (*n* = 2) from the pre-treatment assessment. Specific data were not collected on mental illness or COVID-19; therefore, the researcher could not provide further disaggregated data regarding mental and physical health. Thirty-seven and a half percent (*n* = 3) of those whose total stress score increased were athletes and 62.5% (*n* = 5) were non-athletes.

Half of the participants (*n* = 4) whose total stress scores increased from pre- to post-treatment assessment were in their second year of school, which aligned with some of the literature that freshmen and sophomores reported greater stress than juniors and seniors (Brougham et al., 2009). A study conducted in 2022 noted that "women, non-binary students, and second-year students reported higher academic stress levels and worse mental well-being" (Barbayannsi et al., 2022, para. 15). However, Böke et al. (2019) suggested that the students' perceived stress was higher in subsequent years than in the first year. The findings from the current research suggest that year of study appears to be a significant factor in those whose total

stress scores increased and aligns with research by Barbayannsi et al. (2022) in that second-year students report higher levels of total stress, including academic stress and decreased mental well-being. Barbayannsi et al. suggested that this could be due to selecting a major, advanced coursework, struggling with time management, fewer coping strategies, and even less social support available than upper-class students.

Participants whose total stress scores increased were asked the following, 1) share/explain how the coping strategies helped you deal with your stress, 2) did you find these coping strategies effective for management of your stress? and 3) will you continue to use these coping strategies in the future? Seven of the eight participants reported that the coping strategies were "kind of" effective and noted that they "might" use some of the coping strategies in the future. Two noted that the coping strategies were "calming." A participant who was majoring in a program in the Kinesiology and Human Performance (KHP) department commented, "*1. This course taught me that stress is ok, but managing it is the difference between be [sic] able to keep my composure and not. 2. Yes, I found that most of them (i.e., coping strategies) are beneficial for me to do. 3. I will continue to use my top 3 strategies listed above in the future."*

Demographic Variables for Participants Whose Total Stress Decreased. As noted in Chapter 4, 20 participants' total stress scores decreased from pre- to post-treatment assessments. Pre-treatment PSS-10 scores decreased from a mean of 17.10 to a mean of 14.35, which meant that participants began and finished the course at the moderate-stress level based on the perceived stress scale. Of the 20 participants whose total stress scores decreased, women comprised the majority of participants (n = 14; 70%), while only 30% (n = 6) were men. Ninety-five percent of participants who experienced decreases in total stress scores were White/Caucasian and 5% (n = 1) chose other for race/ethnicity. Findings from this study

indicated that race/ethnicity were not a factor in decreases in total stress scores, however, the majority of participants who completed the post-treatment assessment reported being White/Caucasian. As reported in Chapter 2 (p. 33), Böke et al. (2019) noted that undergraduate women report higher levels of stress in later college years. This contradicted the results from the study regarding sex and year of study. Seventy percent (n = 14) of women experienced decreases in total stress scores, and 30% (n = 6) of those whose total stress scores decreased reported being in their third, fourth, or fifth year and 30% (n = 6) reported ages of 20-26, but it should be noted that many participants in the study were in their first or second year of college.

When participants whose total stress scores decreased were asked about 1) coping strategies that were helpful, 2) whether the coping strategies were effective, and 3) whether they would continue to use them again, all participants (n = 20) reported that at least some of the coping strategies were effective or beneficial and that they would use them again. One woman participant, majoring in education said, "*1. I had never heard of most of these strategies. I have been through a lot of changes this semester so I found it very beneficial to be learning strategies to handle my stress. 2. I found social support and yoga the most useful as I somewhat overthought every other technique. 3. I definitely see myself continuing to use these.*

Unexpected Findings

Due to the literature on women reporting higher levels of stress and/or mental health matters, the researcher expected to find that women experienced higher total stress scores than men (i.e., PSS-10, physiological variables) (Adasi et al., 2020; APA, 2018; Böke et al., 2019; Flatt, 2013; Graves et al., 2021). The findings from the current study showed that 50% of men increased their total stress scores, and 70% of women decreased their total stress scores from pre- to post-treatment assessment and there were no differences across sexes. The findings also

demonstrated increases in participants' total hours of sleep from pre- to post-treatment assessments. As stated in Chapter 2, the literature reported that college students sleep on average less than seven hours a day (Takahashi, 2003; Kamal et al., 2012). Findings from the current research showed that total hours of sleep increased for all participants from pre- to post-treatment assessment, including participants whose total stress scores increased (e.g., from M = 6.88 hours to M = 7.00 hours) and participants whose total stress scores decreased (e.g., from M = 7.25 hours to M = 7.45 hours). The benefits of sleep are numerous and affect mental (e.g., improved stress levels) and physical health (e.g., immune system, cardiovascular system, blood sugar/diabetes) (Faraut et al., 2017).

More athlete participants began the study than the researcher anticipated (e.g., 51%). By the post-treatment assessment in week 13, data was collected from pre- to post-treatment assessments for 13 (43.3 %) athletes and 17 (56.7%) non-athletes. The researcher also expected to find that athletes' PSS-10 and/or total stress scores were higher when the findings showed no significant difference.

Implications of Findings

The implications of this study are that, as young and emerging adults, college students report being moderately stressed, more so in their second year. As noted in Chapter 1 (p. 1), college students worldwide are experiencing increases in anxiety, depression, and mental health matters, affecting their overall health and well-being and impacting their college experience (Asikainen et al., 2019). Perceived stress can impact physical health and is often linked to hypertension, ulcers, heart disease, and anxiety, leading to morbidity and even mortality (Kwaah & Essilfie, 2017; Salleh, 2008). During this time of transition to young and emerging adulthood, it is essential to provide students with adaptive coping options as many college students seek

solace through maladaptive methods (e.g., alcohol, drugs, absence from class) (Kwaah & Essilfie, 2017; Robinson, 2018). Young and emerging adulthood is a time for students to adopt healthy behaviors, seek an education, and experience growth and maturity (e.g., financial responsibility, physical activity, ethical behavior) (Scales et al., 2016). Research from Pickens et al. (2019) indicated that college student's mental health is deteriorating, and students are seeking coping strategies to manage stress. As high school students, many lack the "foundational building blocks of life success" (Scales et al., 2016, p. 155) and struggle with social relationships. If students are entering college already at a disadvantage, this puts additional stress on institutions of higher education to provide areas of support. Scales et al. suggested the long-term implications for those transitioning to young and emerging adulthood for college, work, or married life and noted that ultimately young and emerging adults' health and levels of stress can impact their socioeconomic status and well-being (Scales et al., 2016).

The implementation and practice of adaptive coping strategies in an Introduction to Stress Management class suggested that students total stress scores (i.e., PSS-10, physiological variables) and PSS-10 scores decreased, which positively impacted students' overall health and well-being. In general, the coping strategies to decrease stress exhibited positive results for 2/3 of the individuals. Results from the study indicated that implementing adaptive coping strategies with undergraduate college students effectively decreases perceived stress and physiological variables associated with stress. Teaching students how to objectively assess perceived stress levels and physiological variables allows them to determine the presence of stress. Providing access for students to practice and utilize adaptive coping strategies to assist in efficiently coping with stress is extremely beneficial for students' health and well-being. In the long run, it will benefit colleges and universities as many institutions are concerned about declining enrollment.

The National Academies of Sciences, Engineering, and Medicine (2021) noted that for each student that drops out of school due to mental health concerns equals one less student enrolled in the institution and paying tuition. Dropout rates can range from 43-86% when students suffer from mental health matters (National Academies of Sciences, Engineering, and Medicine, 2021). Institutions of higher education need to provide access to services for students, as there is clearly a need. As noted in Chapter 1,"interventions promoting well-being for college students should be considered by higher education institutions, as it has been reported that emotional and social wellness factors are related to college student success and retention" (Pritchard and Wilson 2003, as cited in Işık & Ergüner-Tekinalp, 2017, p. 172). Many studies indicate the efficacy of adaptive coping strategies (Larson, 2015; Nima et al., 2013; Altaher & Runnerstrom, 2018; Pickens et al., 2019). Interventions focusing on stress management, coping strategies, and wellness can fall under the academic or student affairs umbrella. In academics, a 16-week, 2-credit elective or major requirement can positively impact students and make a significant difference in perceived stress with a student population while providing information and access to life-long tools to measure stress and utilize coping strategies.

Based on the findings, the researcher suggests implementing any of the six coping strategies (i.e., mindfulness, yoga, progressive muscle relaxation, power napping, gratitude journaling, social support) identified in the study, but specifically, power napping, yoga, and mindfulness as most of these are geared towards relaxation and can impact physiological variables. As previously mentioned in this chapter, focus on diaphragmatic breathing may positively impact physiological body states (e.g., RHR, respiration rate). Social support is an effective and vital coping strategy, especially for women in college. Focusing on campus social support systems available for students provides faculty the opportunity to discuss services

provided on campus (e.g., counseling services, academic advisors, financial support, food support) and allows the conversation to take place about the importance of asking for help and seeking counseling or advising.

For most participants (*n* = 20; 66.7%), instruction and implementation of a variety of adaptive coping strategies proved to be effective in reducing PSS-10 and physiological scores. As mentioned in this chapter, the researcher cannot delineate the cause of the increase in perceived stress and total stress scores, but certain demographic variables emerged as potential contributors. Half of participants whose total stress scores increased were white/Caucasian men; however, 70% of those whose total stress scores decreased were white/Caucasian women. Half of the participants whose total stress scores increased were in their second year of school. The change in physiological variables suggested that women responded positively to adaptive coping strategies. This study's findings suggest that the majority of students in an Introduction to Management course will see improvements in perceived stress and physiological variables impacted by stress by learning and practicing adaptive coping strategies in as little as nine weeks (i.e., from weeks four to 13 during the semester). During a time when students' mental health is a chief concern for institutions of higher education, implementing an academic course that provides tools to cope with stress may benefit students and institutions of higher education.

Limitations of the Study

While the study had numerous strengths, there were some limitations. A strength included gathering data from 30 participants for pre- and post-treatment assessments, however, one limitation included receiving 28 participant responses on the mid-treatment assessment. Due to the number of decreased participant responses, the researcher opted to omit the mid-treatment assessments to follow recommended sample size for experimental studies (Fraenkel et al., 2019).

A second limitation was again due to sample size; the study did not allow for random assignment. Convenience sampling was used again to meet the recommended sample of 30 participants (Fraenkel et al., 2019).

Because this was a one group pretest-posttest, the study lacked a control group. While measures were taken to ensure that all participants received the same treatment (i.e., coping strategies) there was no control group in which to compare total stress scores. As noted in Chapter 1, the researcher was initially scheduled to instruct the Introduction to Stress Management courses, however, due to accepting a position at another institution of higher education, the researcher did not serve as the instructor for the course. The researcher did construct the course outline and coping strategies but did not serve as the face-to-face instructor of the course. While this may have removed researcher's bias, it did mean the researcher vanquished control of how the coping strategies were instructed and/or practiced in the course. The researcher also lacked knowledge or control of participant attendance associated with the six adaptive coping strategies utilized (i.e., mindfulness, yoga, progressive muscle relaxation, power napping, gratitude journaling, social support). Confounding variables may have also contributed to factors which affected total stress scores (e.g., weather, holidays, end of semester).

Recommendations for Further Research

Manual measurements for physiological variables were taken in the current research study. The researcher recommends that wearables be used (e.g., WHOOP, Apple Watch, Fitbit, Garmin, Oura) to provide physiological data that can be averaged over time as opposed to only at pre- and post-treatment assessments (Balban et al., 2023). Providing wearables to participants and viewing physiological trends over time would take out specific events like perceived stress from specific events, daily hassles, holidays, or final exams. The researcher also recommends

including breathing exercises as a coping strategy. While breathing exercises were included as a coping strategy in the Introduction to Stress Management course, they were taught by the researcher after the final post-treatment assessment and not included as one of the six adaptive coping strategies. Breathing exercises were not taught by the instructor of the course and were supplemented by the researcher. Breathing exercises differ from the assessment of breathing patterns (i.e., chest breather, belly breather, both) that were instructed for participants during the pre-, mid-, and post-treatment assessments. Literature published by Balban et al. (2023), demonstrated an inverse relationship between decreases in respiratory rate and increases in daily positive affect. Breathwork has also been shown to decrease physiological variables over time, which can lead to decreases in total stress scores.

Findings suggested that students in their second year of school experienced increases in total stress scores, which aligns to the literature, stating first- and second-year students reported greater stress than juniors and seniors, and the students' perceived stress is higher in subsequent years than in the first year (Brougham et al., 2009; Böke et al., 2019). The researcher recommends implementing coping strategies with those in their first and second year of study as this population appears to be the most vulnerable to stress. Introducing adaptive coping strategies early on in students' college careers may provide them with the tools to better manage their stress and set them up for success.

This current study did not focus on the direct impacts of COVID-19. During the fall of 2022, COVID-19 still impacted institutions of higher education (e.g., financially, decreased enrollments, increased stress levels for faculty, staff, and students) (National Academies of Sciences, Engineering, and Medicine, 2021). The researcher did not include any specific items on the questionnaire regarding the impacts of COVID-19 and stress. It may be worth considering

inquiring about this if COVID-19 is still a factor going forward, particularly for those who suffered from the virus and are experiencing its effects in the long haul.

Lastly, the researcher recommends assigning point values for preferred adaptive coping strategies. The addition of a point value may assist in simplifying future research when evaluating coping strategies instead of collecting frequency rank order for each.

Conclusions

This study aimed to determine whether PSS-10 scores and physiological variables in undergraduate college students were impacted after introducing and practicing coping strategies in an Introduction to Stress Management course. Additionally, the researcher sought to determine the most effective coping strategies utilized by the students and determine how demographic variables influenced PSS-10 scores and physiological variables.

Based on the findings, the study confirmed that implementing adaptive coping strategies lowered total stress scores (i.e., PSS-10, physiological variables) in most undergraduate students. Participants reported preferred adaptive coping strategies; there were differences when disaggregated by sex. Data showed that students preferred power napping as the first coping strategy. However, data revealed that more students (i.e., participants whose total stress scores increased and those whose total stress scores decreased) chose social support over power napping as an effective coping strategy. Participants whose total stress scores increased also reported increases in social support from faculty and staff from pre- to post-treatment assessments (see Table 36). All participants but one (n = 29) commented that at least some of the coping strategies were beneficial or effective and some commented that the coping strategies were calming.

Undergraduate students tend to perceive more stress and experience a higher frequency of stress and mental health disorders than the general population (Larson, 2015; Asikainen et al., 2019). Ensuring students have tools to assess perceived stress levels allows them to self-identify low, moderate, and high levels of stress. While stress itself is inevitable, it is imperative that undergraduate students, who can typically be characterized as young and emerging adults, be provided opportunities to learn and practice adaptive coping strategies. This timeframe is critical as young and emerging adults still need guidance and support; supported students tend to perform better academically, which leads to increased graduation rates, and successful professionals who become contributing members of society. Exploring the link between coping strategies and stress also helps verify whether additional stress management and coping strategies need to be provided for students using campus resources. Doing so allows faculty members and the institution to better serve the students, specifically students in their second year, and prioritizes the overall health and well-being of the college students enrolled at institutions of higher education. Institutions of higher education should prioritize college students' health and well-being by offering activities focusing on social and emotional wellness, as these activities can impact academic performance (Işık & Ergüner-Tekinalp, 2017). Institutions of higher education should consider implementing stress management interventions to foster an environment that focuses on students' mental health and well-being. Providing students with tools to assess and appraise stress enables them to better manage stress and choose appropriate coping strategies to improve overall health and well-being.

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APPENDIX A. PERMISSIONS AND IRB APPROVAL

Institutional Review Board

MINNESOTA STATE UNIVERSITY MOORHEAD

DATE:	September 22, 2022
TO:	Ximena Suarez-Sousa, Principal Investigator
FROM:	Dr. Robert Nava, Chair Minnesota State University Moorhead IRB
ACTION:	**APPROVED**
PROJECT TITLE:	[1793720-4] Measuring Perceived Stress Levels and Adaptive Coping Strategies in Undergraduate College Students: A Quasi-Experimental Study
SUBMISSION TYPE:	Response/Follow-Up
APPROVAL DATE:	September 22, 2022
EXPIRATION DATE:	
REVIEW TYPE:	Exempt Review

Thank you for your submission of Response/Follow-Up materials for this project. The Minnesota State University Moorhead IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Exempt Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require that each participant receives a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this committee prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to the Minnesota State University Moorhead IRB. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to the Minnesota State University Moorhead IRB.

This project has been determined to be a project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the appropriate forms for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of .

Please note that all research records must be retained for a minimum of three years after the completion of the project.

If you have any questions, please contact the Minnesota State University Moorhead IRB. Please include your project title and reference number in all correspondence with this committee.

This letter has been issued in accordance with all applicable regulations, and a copy is retained within Minnesota State University Moorhead's records.

Academic Affairs

VALLEY CITY STATE UNIVERSITY

August 3, 2021

To Whom It May Concern:

This letter confirms that I, Margaret Dahlberg, Vice President for Academic Affairs, grant Sarah Milner permission to conduct a research study at Valley City State University during the 2022-2023 academic year. I understand that this study poses no risk to those persons involved or to Valley City State University. I also understand that all information received will be kept confidential and will only be used for purposes of this study.

- Research Site: Valley City State University, 101 College St. SW Valley City, ND 58072
- Study Purpose: This research includes assessing perceived stress levels in undergraduate college students and their preferred adaptive coping mechanisms, a major focus in the Introduction to Stress Management course.
- Study Activities: All students will be assessed using the PSS-10 scale to assess perceived stress; those who agree to participate in the study will be assessed three times throughout the course. Using a sliding scale following the PSS-10 will allow for the collection of data regarding adaptive coping mechanisms taught in the Introduction to Stress Management course and practiced throughout the semester by the students.
- Site Support: Valley City State University will support the investigator in conducting research and collecting data in the Introduction to Stress Management courses.
- Data Management: Participants will be given an informed letter of consent for their review electronically in which they will agree to participate or deny participation with no ramifications. Students will be able to drop out of the study at any time. Subjects will be identified by codes that will not link them to the study. Data will be collected and kept on a secured laptop, and information will be destroyed after three years.

Sincerely,

Margaret Dahlberg

Margaret Dahlberg
Vice President for Academic Affairs
Valley City State University
Valley City, ND 58072
701.845.7200

APPENDIX B.1 PRE-TREATMENT ASSESSMENT QUALTRICS QUESTIONNAIRE

Pre-treatment Assessment

Start of Block: Informed Consent

Q1 Informed Consent:
Thank you for your interest in this study. The title of this research study is Measuring Perceived Stress Levels and Adaptive Coping Strategies in Undergraduate College Students: A Quasi-Experimental Study.

The purpose of this research is to determine if college students' Perceived Stress Scores (PSS-10) and physiological variables change during an Introduction to Stress Management course and identify the preferred adaptive coping strategies college students utilize to manage stress.

This study will collect data on students' perceived stress and physiological variables before, during, and after the stress management course. Demographic information will be collected on participants along with basic physiological variables during pre-, mid-, and post-treatment assessments including resting heart rate, breathing patterns, and respiration rate. The physiological variables will provide a measure of stress-related physiological responses.

The participants will complete this study during class periods on three separate occasions (i.e., the beginning of the semester, the middle of the semester, and the end of the semester).

Participation in the study may help the participants recognize periods of increased and decreased stress and which coping mechanisms they utilize during those times. Some of these questions may place you at minimal risk because it may trigger minimal psychological stress.

Participant's identity will not be shared with anyone, including the co-investigator, Sarah Milner. All individual information will be tracked under an identification number (i.e., the last 4-digits of the participant's cell phone number) and not the participant's name.

Participation in this study is optional. Students can choose not to participate or choose to withdraw at any time without any negative effects on grades, relationship with the professor, or relationship with their school.

If you have any questions about the study, you may contact any of these people:
Sarah Milner Co-Investigator Ph. 712.490.XXXX Email: sarah.milner@go.mnstate.edu Dr. Ximena Suarez-Sousa, Ph.D. Principal Investigator Professor of Leadership and Learning Lommen 211C Ph. 218.477.2007 Email: suarez@mnstate.edu

○ By clicking here, I agree to participate in this study (1)

End of Block: Informed Consent

Start of Block: Last Four Digits of Cell Phone Number

Q2 Please enter the last 4-digits of your cell phone number.

_____

End of Block: Last Four Digits of Cell Phone Number

Start of Block: Physiological Variables

Q3 Please enter your resting heart rate in beats per minute (bpm):

Heart Rate

0 10 20 30 40 50 60 70 80 90 100 110 120

Resting Heart Rate (RHR) in beats per minute ()	

Q4 Please enter your respiration rate in breaths per minute (the number of breaths you took in one-minute):

Breaths per minute

0 5 10 15 20 25 30 35

Number of breaths per minute ()	

Q5 Please choose one of the following that describes your breathing pattern:

- ○ abdomen/belly breathing only (1)
- ○ chest breathing only (2)
- ○ both chest and abdomen breathing (3)

End of Block: Physiological Variables

Start of Block: Perceived Stress Scale

Q6 The questions in this scale ask you about your feelings and thoughts during the LAST MONTH. In each case, you will be asked to indicate your response by choosing HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are differences between them, and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way; rather indicate the alternative that seems like a reasonable estimate.

1. In the last month, how often have you been upset because of something that happened unexpectedly?

- ○ 0-never (1)
- ○ 1-almost never (2)
- ○ 2-sometimes (3)
- ○ 3-fairly often (4)
- ○ 4-very often (5)

Q7 2. In the last month, how often have you felt that you were unable to control the important things in your life?

- ○ 0-never (1)
- ○ 1-almost never (2)
- ○ 2-sometimes (3)
- ○ 3-fairly often (4)
- ○ 4-very often (5)

Q8 3. In the last month, how often have you felt nervous and “stressed”?

- ○ 0-never (1)
- ○ 1-almost never (2)
- ○ 2-sometimes (3)
- ○ 3-fairly often (4)
- ○ 4-very often (5)

Q9 4. In the last month, how often have you felt confident about your ability to handle your personal problems?

- ○ 0-never (1)
- ○ 1-almost never (2)
- ○ 2-sometimes (3)
- ○ 3-fairly often (4)
- ○ 4-very often (5)

Q10 5. In the last month, how often have you felt that things were going your way?

- ○ 0-never (1)
- ○ 1-almost never (2)
- ○ 2-sometimes (3)
- ○ 3-fairly often (4)
- ○ 4-very often (5)

Q11 6. In the last month, how often have you found that you could not cope with all the things that you had to do?

- ○ 0-never (1)
- ○ 1-almost never (2)
- ○ 2-sometimes (3)
- ○ 3-fairly often (4)
- ○ 4-very often (5)

Q12 7. In the last month, how often have you been able to control irritations in your life?

- 0-never (1)
- 1-almost never (2)
- 2-sometimes (3)
- 3-fairly often (4)
- 4-very often (5)

Q13 8. In the last month, how often have you felt that you were on top of things?

- 0-never (1)
- 1-almost never (2)
- 2-sometimes (3)
- 3-fairly often (4)
- 4-very often (5)

Q14 9. In the last month, how often have you been angered because of things that were outside your control?

- 0-never (1)
- 1-almost never (2)
- 2-sometimes (3)
- 3-fairly often (4)
- 4-very often (5)

Q15 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

- 0-never (1)
- 1-almost never (2)
- 2-sometimes (3)
- 3-fairly often (4)
- 4-very often (5)

End of Block: Perceived Stress Scale

Start of Block: Demographics

Q16 With which gender do you identify most?

- Male (1)
- Female (2)
- Non-binary / third gender (3)
- Prefer not to say (4)
- Other (5) _____

Q17 What is your biological sex?

- Man (1)
- Woman (2)
- Intersex (3)
- Prefer not to say (4)

Q18 Please select your age:

17 18 19 20 21 22 23 24 25 26 27 28 29 30

17-30 ()	

Q19 Which describes your race or ethnic background?

- ○ African American/Black (1)
- ○ American Indian or Alaskan Native (2)
- ○ Asian (3)
- ○ Native-Hawaiian or Pacific Islander (4)
- ○ Middle Eastern, Arab, or Arab American (5)
- ○ White/Caucasian (6)
- ○ Other (7) _____

Q20 What year are you in school?

- ○ 1st year (1)
- ○ 2nd year (2)
- ○ 3rd year (3)
- ○ 4th year (4)
- ○ 5th year (5)

Q21 What is your Program of Study? Please only choose your major(s) (choose all that apply):

- ☐ Education (1)
- ☐ Business (2)
- ☐ Fisheries and Wildlife (3)
- ☐ Health & Physical Education (4)
- ☐ Exercise Science & Rehab Studies (5)
- ☐ Strength & Conditioning (6)
- ☐ Sport Management (7)
- ☐ History (8)
- ☐ Music (9)
- ☐ Art (10)
- ☐ Math (11)
- ☐ Biology (12)
- ☐ Technology Education (13)
- ☐ Psychology (14)
- ☐ Social Sciences (15)
- ☐ Human Services (16)
- ☐ Communication (17)
- ☐ Biology (18)
- ☐ Other (19) _____

Q22 Are you a first-generation college student (i.e., none of your parents attended college)?

- Yes (1)
- No (2)

Q23 What is your college varsity athletic status?

- College athlete (1)
- Not a college athlete (2)
- Ineligible due to grades (3)

Q24 How many siblings do you have?

- 0 (1)
- 1 (2)
- 2 (3)
- 3 (4)
- 4 (5)
- 5 (6)
- 6 (7)
- more than 6 (8)

Q25 What is your employment status during the school year?

- I do not work during the school year (1)
- I work part-time during the school year (2)
- I work full-time during the school year (3)

Q26 What is your income?

- ○ $0 (25)
- ○ Less than $9,999 (36)
- ○ $10,000-$19,000 (37)
- ○ $20,000-$29,000 (38)
- ○ $30,000-$39,000 (39)
- ○ More than $40,000 (40)
- ○ I do not know (41)
- ○ I prefer not to say (42)

Q27 What percentage of your yearly expenses does your income cover?

	None at all	A little	A moderate amount	A lot	A great deal
	0 10 20 30 40 50 60 70 80 90 100				
% ()					

Q28 What percentage of your yearly expenses are financially supported by your parents?

	Not at all	A little	A moderate amount	A lot	A great deal
	0 10 20 30 40 50 60 70 80 90 100				
% ()					

Q29 What is your relationship status?

- ○ Single (1)
- ○ In a relationship (2)
- ○ Married (3)
- ○ Divorced (4)
- ○ Living with partner (5)

Q30 Do you have any children/dependents?

- ○ No children/dependents (1)
- ○ 1 (2)
- ○ 2 (3)
- ○ 3 (4)
- ○ 4 (5)
- ○ More than 4 (6)

Q31 Please select your current level of physical activity:

- ○ No physical activity (1)
- ○ less than 150 minutes (2.5 hours) of moderate-intensity activity each week (2)
- ○ 150 minutes (2.5 hours) of moderate-intensity activity each week (3)
- ○ more than 150 minutes (2.55 hours) of moderate-intensity activity each week (4)

Q32 Please select your level of familiarity with (column 1) and usage of (column 2) each of the following coping strategies:

	I am familiar with the following coping strategy:		I have practiced or used the following coping strategy for stress before taking this class:	
	Yes (1)	No (2)	Yes (1)	No (2)
Yoga (1)	○	○	○	○
Progressive Muscle Relaxation (PMR) (2)	○	○	○	○
Power Nap (3)	○	○	○	○
Gratitude Journal (4)	○	○	○	○
Social Support from family, friends, faculty/staff (an individual's knowledge or belief that he or she is cared for and loved, belongs to a network of communication, and has a mutual obligation with others in the network). (5)	○	○	○	○
Mindfulness (6)	○	○	○	○

Q33 How much social support (perception of care) do you receive from:

	None at all	A little	A moderate amount	A lot	A great deal
	0 1 2 3 4 5 6 7 8 9 10				
Peers ()					
Family ()					
Faculty/Staff ()					

Q34 How stressed do you feel today?

	0 - least stressed									10 - most stressed
	0	1	2	3	4	5	6	7	8	9 10
Stress ()										

Q35 In the last month have you been physically and/or mentally ill?

- Yes (1)
- No (2)

Q36 Has there been a life-changing event or routine altering event in your life in the last month (loss of a loved one, living on your own)?

- Yes (1)
- No (2)

Q37 How would you define your average academic performance in all classes?

- 'A' student (1)
- 'B' student (2)
- 'C' student (3)
- 'D' student (4)
- 'F' student (5)

Q38 On average, how many hours of sleep do you get each night?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Hours of sleep ()	

End of Block: Demographics

APPENDIX B.2 MID-TREATMENT ASSESSMENT QUALTRICS QUESTIONNAIRE
Mid-Treatment Assessment

Start of Block: Informed Consent

Q1 Informed Consent:
Thank you for your interest in this study. The title of this research study is Measuring Perceived Stress Levels and Adaptive Coping Strategies in Undergraduate College Students: A Quasi-Experimental Study.

The purpose of this research is to determine if college students' Perceived Stress Scores (PSS-10) and physiological variables change during an Introduction to Stress Management course and identify the preferred adaptive coping strategies college students utilize to manage stress.

This study will collect data on students' perceived stress and physiological variables before, during, and after the stress management course. Demographic information will be collected on participants along with basic physiological variables during pre-, mid-, and post-treatment assessments including resting heart rate, breathing patterns, and respiration rate.

The physiological variables will provide a measure of stress-related physiological responses. The participants will complete this study during class periods on three separate occasions (i.e., the beginning of the semester, the middle of the semester, and the end of the semester).

Participation in the study may help the participants recognize periods of increased and decreased stress and which coping mechanisms they utilize during those times. Some of these questions may place you at minimal risk because it may trigger minimal psychological stress.

Participant's identity will not be shared with anyone, including the co-investigator, Sarah Milner. All individual information will be tracked under an identification number (i.e., the last 4-digits of the participant's cell phone number) and not the participant's name. Participation in this study is optional. Students can choose not to participate or choose to withdraw at any time without any negative effects on grades, relationship with the professor, or relationship with their school.

If you have any questions about the study, you may contact any of these people: Sarah Milner Co-Investigator Ph. 712.490.XXXX Email: sarah.milner@go.mnstate.edu Dr. Ximena Suarez-Sousa, Ph.D. Principal Investigator Professor of Leadership and Learning Lommen 211C Ph. 218.477.2007 Email: suarez@mnstate.edu

○ By clicking here, I agree to participate in this study (1)

End of Block: Informed Consent

Start of Block: Please enter the Last Four Digits of Cell Phone Number
Q2 Please enter the last 4-digits of your cell phone number.

_____

End of Block: Please enter the Last Four Digits of Cell Phone Number

Start of Block: Physiological Variables

Q3 Please enter your resting heart rate in beats per minute (bpm):

Heart Rate

0 10 20 30 40 50 60 70 80 90 100110120

Resting Heart Rate (RHR) in beats per minute ()	

Q4 Please enter your respiration rate in breaths per minute (the number of breaths you took in one-minute):

Breaths per minute

0 5 10 15 20 25 30 35

Number of breaths per minute ()	

Q5 Please choose one of the following that describes your breathing pattern:

- ○ abdomen/belly breathing only (1)
- ○ chest breathing only (2)
- ○ both chest and abdomen breathing (3)

End of Block: Physiological Variables

Start of Block: Perceived Stress Scale

Q6 The questions in this scale ask you about your feelings and thoughts during the LAST MONTH. In each case, you will be asked to indicate your response by choosing HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are differences between them, and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way; rather indicate the alternative that seems like a reasonable estimate.

1. In the last month, how often have you been upset because of something that happened unexpectedly?

- ○ 0-never (1)
- ○ 1-almost never (2)
- ○ 2-sometimes (3)
- ○ 3-fairly often (4)
- ○ 4-very often (5)

Q7 2. In the last month, how often have you felt that you were unable to control the important things in your life?

- ○ 0-never (1)
- ○ 1-almost never (2)
- ○ 2-sometimes (3)
- ○ 3-fairly often (4)
- ○ 4-very often (5)

Q8 3. In the last month, how often have you felt nervous and “stressed”?

- ○ 0-never (1)
- ○ 1-almost never (2)
- ○ 2-sometimes (3)
- ○ 3-fairly often (4)
- ○ 4-very often (5)

Q9 4. In the last month, how often have you felt confident about your ability to handle your personal problems?

- ○ 0-never (1)
- ○ 1-almost never (2)
- ○ 2-sometimes (3)
- ○ 3-fairly often (4)
- ○ 4-very often (5)

Q10 5. In the last month, how often have you felt that things were going your way?

- ○ 0-never (1)
- ○ 1-almost never (2)
- ○ 2-sometimes (3)
- ○ 3-fairly often (4)
- ○ 4-very often (5)

Q11 6. In the last month, how often have you found that you could not cope with all the things that you had to do?

- ○ 0-never (1)
- ○ 1-almost never (2)
- ○ 2-sometimes (3)
- ○ 3-fairly often (4)
- ○ 4-very often (5)

Q12 7. In the last month, how often have you been able to control irritations in your life?

- 0-never (1)
- 1-almost never (2)
- 2-sometimes (3)
- 3-fairly often (4)
- 4-very often (5)

Q13 8. In the last month, how often have you felt that you were on top of things?

- 0-never (1)
- 1-almost never (2)
- 2-sometimes (3)
- 3-fairly often (4)
- 4-very often (5)

Q14 9. In the last month, how often have you been angered because of things that were outside your control?

- 0-never (1)
- 1-almost never (2)
- 2-sometimes (3)
- 3-fairly often (4)
- 4-very often (5)

Q15 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

- 0-never (1)
- 1-almost never (2)
- 2-sometimes (3)
- 3-fairly often (4)
- 4-very often (5)

End of Block: Perceived Stress Scale

Start of Block: Demographics

Q16 What is your relationship status?

- Single (1)
- In a relationship (2)
- Married (3)
- Divorced (4)
- Living with partner (5)

Q17 How much social support (perception of care) do you receive from:

	None at all	A little	A moderate amount	A lot	A great deal
	0 1 2 3 4 5 6 7 8 9 10				
Peers ()					
Family ()					
Faculty/Staff ()					

Q18 How stressed do you feel today?

0 - least stressed 10 - most stressed

0 1 2 3 4 5 6 7 8 9 10

Stress ()

Q19 Has there been a life-changing event or routine altering event in your life in the last month (loss of a loved one, living on your own)?

- Yes (1)
- No (2)

Q20 In the last month have you been physically and/or mentally ill?

- Yes (1)
- No (2)

Q21 How would you define your average academic performance in all classes?

- 'A' student (1)
- 'B' student (2)
- 'C' student (3)
- 'D' student (4)
- 'F' student (5)

Q22 On average, how many hours of sleep do you get each night?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Hours of sleep ()

End of Block: Demographics

APPENDIX B.3 POST-TREATMENT ASSESSMENT QUALTRICS QUESTIONNAIRE
Post-Treatment Assessment

Start of Block: Informed Consent

Q1 Informed Consent:
Thank you for your interest in this study. The title of this research study is Measuring Perceived Stress Levels and Adaptive Coping Strategies in Undergraduate College Students: A Quasi-Experimental Study.

The purpose of this research is to determine if college students' Perceived Stress Scores (PSS-10) and physiological variables change during an Introduction to Stress Management course and identify the preferred adaptive coping strategies college students utilize to manage stress.

This study will collect data on students' perceived stress and physiological variables before, during, and after the stress management course. Demographic information will be collected on participants along with basic physiological variables during pre-, mid-, and post-treatment assessments including resting heart rate, breathing patterns, and respiration rate. The physiological variables will provide a measure of stress-related physiological responses.

The participants will complete this study during class periods on three separate occasions (i.e., the beginning of the semester, the middle of the semester, and the end of the semester).

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If you have any questions about the study, you may contact any of these people: Sarah Milner Co-Investigator Ph. 712.490.XXXX Email: sarah.milner@go.mnstate.edu Dr. Ximena Suarez-Sousa, Ph.D. Principal Investigator Professor of Leadership and Learning Lommen 211C Ph. 218.477.2007 Email: suarez@mnstate.edu

○ By clicking here, I agree to participate in this study (1)

End of Block: Informed Consent

Start of Block: Last Four Digits of Cell Phone Number

Q2 Please enter the last 4-digits of your cell phone number.

_____

End of Block: Last Four Digits of Cell Phone Number

Start of Block: Physiological Variables

Q3 Please enter your resting heart rate in beats per minute (bpm):

Heart Rate

0 10 20 30 40 50 60 70 80 90 100110120

Resting Heart Rate (RHR) in beats per minute ()	

Q4 Please enter your respiration rate in breaths per minute (the number of breaths you took in one-minute):

Breaths per minute

0 5 10 15 20 25 30 35

Number of breaths per minute ()	

Q5 Please choose one of the following that describes your breathing pattern:

- ○ abdomen/belly breathing only (1)
- ○ chest breathing only (2)
- ○ both chest and abdomen breathing (3)

End of Block: Physiological Variables

Start of Block: Perceived Stress Scale

Q6 The questions in this scale ask you about your feelings and thoughts during the LAST MONTH. In each case, you will be asked to indicate your response by choosing HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are differences between them, and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way; rather indicate the alternative that seems like a reasonable estimate.

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- 0-never (1)
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Q15 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

- 0-never (1)
- 1-almost never (2)
- 2-sometimes (3)
- 3-fairly often (4)
- 4-very often (5)

End of Block: Perceived Stress Scale

Start of Block: Demographics

Q16 What is your relationship status?

- Single (1)
- In a relationship (2)
- Married (3)
- Divorced (4)
- Living with partner (5)

Q17 How much social support (perception of care) do you receive from:

	None at all	A little	A moderate amount	A lot	A great deal
	0 1 2 3 4 5 6 7 8 9 10				
Peers ()					
Family ()					
Faculty/Staff ()					

Q18 How stressed do you feel today?

	0 - least stressed									10 - most stressed
	0	1	2	3	4	5	6	7	8	9	10
Stress ()											

Q19 Has there been a life-changing event or routine altering event in your life in the last month (loss of a loved one, living on your own)?

- Yes (1)
- No (2)

Q20 In the last month have you been physically and/or mentally ill?

- Yes (1)
- No (2)

Q21 How would you define your average academic performance in all classes?

- 'A' student (1)
- 'B' student (2)
- 'C' student (3)
- 'D' student (4)
- 'F' student (5)

Q22 On average, how many hours of sleep do you get each night?

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Hours of Sleep ()															

End of Block: Demographics

Start of Block: Ranking & Stress Level

Q23 Over the course of the semester, I feel my stress level:

- ○ Increased (1)
- ○ Decreased (2)
- ○ Stayed the same (3)

Q24 You practiced a variety of stress-reduction techniques throughout the semester.
Rank them in order from 1-6, with 1 being the most effective method to 6 being the least effective method (drag & drop).

_____ Yoga (1)
_____ Progressive Muscle Relaxation (PMR) (2)
_____ Power Nap (3)
_____ Gratitude Journal (4)
_____ Social Support (an individual's knowledge or belief that he or she is cared for and loved, belongs to a network of communication, and has a mutual obligation with others in the network) (5)
_____ Mindfulness (6)

Q25 1. Share/Explain how the coping strategies provided in this course helped you deal with your stress.
2. Did you find these coping strategies effective for management of your stress?
3. Will you continue to use these coping strategies in the future?

_____

End of Block: Ranking & Stress Level

APPENDIX C. PERMISSIONS FOR USE OF THE PSS SCALE

PERMISSION FOR USE OF THE PERCEIVED STRESS SCALE

I apologize for this automated reply. Thank you for your interest in our work.

PERMISSION FOR USE BY STUDENTS AND NONPROFIT ORGANIZATIONS: If you are a student, a teacher, or are otherwise using the Perceived Stress Scale (PSS) without making a profit on its use, you have my permission to use the PSS in your work. Note that this is the only approval letter you will get. I will not be sending a follow-up letter or email specifically authorizing you (by name) to use the scale.

PERMISSION "FOR PROFIT" USE: If you wish to use the PSS for a purpose other than teaching or not for profit research, or you plan on charging clients for use of the scale, you will need to see the next page: "Instructions for permission for profit related use of the Perceived Stress Scale".

QUESTIONS ABOUT THE SCALE: Information concerning the PSS can be found at https://www.cmu.edu/dietrich/psychology/stress-immunity-disease-lab/index.html (**click on scales on the front page)**. Questions about reliability, validity, norms, and other aspects of psychometric properties can be answered there. The website also contains information about administration and scoring procedures for the scales. Please do not ask for a manual. There is no manual. Read the articles on the website for the information that you need.

TRANSLATIONS: The website (see URL above) also includes copies of translations of the PSS into multiple languages. These translations were done *by other investigators*, not by our lab, and we take no responsibility for their psychometric properties. If you translate the scale and would like to have the translation posted on our website, please send us a copy of the scale with information regarding its validation, and references to relevant publications. If resources are available to us, we will do our best to post it so others may access it.

Good luck with your work.

Sheldon Cohen
Robert E. Doherty University Professor of Psychology
Department of Psychology
Baker Hall 335-D
Carnegie Mellon University
Pittsburgh, PA 15213

APPENDIX D. CONSENT

MINNESOTA STATE UNIVERSITY MOORHEAD

Department of Leadership & Learning

218.477.2007 T
sarah.milner@go.mnstate.edu
suarez@mnstate.edu

Consent Form

Participation in Research

Title:
Measuring Perceptions of Stress and Adaptive Coping Strategies in Undergraduate College Students during a 16-week Introduction to Stress Management Course.

Purpose:
The purpose of this research is to determine if college students' perceived stress changes during an Introduction to Stress Management course and which adaptive coping strategies college students prefer to manage stress.

Study Information:
This study will collect data on students' perceived stress before, during, and after a 16-week long stress management course. Using a sliding scale following the PSS would allow for collection of data regarding adaptive coping mechanisms taught in the Introduction to Stress Management course and practiced throughout the semester by the students. Demographic information will be collected on participants along with basic physiological variables during pre-, mid-, and post-tests including resting heart rate, breathing patterns, and respiration rate. The physiological variables will provide a measure of stress-related physiological responses.

Time Commitment:
The participants will complete this study during the class periods on three separate occasions (i.e., the beginning of the semester, the middle of the semester, and the end of the semester).

Risks:
Participation in this study involves minimal risk.

Benefits:
Participation in the study may help the participants recognize periods of increased and decreased stress and which coping mechanisms they utilize during those times.

Confidentiality:
Participant's identity will not be shared with anyone, including the co-investigator, Sarah Milner. All individual information will be tracked under an identification number and not the participant's name.

MINNESOTA STATE UNIVERSITY MOORHEAD

Department of Leadership & Learning

218.477.2007 T
sarah.milner@go.mnstate.edu
suarez@mnstate.edu

Participation and Withdrawal:
Participation in this study is optional. Students can choose not to participate or choose to withdraw at any time without any negative effects on grades, relationship with the professor, or relationship with their school.

Contact:
If you have any questions about the study, you may contact any of these people:

Sarah Milner
Co-Investigator
Ph. 701.845.7162
Email: sarah.milner@go.mnstate.edu

Dr. Ximena Suarez-Sousa, Ph.D.
Principal Investigator
Professor of Leadership and Learning
Lommen 211C
Ph. 218.477.2007
Email: suarez@mnstate.edu

Any questions about your rights may be directed to Lisa Karch, Ph.D., Chair of the MSUM Institutional Review Board, at 218.477.2699 or by lisa.karch@mnstate.edu.

Name of Participant:

Signature of Participant: Date:

Signature of Investigator: Date:

APPENDIX E. CITI PROGRAM TRAINING

CITI PROGRAM

Completion Date 13-Aug-2020
Expiration Date 13-Aug-2023
Record ID 37822828

This is to certify that:

Sarah Milner

Has completed the following CITI Program course:

Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).

Social & Behavioral Research - Basic/Refresher (Curriculum Group)
Social & Behavioral Research (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Minnesota State University Moorhead

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w30db7f39-0641-4cb9-b6e6-b405c0e5410f-37822828

APPENDIX F. COURSE OUTLINE

Course Outline

Week	Course Outline	Data Collection and Introduction to Coping Strategies
	First Day of Class	
1	Wednesday August 24th 10 – 10:50 am	
	Review Syllabus	
	Due: August 24th: Read Ch. 1 Stress in Today's World	
	Due August 28th: Ch. 1 Quiz	
2	Module 1	
	Ch. 1 August 29th	
	In-Class Activity: Wednesday August 31st	
	Due September 4th: Ch. 1 Lab 1.1 & Ch. 2 Quiz	
3	Module 2	
	Off Monday, September 5th Labor Day	
	Ch. 2: Self-Assessment Wednesday September 7th	
4	Module 3	
	Pre-treatment Assessment September 12th*	Collection of demographic data, physiological data, PSS-10 score, familiarity with coping strategies
	In-Class Activity: Wednesday September 14th	
	Due September 18th: Lab 2.2 & Ch. 3 Quiz	
5	Module 4	
	Ch. 3 The Science of Stress Monday September 19th	
	In-Class Activity: Wednesday September 21st	
	Due September 25th: Ch. 3.1 Lab & Video/Reaction to	
	The Science of Stress video, & Ch. 6 Quiz	
	Module 5	

Week	Course Outline	Data Collection and Introduction to Coping Strategies
6	Ch. 6 Thinking & Choosing September 26th In-Class Activity: Wednesday September 28th Due October 2nd: Ch. 6 Handout 6.3, Gratitude journal, & Ch. 7 Quiz	Introduction to Coping Strategy 1 Gratitude Journaling
7	Module 6 Ch. 7 Mindfulness in class October 3rd In-Class Activity: Wednesday October 5th Stress Relief Audio Due October 9th: Ch. 7 Lab 7.1 & Flowing Comfort Audio/Relaxation Homework	Introduction to Coping Strategy 2 Mindfulness
8	Module 7 October 10th Mid-Treatment Assessment* October 12th Ch. 16 Introduction to Relaxation & In-Class Activity Power Nap	Collection of physiological data, PSS-10 score Introduction to Coping Strategy 3 Power Nap
9	October 17th Ch. 19 Progressive Relaxation October 19th In-Class Activity: PMR Due October 16th: Ch. 16 Handout & Quiz Ch. 16 & 19 Due October 23rd: Ch. 19 Progressive Relaxation & Quiz Ch. 22	Introduction to Coping Strategy 4 Progressive Muscle Relaxation (PMR)
10	Module 8 October 24th Ch. 22 Yoga October 26th In-Class Activity Yoga Due October 30th: Ch. 22 Yoga Lab & Ch. 13 Quiz	Introduction to Coping Strategy 5 Yoga

Week	Course Outline	Data Collection and Introduction to Coping Strategies
11	Module 9 October 31st: Ch. 13 Social Support, Relationships & Communication November 2nd: In-Class Activity **Location TBD** Due November 6th: Ch. 13 Activity 3 Happy Relationships & Pets & Quiz Ch. 12 & **Ch. 12.1 Handout** Please note the time change on Sunday	Introduction to Coping Strategy 6 Social Support
12	Module 10 November 7th Ch. 12 Money Matters In-Class Activity: November 30th **Guest Speaker** Due **November 6th**: Ch. 12.1 Handout Due Sunday Due November 13th: Ch. 12.1 Lab Spending Habits and Emotions & Ch. 8 Quiz	
13	Module 11 November 14th Post-Treatment Assessment* November 16th Ch. 8 Managing Emotions & In-Class Activity Due November 20th: Ch. 8 Lab	Collection of physiological data, PSS-10 score, ranking order for coping strategies

Note. This table includes the course outline for both sections of the Introduction to Stress Management course in the Fall of 2022 through week 13 of the semester.

*Pre, Mid-, and Post-treatment Assessment days.

APPENDIX G. PERCEIVED STRESS SCALE (PSS-10)

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the LAST MONTH. In each case, you will be asked to indicate your response by choosing HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are differences between them, and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way; rather indicate the alternative that seems like a reasonable estimate.

1. In the last month, how often have you been upset because of something that happened unexpectedly?

0-never	1-almost never	2-sometimes	3-fairly often	4-very often
○	○	○	○	○

2. In the last month, how often have you felt that you were unable to control the important things in your life?

0-never	1-almost never	2-sometimes	3-fairly often	4-very often
○	○	○	○	○

3. In the last month, how often have you felt nervous and "stressed"?

0-never	1-almost never	2-sometimes	3-fairly often	4-very often
○	○	○	○	○

4. In the last month, how often have you felt confident about your ability to handle your personal problems? ***Scoring is reversed!***

0-very often	1-fairly often	2-sometimes	3-almost never	4-never
○	○	○	○	○

5. In the last month, how often have you felt that things were going your way? ***Scoring is reversed***

0-very often	1-fairly often	2-sometimes	3-almost never	4-never
○	○	○	○	○

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

0-never	1-almost never	2-sometimes	3-fairly often	4-very often
○	○	○	○	○

7. In the last month, how often have you been able to control irritations in your life? ***Scoring is reversed***

0-very often	1-fairly often	2-sometimes	3-almost never	4-never
○	○	○	○	○

8. In the last month, how often have you felt that you were on top of things? ***Scoring is reversed***

0-very often	1-fairly often	2-sometimes	3-almost never	4-never
○	○	○	○	○

9. In the last month, how often have you been angered because of things that were outside your control?

0-never	1-almost never	2-sometimes	3-fairly often	4-very often
○	○	○	○	○

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

0-never	1-almost never	2-sometimes	3-fairly oftne	4-very often
○	○	○	○	○

APPENDIX H. STATEMENT FOR SYLLABUS

Statement on Study

This semester you will have the opportunity to participate in a research study on perceived stress and preferred coping strategies in college students conducted by doctoral candidate Sarah Milner sarah.milner@go.mnstate.edu. Participation in the study is optional. Participation includes completing three questionnaires during class time. More details will be provided in class.

If you are unable to be present on any of these days, please contact Sarah Milner at sarah.milner@go.mnstate.edu or 712.490.7915 to schedule a time to meet over Zoom. The questionnaires take less than 10 minutes to complete.

Sarah Milner's Personal Meeting Room

Join Zoom Meeting

https://minnstate.zoom.us/j/7074599265

Meeting ID: 707 459 9265

Passcode: 089648

APPENDIX I. PILOT PRE- AND POST-TREATMENT EMAILS

From: Milner, Sarah <sarah.milner@go.mnstate.edu>
Date: Wednesday, June 29, 2022 at 2:33 PM
To: Milner, Sarah <sarah.milner@go.mnstate.edu>
Subject: Pilot questionnaire - less than 10 minutes!

Dear participant,
Thank you for agreeing to help with this study. I need 6-10 students to evaluate the questionnaire and you have been identified as one of those potential students. The purpose of this pilot survey is to allow me to make changes to the questionnaires before sending it to the Introduction to Stress Management class. It should take approximately 10-15 minutes to complete the *Pre-Treatment Assessment Survey* and answer the questions in the *Milner_Pilot Pre-Treatment Assessment*. Please complete the surveys by **July 15th.**
First, open the *Milner_Pilot Pre-Treatment Assessment*. Review the questions and keep them visible. **Do not answer them yet.**
Second, open the *Pre-Treatment Assessment Survey* (PTAS). Read question by question and enter any responses (you do not need to answer truthfully each one of the questions as you are evaluating this questionnaire in terms of the clarity of the questions, the structure, the formatting, etc. Because of that, your responses to the PTAS do not actually matter).
Third, based on your experience with the PTAS, please respond to the questions on the *Milner_Pilot Survey*. The goal of this Pilot study is for you to assess the PTAS by answering *Milner_Pilot Survey*. **This is the most crucial information.**
Milner_Pilot Pre-Treatment Assessment link
https://mnstate.co1.qualtrics.com/jfe/form/SV_9N3lu5fRbmkyzki

Pre-Treatment Assessment Survey link: https://mnstate.co1.qualtrics.com/jfe/form/SV_79Ak7FdQxDU8uRU

Thank you for your time and help!

Sincerely,

Sarah Milner

From: Milner, Sarah <sarah.milner@go.mnstate.edu>
Date: Wednesday, June 29, 2022 at 2:39 PM
To: Milner, Sarah <sarah.milner@go.mnstate.edu>
Subject: Pilot survey - less than 10 minutes!

Dear participant,
Thank you for agreeing to help with this study. I need 6-10 students to evaluate the questionnaire and you have been identified as one of those potential students. The purpose of this pilot survey is to allow me to make changes to the questionnaires before sending it to the Introduction to Stress Management class. It should take approximately 10-15 minutes to complete the *Post-Treatment Assessment Survey* and answer the questions in the *Milner_Pilot Post-Treatment Assessment Survey*. Please complete the surveys by **July 15th.**
First, open the *Milner_Pilot Post-Treatment Assessment Survey*. Review the questions and keep them visible. **Do not answer them yet.**
Second, open the *Post-Treatment Assessment Survey* (PTTAS). Read question by question and enter any responses (you do not need to answer truthfully each one of the questions as you are evaluating this questionnaire in terms of the clarity of the questions, the structure, the formatting, etc. Because of that, your responses to the PTAS do not actually matter).
Third, based on your experience with the PTTAS, please respond to the questions on the *Milner_ Pilot Survey*. The goal of this Pilot study is for you to assess the PTTAS by answering *Milner_Pilot Survey*. **This is the most crucial information.**
Milner_Pilot Post-Treatment Assessment link: https://mnstate.co1.qualtrics.com/jfe/form/SV_b14DvVokBDTja3c

Post-Treatment Assessment Survey link: https://mnstate.co1.qualtrics.com/jfe/form/SV_6J99vvMrK8JdNci

Thank you for your time and help!

Sincerely,

Sarah Milner

Dear participant,
This is a reminder that I need your help with this study *if* you have not already completed it. I need 6-10 students to evaluate the questionnaire and you have been identified as one of those potential students. The purpose of this pilot survey is to allow me to make changes to the questionnaires before sending it to the Introduction to Stress Management class. It should take approximately 10-15 minutes to complete the *Pre-Treatment Assessment Survey* and answer the questions in the *Milner_Pilot Pre-Treatment Assessment*. Please complete the surveys by **July 15th.**

- **First**, open the *Milner_Pilot Pre-Treatment Assessment*. Review the questions and keep them visible. **Do not answer them yet.**
- **Second**, open the *Pre-Treatment Assessment Survey* (PTAS). Read question by question and enter any responses (you do not need to answer truthfully each one of the questions as you are evaluating this questionnaire in terms of the clarity of the questions, the structure, the formatting, etc. Because of that, your responses to the PTAS do not actually matter).
- **Third**, based on your experience with the PTAS, please respond to the questions on the *Milner_Pilot Pre-Treatment Assessment*. The goal of this Pilot study is for you to assess the PTAS by answering *Milner_Pilot Pre-Treatment Assessment.* **This is the most crucial information.**

Milner_Pilot Pre-Treatment Assessment link
https://mnstate.co1.qualtrics.com/jfe/form/SV_9N3lu5fRbmkyzki

Pre-Treatment Assessment Survey link (PTAS):
https://mnstate.co1.qualtrics.com/jfe/form/SV_79Ak7FdQxDU8uRU

Thank you for your time and help!

Sincerely,

Sarah Milner

Dear participant,
This is a reminder that I need your help with this study *if* you have not already completed it. I need 6-10 students to evaluate the questionnaire and you have been identified as one of those potential students. The purpose of this pilot survey is to allow me to make changes to the questionnaires before sending it to the Introduction to Stress Management class. It should take approximately 10-15 minutes to complete the *Post-Treatment Assessment Survey* and answer the questions in the *Milner_Pilot Post-Treatment Assessment Survey*. Please complete the surveys by **July 15th.**

- **First**, open the *Milner_Pilot Post-Treatment Assessment Survey*. Review the questions and keep them visible. **Do not answer them yet.**
- **Second**, open the *Post-Treatment Assessment Survey* (PTTAS). Read question by question and enter any responses (you do not need to answer truthfully each one of the questions as you are evaluating this questionnaire in terms of the clarity of the questions, the structure, the formatting, etc. Because of that, your responses to the PTTAS do not actually matter).
- **Third**, based on your experience with the PTTAS, please respond to the questions on the *Milner_ Pilot Post-Treatment Assessment*. The goal of this Pilot study is for you to assess the PTTAS by answering *Milner_Pilot Post-Treatment Assessment*. **This is the most crucial information.**

Milner_Pilot Post-Treatment Assessment link: https://mnstate.co1.qualtrics.com/jfe/form/SV_b14DvVokBDTja3c

Post-Treatment Assessment Survey link (PTTAS): https://mnstate.co1.qualtrics.com/jfe/form/SV_6J99vvMrK8JdNci

Thank you for your time and help!

Sincerely,

Sarah Milner

APPENDIX J. CHANGES TO PRE-, MID, AND POST-TREATMENT ASSESSMENTS FOLLOWING PILOT STUDY

Changes to Pre-, Mid- and Post-Treatment Assessments Following Pilot Study

Original Item	Updated Item
9. In the last month, how often have you felt confident about your ability to handle your personal problems? *4 – never* *3 – almost never* *2 – sometimes* *1 – fairly often* *0 – very often*	9. In the last month, how often have you felt confident about your ability to handle your personal problems? *0 – never* *1 – almost never* *2 – sometimes* *3 – fairly often* *4 – very often*
10. In the last month, how often have you felt that things were going your way? *4 – never* *3 – almost never* *2 – sometimes* *1 – fairly often* *0 – very often*	10. In the last month, how often have you felt that things were going your way? *0 – never* *1 – almost never* *2 – sometimes* *3 – fairly often* *4 – very often*
12. In the last month, how often have you been able to control irritations in your life? *4 – never* *3 – almost never* *2 – sometimes* *1 – fairly often* *0 – very often*	12. In the last month, how often have you been able to control irritations in your life? *0 – never* *1 – almost never* *2 – sometimes* *3 – fairly often* *4 – very often*
13. In the last month, how often have you felt that you were on top of things? *4 – never* *3 – almost never* *2 – sometimes* *1 – fairly often* *0 – very often*	13. In the last month, how often have you felt that you were on top of things? *0 – never* *1 – almost never* *2 – sometimes* *3 – fairly often* *4 – very often*

Note. Some of the same questions were used on the Pre-, Mid-, and Post-Treatment Assessments. Changes are shown in italics.

APPENDIX K. CHANGES TO PRE-TREATMENT ASSESSMENTS FOLLOWING PILOT STUDY

Changes to Pre-Treatment Assessment Following Pilot Study

Original Item	Updated Item
16. *To* which gender do you identify most?	16. *With* which gender do you identify most?
Male	Male
Female	Female
Non-binary/third gender	Non-binary/third gender
Prefer not to say	Prefer not to say other
17. What was your *sex at birth*?	17. What is your *biological sex*?
Man	Man
Woman	Woman
Intersex	Intersex
Prefer not to say	Prefer not to say
18. Please select your age:	18. Please select your age:
Sliding scale from *0-40*	Sliding scale from *17-30*
19 Has there been a life-changing event or routine altering event in your life in the last month?	19 Has there been a life-changing event or routine altering event in your life in the last month *(loss of a loved one, living on your own)?*
Yes	Yes
No	No
27. What percentage *does your income cover your yearly expenses?*	27. What percentage *of your yearly expenses does your income cover?*
Slider scale 0 (none at all) to 100 (a great deal)	Slider scale 0 (none at all) to 100 (a great deal)
28. What percentage *do your parents support you financially?*	28. What percentage *of your yearly expenses are financially supported by your parents?*
Slider scale 0 (not at all) to 100 (a great deal)	Slider scale 0 (not at all) to 100 (a great deal)
30. Do you have any children/dependents?	30. Do you have any children/dependents?
No children/dependents	*0*
1	*1*
2-3	*2*
> 4	*3*
	4
	> 4

Original Item	Updated Item
31. Please select your current level of physical activity: No physical activity < 150 minutes (*5 hours*) of moderate-intensity activity each week 150 minutes (*5 hours*) of moderate-intensity activity each week > 150 minutes (*5 hours*) of moderate-intensity activity each week	31. Please select your current level of physical activity: No physical activity < 150 minutes (*2.5 hours*) moderate-intensity activity each week 150 minutes *(2.5 hours*) of moderate-intensity physical activity each week >150 minutes (*2.5 hours*) moderate-intensity activity each week
32. Please select your level of familiarity and experience with each of the following coping strategies:	32. Please select your level of familiarity with *(column 1)* and usage of *(column 2)* each of the following coping strategies:
33. How much social support do you receive from: family, friends, faculty/staff	33. How much social support (*perception of care)* do you receive from: family, friends, faculty/staff
34. How stressed do you feel today? Scale from 0 (*least amount of stress*) to 10 (*most amount of stress*)	34. How stressed do you feel today? Scale from 0 (*least stressed*) to 10 (*most stressed*)
35. Have you been *ill recently*? Yes No	35. *In the last month have you been physically and/or mentally ill*? Yes No
38. On average, how many hours of sleep do you get each night? Scale from 0-14 *with some missing values* (i.e., hours of sleep)	38. On average, how many hours of sleep do you get each night? Scale from 0-14 *with all 15 values* (i.e., hours of sleep)

Note. Changes are shown in italics.

APPENDIX L. CHANGES TO PRE-TREATMENT ASSESSMENTS FOLLOWING PILOT STUDY

Changes to Post-Treatment Assessment Following Pilot Study

Original Item	Updated Item
24. You practiced a variety of stress-reduction techniques throughout the semester.	24. You practiced a variety of stress-reduction techniques throughout the semester.
Rank them in order from 1-6, with 1 being the most effective method to 6 being the least effective method.	Rank them in order from 1-6, with 1 being the most effective method to 6 being the least effective method (*drag & drop*).
Yoga	Yoga
Progressive muscle relaxation (PMR)	Progressive muscle relaxation (PMR)
Power nap	Power nap
Gratitude journal	Gratitude journal
Social support (an individual's knowledge or belief that he or she is cared for and loved, belongs to a network of communication, and has a mutual obligation with others in the network)	Social support (an individual's knowledge or belief that he or she is cared for and loved, belongs to a network of communication, and has a mutual obligation with others in the network)
Mindfulness	Mindfulness
25. Share/Explain how the coping strategies provided in this course helped you deal with your stress.	25. *1*) Share/Explain how the coping strategies provided in this course helped you deal with your stress.
Did you find these coping strategies effective for management of your stress?	*2*) Did you find these coping strategies effective for management of your stress?
Will you continue to use these coping strategies in the future?	*3*) Will you continue to use these coping strategies in the future?

Note. Changes are shown in italics.