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Resilience and Burnout in Second- and Third-Year Medical Students

Chad E. Whistle
University of South Florida

Resilience and Burnout in Second- and Third-Year Medical Students

by

Chad E. Whistle

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Major Professor: Thomas E. Miller, Ed.D.
Judith A. Ponticell, Ph.D.
Jody Conway, Ph.D.
Kira K. Zwygart, M.D.

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DEDICATION

I dedicate this dissertation to every medical student, every health professions student, and every healthcare professional working endlessly on the frontlines and with research teams to treat, comfort, and care for countless patients and communities impacted by the coronavirus pandemic in 2020. You have learned to overcome severe periods of burnout in this unprecedented global health crisis. This year tested your resilience skills in unusual and unforeseen ways. Yet, you have each returned day after day to face another battle. You are all my heroes.

Thank you.

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ABSTRACT

Between their second- and third-years of medical school, students must pass the United States Medical Licensing (USMLE) Step 1 exam. This high-stakes exam is critical to the overall success of medical students; the score has been a determining factor for the student's residency training and specialty choice. Because medical students are faced with the burden of studying and concept mastery of content for USMLE Step 1, concurrent to ongoing coursework in the medical school curriculum, students may develop symptoms of burnout and be ill-prepared to remain resilient.

This study investigated the extent of the relationship between burnout and resilience in second- and third-year medical students, before and after taking their first major licensure exam, USMLE Step 1. This was accomplished by using survey data of two consecutive cohorts of medical students which measured their current self-reported behaviors of resilience and their feelings of burnout surrounding the exam. This quantitative study is built from data from the online administration of the Maslach Burnout Inventory and the Brief Resilience Scale.

The Brief Resilience Scale is a unitary scale made up of six items to measure different aspects of resilience. It assesses an individual's ability to bounce back or recover from stress (Smith et al., 2008). The Maslach Burnout Inventory is measured using three subscales to determine varying degrees of burnout: Exhaustion, Cynicism, and Professional Efficacy. A high degree of burnout is reflected in high scores on the Exhaustion and Cynicism subscales and a low score on the Professional Efficacy Subscale (Maslach, Schaufeli, & Leiter, 2001).

The overall findings of this study contribute to the increased understanding of the complexities related to the importance of medical student resilience, specifically as they progress

through more advanced and multifaceted concepts. It aims to bring light to the importance of burnout and its prevalence in healthcare professions.

The findings, however, do not illustrate a statistically significant relationship between burnout and resilience in second- and third-year medical students from these two consecutive cohorts. The research contributes to the lack of research on the ways in which medical students, a group of individuals that enter their professional education program with lower burnout scores compared to their similarly aged peers pursuing other professions, quickly decline as their education ramps up. To promote resilience-building skills and reduce burnout, medical schools should continue, or begin to, create supportive medical school environments for mental and emotional well-being. It is increasingly important for medical students to have coping skills in order to feel successful in their current academic environment and future patient encounters.

CHAPTER ONE: INTRODUCTION

Recent research has shown that resilience is an integral player in allowing a person to cope with, and overcome, times of stress and transition. Definitions of resilience from empirical psychological research literature focus on "the ability to adjust to stressful circumstances and persevere in the face of adversity" (DeRosier, Frank, Schwartz, & Leary, 2013) and "the process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances" (Masten, Best, & Garmezy, 1990). Researchers from the positive psychology movement have become increasingly interested in resilience, most specifically considering it as both an inherent trait and a learnable skill (Seligman & Csikszentmikhalyi, 2000).

More could be investigated about resilience in healthy adult populations, even with an increasing interest in developing knowledge about resilience for special populations. Research has principally concentrated on resilience in children who are either deemed at-risk or already experiencing trauma (Campbell-Sills, Cohan, & Stein, 2006; Luthar, Cicchetti, & Becker, 2000; Rutter, 1985, 2012).

Medical student distress is a growing concern for healthcare educators (Rohe, Barrier, Clark, Cook, Vickers, & Decker, 2006). Medical students, a subgroup of learners in the higher education community, may experience higher anxiety than their graduate school counterparts and consistently exhibit higher depression rates than their peers in the same age group from the general population (Slavin, Schindler, & Chibnall, 2014). Psychological distress is an essential issue during medical education that commands medical schools' attention (Dyrbye, Power, Massie, Eacker, Harper, Thomas, Szydlo, Sloan, & Shanafelt, 2010).

Some medical education aspects have unintended negative consequences for medical students' health (Dyrbye, Thomas, & Shanafelt, 2005). The stress that medical students experience throughout their education can limit their knowledge base, skills, and professionalism (Dyrbye et al., 2010). This mentality can transfer to residency and beyond, ultimately hurting patient care since physicians have overwhelmingly high burnout, suicide rates, and depression (Slavin et al., 2014). For example, fifty percent of medical students experience burnout; twenty-five percent have depression, chronic anxiety, and reduced mental health quality of life (Dyrbye et al., 2010).

Dyrbye et al. studied the ways in which resilience, when faced with the adversity of stress which may cause burnout, became more prevalent in students who perceived their learning environment to be more positive and had social support (2010). Once burnout develops, there are only a few variables that might provide protection to students against its dangers, and eventually, once they become practicing physicians, the risks transition to their patients (Shanafelt et al., 2009). If students are able to practice resilience, they are less likely to demonstrate signs of depression, burnout, or any other symptom of distress (Dyrbye et al., 2010). The American Association of Medical Colleges (AAMC) advised medical colleges to create nurturing and positive learning environments as a result of the growing trend of burnout in medical students so that there would ultimately be a positive effect on student well-being (Dyrbye et al., 2005).

Statement of the Problem

Burnout is a concern for medical schools because high satisfaction with the learning environment is associated with positive well-being and student success (Dyrbye et al., 2010). As students attempt to master a new type of academic rigor and a large volume of information —this struggle may be amplified by those students who are prone to struggle academically (Dyrbye et

al., 2005). High-stakes exams, such as the United States Medical Licensing Examination (USMLE) Step 1, become critical to students' overall success and pass rates (Rosenthal, Rosenthal, & Edwards, 1990). Additionally, medical students may be concerned about financial issues, long work hours, student abuse, and human suffering exposure (Wolf, Faucett, Randall, & Balson, 1988).

As the academic medicine community leader, the Association of American Medical Colleges suggests that medical schools are responsible for developing caring and competent physicians who are knowledgeable, skillful, and professional (Association of American Medical Colleges, 1998).

Modern undergraduate medical education (UME) is divided between preclinical and clinical years of study. The former often consists of didactic learning in the basic sciences, such as anatomy, physiology, biochemistry, pharmacology, and pathology. The latter consists of experiential teaching in the various areas of clinical medicine, such as internal medicine, pediatrics, obstetrics and gynecology, psychiatry, general practice, and surgery. In most US medical schools, USMLE Step 1 is taken between the second-and third-year medical school or between the preclinical and clinical years. However, any medical student enrolled in an accredited program may register and sit for the exam at any point and may attempt USMLE Step 1 (2020) no more than six times.

The Impact of USMLE Step 1. Generally, in US medical schools' curricula, before starting the formal clinical education, medical students must pass the United States Medical Licensing Examination (USMLE) Step 1 Examination. The national licensure exam measures the students' fund of medical knowledge upon completing the first two years of their medical education training. USMLE Step 1 evaluates students' abilities to integrate basic science

concepts that are essential to practicing medicine. The exam underscores the primary principles of human health, diseases, and standard treatment. Completion of the exam confirms that the student has a solid foundation for which to continue to build more advanced medical competencies. USMLE Step 1 (2020) is a one-day exam lasting eight hours. It consists of up to 280 questions covering all topics and principles of basic science the medical student has learned in the MD program's first two years (FSMB, 2019). A medical student must pass USMLE Step 1 to continue to the clinical years of their training.

When applying for a residency position near the end of medical school, the student's USMLE Step 1 score is heavily considered. Therefore, this exam score has a direct impact on a student's entire academic career. Often residency programs, or some entire specialties in general, may have a threshold USMLE Step 1 score that applicants must have earned for consideration. Students earning above the minimum are not guaranteed an interview, and higher scores improve the chance of being invited for a residency interview. A student's USMLE Step 1 score provides the types of specialties they are likely to pursue, thus informing their clinical focus during the final portion of their medical education and specialty area.

Medical students begin to think about USMLE Step 1 as early as the first year of their MD program, or sooner. They work consistently to hone their study skills and to prepare for the upcoming exam. Looming pressure and stress increase as students enter into their second year of medical school. They turn their focus more toward studying and preparing for USMLE Step 1. Therefore, they may begin to feel overwhelmed by retaining first-year information as they build upon their second-year knowledge. The exam is a constant sense of worry for second-year medical students.

USMLE Step 1 stirs a range of emotions in second-year medical students as it nears. Students may be mentally drained during their preparation and study periods. Studying for long periods is physically, emotionally, and socially taxing. Second-year medical students may be overwhelmed by the amount of medical information and competencies required for mastery of USMLE Step 1.

Since the USMLE Step 1 Exam has such a substantial effect on each student's future, preparation for the exam can be overwhelmingly stressful. Preparing for the USMLE Step 1 Exam is the most time-consuming aspect of medical school for the first two years. Until the time of their Step 1 examination date, second-year medical students are consistently enrolled in regular coursework while simultaneously beginning solitary or small group preparation for USMLE Step 1.

Medical residency program directors are likely to inherit medical school graduates with a substantial burden of burnout symptoms who are subsequently ill-prepared to remain resilient. The burden of burnout symptoms continues during the transitional period from medical school into residency programs. A longitudinal study that followed medical students transitioning from Sweden's Karolinska Institute Medical School into residency programs found a high degree of worry about the future during the final year of medical school and predicted postgraduate exhaustion (Demerouti, Bakker, Vardakou, & Kantas, 2003). Demerouti et al. suggested that students who are anxious about workload, long hours, the volume of material to learn, and the ability to meet future responsibilities may be more vulnerable to a spike in their burnout level as they prepare to begin residency (2003).

Theoretical Framework

Historically, researchers studied burnout from the perspective of a variety of social science theories. There are many theories related to work, individual characteristics, and chronic stress in the workplace that may be used to understand and explain burnout from a medical student's perspective. The many theories emphasize the influences of burnout differently, and although some concepts overlap from one approach to the next, none thoroughly explains the development of burnout on its own. For this research, the Five-Factor Model (FFM) (Digman, 1990) studied burnout, specifically in aspects of burnout related to emotional exhaustion, cynicism, and reduced professional efficacy. Relating fundamental personality factors to burnout may provide insight into whether burnout is a social phenomenon or is more closely related to individual variability.

Five-Factor Model. The Five-Factor Model (FFM) focuses on an individual's mental, emotional, and behavioral characteristics (Judge, Heller, & Mount, 2002). Within the FFM theory, the nature of one's personality is conceptualized by five different traits useful for describing a burnout about emotional exhaustion, cynicism, and professional efficacy (Judge, Heller, & Mount, 2002).

Each of the five traits describes the spectrum's personal qualities are correlated with their respective trait (Ghorpade, Lackritz, & Singh, 2007). The five traits that comprise the FFM theory are described as follows: openness, conscientiousness, extraversion, agreeableness, and neuroticism (Ghorpade, Lackritz, & Singh, 2007). The openness trait is evident in open-minded and intellectually curious individuals (Digman, 1990). The conscientiousness trait is noticeable in individuals who are achievement-oriented, hardworking, and efficient. The extraversion trait is evident in positive, optimistic, cheerful, and enthusiastic (Digman, 1990). The agreeableness trait

is noticeable in individuals who are supportive, warm, compliant, and highly adaptable. Individuals with neuroticism are anxious, depressed, fearful, and insecure (Digman, 1990).

As we think about the FFM theory's traits, we realize that personality is not specific to the work environment; it transcends the workplace. While employees can leave the limited work resources in the workplace or the inadequate work environment at work, they cannot switch their personality on and off depending on whether they are on the job or not. A personality trait is a crucial factor to explore as one seeks to explain the employee's approach to burnout on the job.

Several studies have shown an association between each of the five traits and burnout (Swinder & Zimmerman, 2010). Swinder and Zimmerman conducted meta-analyses of more than 100 studies on personality and burnout; most of the studies reviewed suggest that an individual's vulnerability to burnout varies by personality type (2010). Although the FFM has not been studied with the burnout experience of medical students specifically, it is evident that the FFM theory does explain each of the burnout constructs:

- Emotional exhaustion (33% of burnout variation)
- Cynicism (21% of burnout variation)
- Reduced professional efficacy (27% of burnout variation) (Alarcon, Eschleman, & Bowling, 2009)

There is a need to understand burnout better. In doing so, we must first acknowledge that burnout, and its causes, vary from one individual to the next. Personality traits can predict burnout over time (Alarcon, Eschleman, & Bowling, 2009). Literature has suggested that neuroticism and extraversion are negatively associated with the emotional exhaustion construct of burnout (Ghorpade, Lackritz, & Singh, 2007). Similarly, agreeableness and neuroticism are

linked with extraversion and cynicism, while neuroticism is related to reducing professional efficacy (Swinder & Zimmerman, 2010).

Someone upbeat or cheerful might be less prone to experiencing burnout than another individual who is considered more nervous (Zeller, Perrfwe, & Hochwarter, 1999). Researchers of the burnout phenomenon have used an integrated model of various theories to understand how burnout develops.

The FFM theory is useful in demonstrating that personality, which is individual and portable, can help predict and clarify the burnout process. Individuals who are optimistic and resourceful can help to prevent the onset of burnout. FFM can help optimize the Maslach Burnout Inventory (MBI), a tool often used by social science researchers to measure burnout (Maslach, Schaufeli, & Leiter, 2001). Therefore, this theory may be used to explain the development of burnout among undergraduate medical education students.

Purpose of the Study

The purpose of this study was to investigate the extent of the relationship between burnout and resilience in second-and third-year medical students before and after taking the first significant milestone licensure exam. This was accomplished by using survey data of medical students' two consecutive cohorts about their current self-reported behaviors of resilience in their daily life and their feelings of burnout before and after the completion of USMLE Step 1. UME students may experience a change in resilience and burnout. Additionally, increased reports of depression, anxiety, and stress may decrease reports of resilience and burnout. Data analysis in this study was done with these hypotheses in mind.

Research Questions

This study was concerned with examining the differences between mean resilience and burnout scores of two consecutive cohorts of medical students before and after the completion of USMLE Step 1.

Question One: To what extent does resilience, as measured by the Brief Resilience Scale, differ from the second-year of undergraduate medical education to the third-year of undergraduate medical education?

Question Two: To what extent does burnout, as measured by the Maslach Burnout Inventory, differ from the second-year of undergraduate medical education to the third-year of undergraduate medical education?

Question Three: What is the relationship between burnout, as measured by the Maslach Burnout Inventory, and resilience, as measured by the Brief Resilience Scale, during the second-year of medical school?

Question Four: What is the relationship between burnout, as measured by the Maslach Burnout Inventory, and resilience, as measured by the Brief Resilience Scale, during the third-year of medical school?

Question Five: Do scores on the Brief Resilience Scale differ among students of different ages, genders, and state of residency in the second-year of medical school?

Question Six: Do scores on the Brief Resilience Scale differ among students of different ages, genders, and state of residency in the third-year of medical school?

Question Seven: Do scores on the Maslach Burnout Inventory differ among students of different ages, genders, and state of residency in the second-year of medical school?

Question Eight: Do scores on the Maslach Burnout Inventory differ among students of different ages, genders, and state of residency in the third-year of medical school?

Significance of the Study

This study was significant for two reasons.

First, this study filled a gap in the scholarly literature on burnout and resilience by including the medical student population. Second, understanding burnout and resilience between consecutive cohorts of medical students in their second-and third-years provided valuable information for developing interventions and implementing curricular changes for necessary adjustments to the learning environment.

Definition of terms

The following terms have been defined as integral to understanding the research study:

1. *Resilience* is the ability to bounce back from negative experiences (Tugade & Frederickson, 2004). Resilience includes positive personality characteristics that enhance individual adaptation (Ahern, Kiehl, Lou Sole, & Byers, 2006). For this study, resilience has been defined as how well individuals deal with stressful situations, challenges, and setbacks.
2. Maslach et al. (2001) state that burnout is "a prolonged response to chronic emotional and interpersonal stressors on the job" (p. 1). For this study, burnout is defined as experiencing extreme exhaustion. One cannot contribute emotionally and physically at work, being cynical, accompanied by withdrawal or detached from work, lacking a sense of personal accomplishment, feeling inefficient, and unproductive.
3. *Undergraduate medical education* is the initial training completed in a medical school. Traditionally, this initial medical education is divided between the preclinical

and clinical years of study. The former consists of the basic sciences, such as anatomy, physiology, biochemistry, pharmacology, and pathology. The latter consists of teaching in the various areas of clinical medicine, such as internal medicine, pediatrics, obstetrics and gynecology, psychiatry, general practice, and surgery.

Limitations and Delimitations of the Study

Extensive research has been done on the limitations of self-report questionnaires. Specifically, one limitation was the idea that respondents may inaccurately present themselves in the best possible way, or social desirability bias (Fisher 1993). This can be due to both self-deception and other deception (Nederhoff, 1985).

Another limitation of this study was the correlational methodology. The internal validity of a correlational design lacks strength. To strengthen the research, the researcher controlled for demographic and enrollment extraneous variables through the statistical design. The researcher used specific criteria to homogenize the population to increase the internal validity of the study.

Included in this study is an analysis of data from one cohort of undergraduate medical students who are currently in the second year of medical school as compared to another cohort of students currently in the third year of medical school in a large public research institution in the southeast in the 2020-2021 academic years. At the university where the study occurred, medical students must successfully pass the USMLE Step 1 board examination before beginning third-year coursework. Due to these delimitations, the results may not be generalizable to other medical colleges as they have school-specific regulations. Additionally, the results may not be generalizable to other medical student or professional student populations.

Organization of the Study

Chapter One presented the necessity to research the relationship between resilience and burnout in second and third-year medical students. It elaborated on the problem statement. The purpose of the study and the research questions were shared. This chapter justified the study's significance, defined relevant terms, and disclosed the limitations and delimitations.

The remaining chapters are organized as follows: Chapter Two contains a review of the pertinent literature related to resilience and burnout. Chapter Three includes a restatement of the problem and research questions, description of the research design, an overview of the setting and participants, procedures for data collection, a description of how the data was analyzed, explanation of the variables, clarification of the instruments and its administration, data collection procedures, description of how the data will be investigated, and role of the researcher. Chapter Four provides the sample's characteristics, results of the data analysis, and interpretation of the data to determine the relationship between burnout and resilience in second-and third-year medical students. Chapter Five comprises a summary of the research study and a discussion of the research findings, implications for practice, and future research recommendations.

CHAPTER TWO: LITERATURE REVIEW

It was essential to understand if any relationship existed between resilience and burnout in second-and third-year medical students and if predictive factors could find for each variable. No recent comprehensive reviews have appropriately linked resilience and burnout in undergraduate medical education. Consequently, the purpose of this study was to examine the historical perspectives of resilience and burnout. This chapter will include the history, definitions, importance, conceptual framework, and measurement approaches for resilience and burnout as individual constructs.

History of Research on Resilience

Resilience developed as a theory in the literature on psychopathology in the early 1970s. Then, *resilience* was a personality characteristic that remained stable. Over time, more research has shifted that conceptualization in that resilience is now a dynamic, continuing process between individuals and their environment (Luthar et al., 2000; Luthar & Zelazo, 2003).

Before research on the construct of resilience, concepts such as invulnerability and invincibility defined the process of adaptation following adverse situations (Anthony, 1974; Earvolino-Ramirez, 2007). *Invulnerability* was used to describe how individuals' inherent traits were "absolute and unchanging" (Luthar et al., 2000, p. 544). This restricted definition, coupled with growing research indicating that "positive adaptation despite adversity involves a developmental progression," was encouraging to expand the concept of resilience (Luthar et al., 2000, p. 544).

Definitions of Resilience

Numerous definitions of resilience—sometimes from the same researcher over time—have been put forth (Anthony, 1974; Garmezy, 1983; Rutter, 1979). One standard definition is the "ability to adapt successfully despite adversity" (Garmezy & Masten, 1991, p. 151). Masten et al. (1990) defined resilience as "the process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances" (p. 426). Ingram and Price (2001) have added to the conceptualization of resilience that it may exist along a continuum with vulnerability. "A resistance to psychopathology, though not a total invulnerability to the development of psychiatric disorder" (Campbell-Sills, Barlow, Brown, & Hoffman, 2006, p. 586). Monroe and Simons (1991) researched resilience from the perspective of a diathesis-stress model where "stress activates a diathesis transforming the potential of predisposition into the presence of psychopathology" (p. 406).

According to Hartley and Phelps (2012), however, "the diathesis-stress model fails to capture the presence or absence of protective factors" (p. 38) such that we neglect to consider the reduction of the impact of stress by use of an individual's internal or external protective factors (Egeland, Carlson, & Sroufe, 1993). Gordon and Song (1994) contended that defining resilience can be difficult "because resilience may not be a single construct, but a complex of related processes that deserve to be identified and studied as discrete constructs" (p. 30). Finally, in a literature review by Jackson, Firtko, and Edenborough (2007), throughout its theoretical development, resilience has been defined as a trajectory, a continuum, a system, a trait, a process, a cycle, and a qualitative category (Bonanno, 2004; Flach, 1980, 1988; Jacelon, 1997; Rutter, 1985).

Different researchers give different definitions of resilience, and each description focuses on one specific aspect of the phenomenon. The definitions of resilience can be placed into four categories to highlight differences and connections among the definitions: trait, process, coping, and outcome.

First, resilience is a set of traits or personal characteristics. Jacelon defined resilience as the ability to spring back in the face of adversity (1997). An additional definition of resilience from Ahern et al. shared that the concept, as a positive personality characteristic, enhanced an individual's adaptation (2006). Second, resilience was defined as a process which involved an intersection of risk and protective factors (Jacelon, 1997). Third, resilience was researched as a coping tool to benefit healthcare workers with regard to their high workload, emotional and physical demands, and increasing expectations (Howe, Smajdor, & Stockl, 2005). Physicians are expected to constantly react and respond to challenging situations; resilient individuals can meet these situations and learn from them along with the increasing workloads and expectations of healthcare (Eley, Cloninger, Walters, Laurence, Synnott, & Wilkinson, 2013). Lastly, resilience scales were created to measure the outcome of how individuals were responding to their exposure to stress and its effects (Luthar & Cicchetti, 2000).

Definitions of resilience can be distinguished from one another regarding the target population. Some researchers restrict the possession of resilience to only a group of individuals at risk or face severe trauma or adversity. Other researchers argue that resilience is the capacity to overcome challenges and difficulties in everyday life (Martin, 2013).

In the current study, resilience is how well individuals deal with stressful situations, challenges, and setbacks. The researcher does not restrict the capacity to be resilient to a particular group of at-risk people or require adversity as a prerequisite for people to show

resilience. However, this study will focus on second-and third-year medical students in a specific college of medicine.

In recent years, medical students have experienced a great deal of competition and higher pressure to perform than ever before. Success in medical school and later in professional practice requires physicians to handle stressful situations and frustrations effectively. Whether medical students overcome challenges and utilize setbacks as stepping-stones for improvement separates them from those who do not. Any inability to bounce back from stressful or difficult situations may cause issues for a medical student's psychological well-being (Tinsley & Spencer, 2010).

Importance of Resilience

Resilience is affected by various factors, including individuals' personality characteristics, beliefs and self-perception, coping strategies, social skills, and learning elements (Rak & Patterson, 1996). There is evidence of the relationship between resilience factors and two necessary outcome measures within each resilience aspect: academic achievement and subjective well-being.

Gerber et al. (2013) studied the construct of mental toughness (the quality which determines how people respond to stress and challenges). They concluded that baseline mental toughness predicted depressive symptoms and life satisfaction over time after controlling for confounding factors.

Researchers have also studied traits which include goals and aspirations (Dickson & MacLeod, 2004), emotional intelligence (Garmezy, 1984), problem-solving (Frye & Goodman, 2000), and self-efficacy (Benard, 1991; Ehrenberg, Cox, & Koopman, 1991). Each of these traits are integral in helping an individual to develop a positive mindset and prevent depression. In this

research, it was found that healthy relationships between students and their families and peers helped them to overcome periods of stress (Hamre & Painta, 2001; Jackson & Warren, 2000).

Conceptual Framework of Resilience

The factors affecting resilience may be either internal or external to the individual. Here, internal is viewed as intrinsic, inherent, or occurring and coming from within an individual. External is considered to be irrelevant, exterior, or occurring and generated from outside an individual. See Figure 1 below.

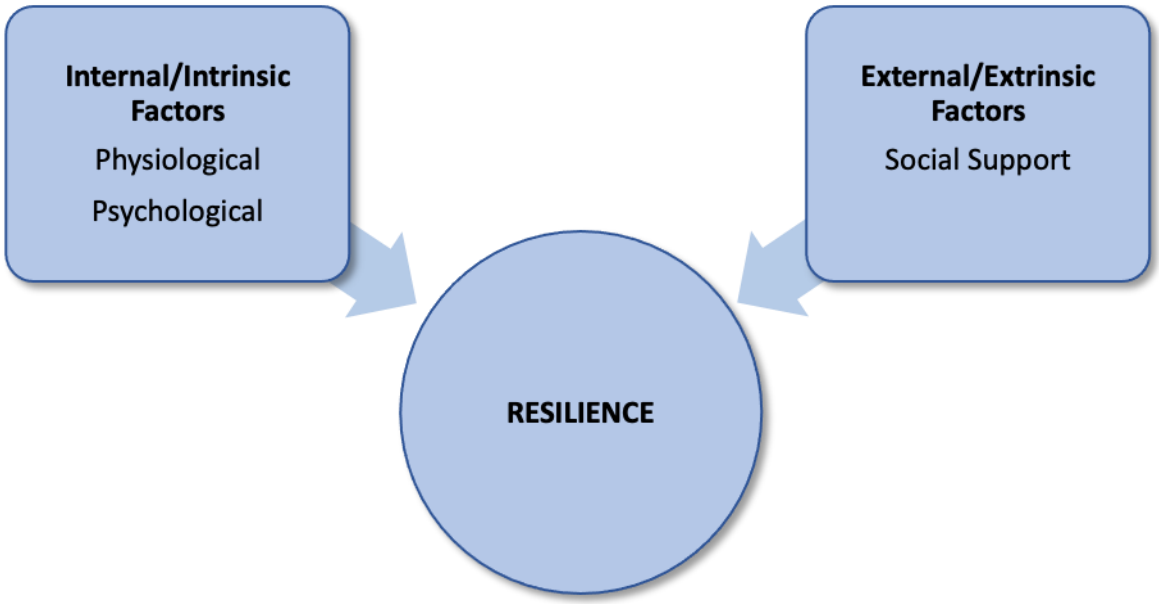

Figure 1. Factors affecting resilience.

Internal components include physiological factors and psychological factors. Physiological factors encompass good general health (Heider, 1958; Wener & Smith, 1982) and genetic disposition (Anthony, 1974a; Block & Block, 1980; Rutter, 1971).

Psychological factors discussed in the literature include personality characteristics (Anthony, 1974; Beardslee & Podorefsky, 1988; Betz & Thomas, 1979; Block & Block, 1980; Garmezy, 1984; 1981; Mrazek & Mrazek, 1987; Murphy & Moriarity, 1976; Wener & Smith,

1982), coping ability (Garmezy, 1981; Murphy & Moriarity, 1976; Wener & Smith, 1982), and cognitive capability (Block & Block, 1980; Garmezy, 1981; Garmezy & Tellegen, 1984; Wener & Smith, 1982). Personality characteristics identified as affecting resilience are descriptions of traits involving oneself and descriptions of traits involving others' interactions. Coping ability involves coping with the self and coping with the environment.

Cognitive capability consists of intelligence and cognitive style. Resilient individuals have practical coping abilities (Murphy & Moriarity, 1976), positive personality characteristics (friendly, motivated, cooperative) (Beardslee & Podorefsky, 1988; Garmezy & Nuechterlein, 1972), a reflective cognitive style (Garmezy, 1981), and higher mean scores on intelligence and achievement tests than those adversely influenced by environmental stressors (Garmezy & Tellegen, 1984; Wener & Smith, 1982).

The external factor incorporated within the model is social support (Anthony, 1974a; Beardslee & Podorefsky, 1988; Block & Block, 1980; Caplan, 1974; Garmezy, 1981; 1983; Mrazek & Mrazek, 1987; Murphy & Moriarity, 1976; Rutter, 1979; Werner & Smith, 1982). Studies using both humans and animals suggest social support, the presence of other members of the same species, may protect the organism from stressors and enhance resilience (Boyard, 1959; Caplan, 1974; Conger, Sawrey, & Turrell, 1957).

Social support for resilience comes either from within or from outside the family. Social support from within the family includes parents, siblings, grandparents, cousins, aunts, uncles, spouses, and children. Social support from outside the family consists of peers, adult friends, teachers, schools, or other community agencies.

Measurement of Resilience

Two efforts to review and compare distinct resilience scales have occurred (Ahern et al., 2006; Windle, Bennett, & Noyes, 2011). Both focused on reaching the resilience scales' concurrent and predictive validity while ignoring the theoretical foundations on how those scales were constructed.

There are four different categories of definitions for resilience which each focus on one aspect of resilience: the trait aspect, the process aspect, the coping aspect, and the outcome aspect. Corresponding to the four resilience elements, there are four different approaches to measure resilience: the trait approach, the process approach, the coping approach, and the outcome approach.

The trait approach aims to measure personal characteristics that are strongly related to resilience. Usually, items under such scales contribute to different factors affecting resilience. The Connor-Davidson Resilience Scale (CD-RISC) (Connor & Davidson, 2003) and Resilience Scale (RS) (Wagnild & Young, 1993) use this approach.

The second way to build a resilience scale is to focus on the resilience process—how protective factors help individuals deal with pressure and setbacks. It has been well-documented that defensive resources can interact with risk factors to influence health-enhancing behaviors (Davey, Goettler, Eaker, & Walters, 2003). Protective factors refer to environmental factors, including family bonds, friendship, community support, and caring. They sometimes include personal traits, too, such as internal protective factors.

Scales in this category include the Resilience Scale for Adults (RSA) (Friborg, Hjemdal, Roazzi, deGraca, & Dias, 2003), and the Baruth Protective Factors Inventory (BPFI) (Baruth, Katey, & Carroll, 2002).

The coping approach to measure resilience focuses on respondents' specific skills and purposeful strategies in response to stress and challenges. Coping always changes efforts to manage demands that exceed a person's resources (Lazarus & Folkman, 1984). Scales grouped into this category include the Brief Resilience Coping Scale (BRCS) (Sinclair & Wallson, 2004).

Finally, the fourth way to construct a resilience scale uses a more direct outcome approach. Items written by researchers here indicated an effect of exposure to stress. The Brief Resilience Scale (BRS) (Smith et al., 2008) stands for scales in this category.

Table 1 provides an overall summary of the approaches.

Brief Resilience Scale. Smith et al.'s (2008) philosophy was to develop a unitary scale made up of a few items as possible instead of items that measure different aspects of resilience resources (Windle, Bennett, & Noyes, 2011).

The BRS was designed as an outcome measure to assess the ability to bounce back or recover from stress. The authors suggest that setting the ability to recover from individuals who are ill is essential. No clinical applications are reported. The authors note that most resilience measures have focused on examining the resources and protective factors that might facilitate a resilient outcome.

Smith et al. (2008) developed the BRS to assess resilience in its original meaning, where other resilience measures have failed to do so. The succinct instrument was created with only a few items, reliable, and one dimension (Smith et al., 2008).

Table 1

Approaches to Measure Resilience

Categories of Definitions for Resilience	**Popular Scale(s)**	**Attributes of Scale**
Trait Approach	Connor-Davidson Resilience Scale	1. Hardiness 2. Self-Efficacy 3. Patience and tolerance of negative effects
	Resilience Scale	1. Perseverance 2. Equanimity 3. Meaningfulness 4. Self-reliance 5. Existential aloneness
Process Approach	Resilience Scale for Adults	1. Personal competence 2. Family coherence 3. Social support 4. Personal structure
	Baruth Protective Factors Inventory	1. Adaptable personality 2. Supportive environments 3. Fewer stressors 4. Compensating experiences
Coping Approach	Brief Resilience Coping Scale	1. Coping with stress in a highly adaptive manner
Outcome Approach	Brief Resilience Scale	1. Ability to bounce back or recover from stress

The final six items were selected from a more extensive list after a reaction from different researchers and student user groups. The authors elected to use recorded items to increase reliability. Smith et al. (2008) used four different samples, composed of undergraduate students, women who have either fibromyalgia or healthy controls, and cardiac rehabilitation patients for the validation measure. The items presented significance above 0.67 on one single factor in all samples, with Cronbach's alphas ranging from 0.80 to 0.91. The BRS was sufficiently different from related constructs such as coping styles, health-related outcomes, social relationships, and other personal characteristics. It correlated positively with optimism and purpose in life and

negatively with pessimism and alexithymia (Smith et al., 2008). For the reasons outlined above, the Brief Resilience Scale was selected as the instrument for this study.

Summary of Resilience

Resilience is how well individuals deal with stressful situations, challenges, and setbacks. Definitions of resilience focus on the trait aspect, the process aspect, the coping aspect, and the outcome aspect. Medical students encounter a great deal of pressure in exchange for high performance.

Success in medical school and later in professional practice requires physicians to handle stressful situations and frustrations effectively. Using the Brief Resilience Scale, this study will investigate how medical students express the ability to bounce back from stress in their academic careers.

History of Research on Burnout

Rabbinbach (1990) has argued persuasively that the current interest in the concept of fatigue was a product of the industrial revolution. The change in work behavior, longer hours, and more monotonous tasks triggered a sudden preoccupation with the problem of fatigue. At first, this centered on the issues of loss of productivity due to fatigue, a process that became further accelerated with the invention of the assembly line (Rabbinbach, 1990). The paralleled expansion in education, especially once it started to encompass both the rising middle and lower classes and women, along with the emergent themes of the overstrain and degeneration of society, also increased mental fatigue concerns (Nye, 1982; Rabbinbach, 1990).

Definitions of Burnout

Burnout has the potential to be a tragic ending for individuals, notably healthcare providers who began their careers with positive aspirations, dedication for helping others, and

high enthusiasm. The central component of burnout is fatigue which can also be associated with physical sickness, or disability (Borritz, Rugules, Christensen, Viladsen, & Kristensen, 2006; Huibers, Leone, Kant, & Knottnerus, 2006; Schaufeli & Enzman, 1998). Other than focusing on fatigue, other symptoms of burnout might be depression, physical muscle pain, and headaches (Schaufeli & Enzman, 1998; Wessely, Hotopf, & Sharpe, 1998). Burnout is the experience of extreme exhaustion (Maslach et al., 2001). When an individual cannot give of themselves either physically or emotionally, they are cynical, their initial emotional response is one of withdrawal or detachment, they feel unproductive and inefficient, they lack any sort of sense of professional efficacy, they may be experiencing burnout. Burnout is a psychological condition which causes people to suffer emotional exhaustion, depersonalization, and deprivation of any professional efficacy (Freudenberger, 1974). Maslach et al. (2001) revised the definition of burnout as "a prolonged response to chronic emotional and interpersonal stressors on the job" (p. 1). Maslach, Jackson, and Leiter et al. (1996) state, "When a worker's resources are depleted, and he feels he is no longer able to give of himself at the psychological level, emotional exhaustion can occur" (p. 4).

There are three dimensions of burnout as identified by Maslach, Jackson, and Leiter (1996a). Emotional exhaustion is the feeling of being overextended and exhausted by one's work (Maslach et al., 1996). Cynicism is an unfeeling or impersonal response and a reduced sense of professional efficacy (Maslach et al., 1996).

Importance of Burnout

A lack of extensive, multi-institutional, or national studies using related methodologies makes it challenging to conclude historical trends. Before May 2005, there was one publication on burnout among medical students (Guthrie et al., 1998). Fifteen years later, similar types of

publications are increasingly common, raising the likelihood that either the prevalence of burnout increases or at least interest in the subject is increasing. When reviewing results from large, cross-sectional, multi-institutional study conducted over the last several years using similar methodologies, the mean emotional exhaustion and cynicism scores, as well as the prevalence of high emotional exhaustion, high cynicism, and overall burnout among responding medical students, appears to have an upward trajectory in general (Guthrie et al., 1998).

Prevalence of burnout. Evidence of burnout in physicians and healthcare workers is remarkably prevalent, so does it positively affect the entire population? Despite having undergone rigorous academic preparation necessary for acceptance into medical school programs, students begin training with mental health profiles on par with similarly aged peers entering other careers (Brazeau, Shanafelt, Satele, Sloan, & Dyrbye, 2014; Dyrbye, Thomas, & Shanafelt, 2006).

In 2012, a study of medical students at six US medical schools found that this population had lower levels of burnout (27.3% versus 37.3%) and depression, and a higher quality of life, relative to similarly aged peers entering into other careers (Brazeau et al., 2014). This data shifts once medical school begins and medical students' mental health follows a downward trajectory and is soon worse than those peers (Dahlin, Joneborg, & Runeson, 2005; Dyrbye et al., 2014; Dyrbye, Thomas, & Shanafelt, 2006). Dyrbye and Shanafelt (2016) sampled 4,402 medical students and 1,701 resident physicians, learning that these groups have high emotional exhaustion, high cynicism, and their overall burnout was substantially more significant than peers not pursuing healthcare in the same way.

Prevalence of burnout in healthcare professions. Burnout may be just as prevalent in other highly demanding fields such as the airline industry or the military as it is in medical

trainees. As Dyrbye and Shanafelt (2016) examined in their 2011 study, physicians were at an increased risk of burnout compared to individuals with a high school diploma. Comparatively, individuals with more advanced education, other than a medical degree, were at a lower risk of burnout after adjusting for age, gender, relationship status, and hours worked per week (Dyrbye and Shanafelt, 2016). The study provided an interesting context for comparing various groups of individuals and rich background for the types of stress that medical doctors endure in their training.

Process of Burnout

Rather than a state or condition (being burned out), burnout is often referred to as a process (burning out), with the end state of the burnout process referred to as 'clinical burnout' (Schaufeli, Bakker, Hoogduin, Schaap, & Kladler, 2001). Burnout follows a psychological path. Initial work on burnout suggested that it affected mainly healthcare professionals due to chronic stress arising from strenuous interpersonal relationships at work (Freudenberger, 1974; Maslach & Jackson, 1981). This chronic stress depletes emotional and empathetic reserves leaving one to feel drained and weak or burned out. Factors related to the work setting, like social support, unknown roles and responsibilities, and heavy workloads, are critical factors in understanding burnout (Schaufeli, 2003). Cynicism refers to a negative, callous, or excessively detached response to other people, which often includes a loss of idealism.

Sources of stress and contribution to burnout. Although some stress sources persist throughout training and practice, other stress sources vary at different career stages. Grading schemes have been associated with an increased risk of burnout about the curriculum's changeable aspects for first- and second-year medical students (Reed, Shanafelt, Satele, et al., 2011). When three or more grading hierarchies were present (e.g., A-F; honors/ high pass/ pass/

fail) instead of a strict pass or fail system, students had 1.97 more chances of experiencing burnout (Reed, Shanafelt, Satele, et al., 2011). Similar studies have examined how pass or fail grading schemes during the preclinical years of medical school might promote more group cohesion and resilience (Bloodgood, Short, Jackson, & Martindale, 2009; Reed, Shanafelt, Satele, et al., 2011; Rohe, Barrier, Clark, Cook, Vickers, & Decker, 2006). Firmer grades could influence how supportive students perceive their environment to be. The development of social support networks is vital for continued resilience skill-building (Howe, Smajdor, & Stöckl, 2012). Conversely, in a national study of orthopedic residents in the Netherlands, poor peer collaboration was the most vital learning climate factor studied associated with increased burnout symptoms (van Vendeloo, Brand, & Verheyen, 2014).

Life stressors outside of medicine. Routine life experiences, such as personal illness, family-related stress and illness, and financial concerns may exponentially increase the possibility and risk of burnout for medical students (Campbell, Prochazka, Yamashita, & Gopal, 2010; Dyrbye, Thomas, Huntington, et al., 2006; Prins et al., 2007; Ripp, Babyatsky, Faller, et al., 2011). High educational debt is also more likely to cause medical students' burnout (Dyrbye, Sloan, & Shanafelt, 2009). The experience of burnout is a complex phenomenon due to the complex interaction of professional, personal, and environmental characteristics.

New stressors. Some new stressors are on the horizon for the next generation of doctors. For one, competition for residency positions increases because of new medical schools opening, existing medical schools expanding, and stagnant growth of residency and fellowship programs. This will increase competition and stress as trainees strive to achieve the highest test scores and grades, potentially fueling a competition culture that could undermine social support. Second, a milestone-based progression that shortens paths to training completion may accelerate the

timeline for assessments trainees take and thereby amplify stress, increasing the risk of burnout. Third, exponential growth in the medical knowledge to be learned, coupled with new competencies to be reached within interprofessional teamwork, quality and safety, population health, and data analytics, increases the challenges that accompany curriculum hypertrophy (Abrahamson, 1996). Fourth, today, trainees are entering a rapidly evolving and changing healthcare system experiencing dramatic environmental and cultural shifts. Also, they will work in an era of workforce shortages. Hence, trainees face enormous uncertainty, coupled with new constraints (Mareiniss, 2004). This is concerning because studies suggest that residents who feel uncertain about the future are more likely to experience burnout (Shanafelt, Bradley, Wipf, & Back, 2002).

Measurement of Burnout

Maslach, Schaufeli, and Leiter (2001) designed systematic empirical research quantitative in nature based on burnout's standard definition. Their research employed a questionnaire and survey methodology and studied large subject populations. Initially, different authors developed instruments in the form of self-report survey-questionnaire instruments to assess burnout. Three instruments were historically used to capture an individual's perception of work-related stress: The Tedium Scale, the Staff Burnout Scale for Health Professionals, and the Maslach Burnout Inventory (MBI).

Maslach Burnout Inventory. Maslach and Jackson (1981) developed the Maslach Burnout Inventory (MBI) to obtain the individual worker's responses to burnout. The MBI instrument consists of three subscales (Arthur, 1990). The statements or items require a rating of "the intensity and frequency of their (affective) experience, along with a response scale" (p. 186). The MBI has extensive empirical research supported database, and it is the most utilized

instrument for measuring burnout worldwide (Schaufeli & Enzman, 1998). Maslach et al. (1996) presented a process model of burnout that indicates predictors for each of the three subscales in their MBI manual. The MBI was developed for human services professionals and later for educators and students (Maslach et al., 1996).

Summary of Burnout

In this study, burnout is defined as experiencing extreme exhaustion. One cannot contribute emotionally and physically at work, being cynical, accompanied by withdrawal or detached from work, maintaining a sense of professional efficacy, feeling inefficient, and unproductive. Rabinbach (1990) argued persuasively that the current interest in the concept of fatigue was a product of the industrial revolution. The change in work behavior, longer hours, and more monotonous tasks triggered a sudden preoccupation with the problem of fatigue. The expansion in education also increased mental fatigue concerns (Nye, 1982; Rabinbach, 1990).

Once medical school begins, many medical students' mental health follows a downward trajectory and becomes worse than that of peers outside medicine. Medical students are experiencing higher emotional exhaustion, higher cynicism, and more overall burnout than their age-matched college graduates not studying medicine. Initial work on burnout suggested that it affected healthcare professionals due to chronic stress arising from strenuous interpersonal relationships at work. This chronic stress depletes emotional and empathetic reserves leaving one to feel drained and weak or burned out. Using the Maslach Burnout Inventory, this study will investigate how medical students experience burnout.

Summary of the Literature

To understand the relationship more fully between resilience and burnout in second-and third-year medical students, it is important to explore each. Resilience is how well individuals

deal with stressful situations, challenges, and setbacks. As individuals experience extreme exhaustion accompanied by withdrawal, lacking a sense of personal accomplishment, feeling inefficient, and unproductive, burnout occurs.

The Brief Resilience Scale (BRS) takes a direct approach to measuring resilience. The BRS was designed as an outcome measure to assess the ability to bounce back or recover from stress. The succinct instrument was created with only a few items, reliable, and with one dimension. The Maslach Burnout Inventory (MBI) obtains the individuals' responses to three aspects of burnout. MBI assesses burnout in the form of a self-reported questionnaire and requires respondents to rate their choice on a Likert-type scale.

Using the BRS and MBI, this study aims to determine the prevalence of burnout and resilience in second-and third-year medical students.

CHAPTER THREE: METHODS

This study aimed to explore the relationship between resilience and burnout in two consecutive cohorts of second-and third-year medical students. This chapter will outline the methods used in this study. Also included in Chapter Three is a restatement of the problem and research questions, the research design, an overview of the setting and participants, procedures for data collection, and a description of how the data will be analyzed.

Restatement of the Problem

Burnout is a concern for medical schools because high satisfaction with the learning environment is associated with positive well-being and student success (Dyrbye et al., 2010). As students attempt to master a new type of academic rigor and a large volume of information —this struggle may be amplified by those students who are prone to struggle academically (Dyrbye et al., 2005). The high-stakes exams, such as the United States Medical Licensing Examination (USMLE) Step 1 examination, become critical to students' overall success and pass rates (Rosenthal, Rosenthal, & Edwards, 1990). Additionally, students may be concerned about financial issues, long work hours, student abuse, and exposure to human suffering (Wolf, Faucett, Randall, & Balson, 1988).

As the academic medicine community leader, the Association of American Medical Colleges suggests that medical schools have the responsibility of developing caring and competent physicians who are knowledgeable, skillful, and professional (Association of American Medical Colleges, 1998).

Before beginning a formal clinical education, undergraduate medical students must pass the United States Medical Licensing Examination (USMLE) Step 1 Examination. This national, universal licensure exam assesses the students' fund of medical knowledge upon completing the first two years of their undergraduate medical education (UME) program. The exam assesses students' understanding and ability to apply important basic science concepts integral to medicine. It emphasizes the principles and mechanisms regarding health, disease, and therapy; successful completion of the exam ensures that the student has a foundation for the safe and competent practice of medicine and the scientific principles necessary for lifelong learning. It integrates two dimensions of learning: systems and process. It is a one-day examination, given in one eight-hour testing session.

In most cases, USMLE Step 1 is taken between the second and third years of medical school. Until the time of their Step 1 examination date, second-year medical students are consistently enrolled in regular coursework while simultaneously beginning solitary or small group preparation for USMLE Step 1. Scores of the licensure exam are heavily weighed when students apply for medical residency positions.

Medical residency program directors are likely to inherit medical school graduates with a substantial burden of burnout symptoms who are subsequently ill-prepared to remain resilient. The burden of burnout symptoms continues during the transitional period from medical school into residency programs.

Research Questions

This study was concerned with examining (a) the comparative differences between mean resilience scores of two cohorts of medical students – a second-year cohort and a third-year cohort currently immersed in undergraduate medical education; (b) the difference between mean

burnout scores of each cohort of medical students in the second-and third-years of their undergraduate medical education; and (c) if there is a relationship between student resilience scores and burnout.

Research Design

This quantitative research study followed a correlational research design. Correlational designs are often used in educational studies to explore the "degree and direction…of the relationship between two or more variables" (Gall & Borg, 2007, p. 336). This design type fits with the non-experimental nature of the research study. The correlational design explored the degree and direction of the relationships between resilience and burnout from the second to third medical school years. Moreover, this design uncovered the specifics of the relationships between the variables.

Setting and Participants

A large, public research institution located in a metropolitan area in Florida provided this research study's setting. The institution is comprised of the main campus, which includes the College of Medicine, and two regional campuses. To homogenize the population, this study only focused on students pursuing a medical doctor degree. The main campus currently reports an unduplicated headcount of more than 50,000 individual students, with a medical student population of 721 students.

The research population included two cohorts of medical students enrolled in the second- and third-year medical school during the 2020-2021 academic year. Additionally, this population included students who began at the university, left to pursue a leave of absence for health, academic, or research reasons, and returned to the university.

Instruments

Brief Resilience Scale. Smith et al. (2008) developed the BRS to assess resilience in its original meaning, where other resilience measures have failed to do so. It was designed as an outcome measure to assess the ability to bounce back or recover from stress. The succinct instrument was developed with only a few items, reliable, and one dimension (Smith et al., 2008). The final six items were selected from a more extensive list after reaction from different researchers and student user groups. The authors elected to use recorded items to increase reliability. Smith et al. (2008) used four different samples, composed of undergraduate students, women who have either fibromyalgia or healthy controls, and cardiac rehabilitation patients for the validation measure. The items presented significance above 0.67 on one single factor in all samples, with Cronbach's alphas ranging from 0.80 to 0.91. The BRS was sufficiently different from related constructs such as coping styles, health-related outcomes, social relationships, and other personal characteristics. It correlated positively with optimism and purpose in life and negatively with pessimism and alexithymia (Smith et al., 2008).

Maslach Burnout Inventory. Maslach and Jackson (1981b) developed the Maslach Burnout Inventory (MBI) to obtain the individual worker's responses to three aspects of burnout. MBI assesses burnout in the form of a self-reported questionnaire and requires respondents to rate their choice on a Likert-type scale. The MBI instrument consists of three subscales measuring the respondents' attitudes toward Exhaustion, Cynicism, and Professional Efficacy (Arthur, 1990). The statements or items require a rating of "the intensity and frequency of their (affective) experience, along with a response scale" (p. 186). The MBI can be administered either individually or to a group. It can be completed in about fifteen minutes. The researcher can quickly score the twenty-two items on the instrument. The MBI has extensive empirical

research supported database, and it is the most utilized instrument for measuring burnout worldwide (Schaufeli & Enzman, 1998). MBI cut-offs were developed for each of the three scales as indicators of the severity of burnout among individuals. Maslach et al. (1996) presented a process model of burnout that indicates predictors for each of the three subscales in their MBI manual.

Regarding validity and reliability for the MBI and the three subscales, Zalaquett and Wood (1997) reported that the factor analysis studies support the validity of the MBI. Cronbach alpha scores for a reliability report the Exhaustion dimension at .90, Cynicism at .76, and Professional Efficacy at .76 (Zalaquett & Wood, 1997). These results indicated that the instrument measures the constructs of burnout as intended and that these results across varying and similar populations have proven to be reliable over time. The MBI by Maslach et al. (1996) specified that the degree of burnout is reflected in the following combination of subscale scores: a high degree of burnout is reflected in high scores on the Exhaustion and Cynicism subscales and low scores on the Professional Efficacy subscale. An average degree of burnout is reflected in average scores on the three subscales. Burnout is conceptualized as a constant variable ranging from low to moderate to high degrees of experienced emotion (Maslach et al., 1996).

Using the Maslach Burnout Inventory, scores can be interpreted for individual respondents, or a group of respondents can be treated as aggregate data. With either approach, scores can be interpreted as absolute values or by comparing scores to those of a larger population to determine the individual's relative degree of burnout.

Data Collection

This study used data collected from 106 students in the MD classes of 2022 and 2023. The researcher partnered with the College of Medicine's Division of Medical Education,

specifically the Office of Student Affairs, to share the Brief Resilience Scale and Maslach Burnout Inventory one week before the start date of the first day of each academic year for both cohorts of students during the summer of 2020. The researcher sent one reminder to each cohort after one week to encourage participation.

To participate in the study, students had to review the Informed Consent attached to the emailed invitation describing the initiative. The study then required student participants to use a password to access the instruments. The study was anonymous and was designed not to collect student participant names, IP addresses, or other identifying information. Throughout the entire data collection process, the researcher was the only individual to access the survey results.

Data Analysis

The researcher recorded participants' responses in a Microsoft Excel database. Composite scores and subscales were calculated and then imported into the Statistical Package for the Social Sciences (SPSS) database. The Excel file was checked for missing data. Missing data were replaced using the SPSS replace missing values function, which replaced the missing value with a mean score calculated by SPSS for that item from all other participants. A correlation analysis was run to determine the relationships between burnout and resilience. To assess statistical significance, data were analyzed using an $\alpha = 0.05$. SPSS determined the extent to which each variable was associated with the outcome measures of burnout and resilience.

Descriptive Statistics. Descriptive statistics of central tendency and frequency are determined by the variables, including the academic year, resilience, and burnout. Descriptive statistics were used to describe the characteristics of the responding population and the resilience and burnout variables.

Coefficient Alpha. Cronbach's alpha (α) was used to determine the reliability of each separate instrument's items in the total instrument using SPSS. A perfect alpha score was 1, and the closer the score was to 1, the better the internal consistency. Although no set level was acceptable, 0.7 or better would be considered sufficient (Taber, 2016).

Pearson Product-Moment Correlations. A Pearson product-moment correlation coefficient was used when variables were in the ratio scale of measurement, and a linear relationship between the variables was suspected. Pearson correlations were run to determine the positive or negative relationships between second-and third-year scores of resilience and burnout. Overall scores for each variable were used to determine the correlations. Correlation analyses were used to determine what relationships exist and the extent to which these relationships occur among the variables.

The Pearson product-moment correlation coefficient measured the degree and direction of the linear relationship between the variables (Glass & Hopkins, 1996), in this case, the strength and direction of the relationship between resilience and burnout. The coefficient was calculated as the covariance ratio between burnout and resilience to the product of the variables' standard deviations. The closer the coefficient was to +1.0 or -1.0, the greater the linear relationship's strength in either a positive or negative direction. Pearson's correlation coefficient was independent of change in origin and scale. As with many related statistics, the coefficient was not used to make claims about a cause-and-effect relationship.

T-test/ANOVA. A bivariate analysis or independent samples t-test was used to determine the academic year's effect on burnout and resilience. One-way Analysis of Variance (ANOVA) was used to determine each academic year's effects on burnout and resilience. All analyses were run with the SPSS statistical software program. Both t-tests and ANOVAs have

certain assumptions about the data they are used to compare. They both assumed that the date fell on a normal distribution and that the individual scores that go into a mean are independent. ANOVA had the assumption that the groups being compared have similar variances or spreads in their scores.

An independent samples t-test is designed to compare the mean of two groups to determine whether they differ significantly. The ANOVA was used as a preliminary check for significance, and the t-test was used to make a more detailed comparison. The ANOVA indicated differences among the students in both the second and third-year medical school but did not specify precisely those differences. T-tests were used to make year-to-year comparisons to flush out exactly which were significantly different.

Table 2 provides an overview of the research questions, the variables under study, and the data analysis procedures.

Researcher Bias

The researcher developed this topic based on his professional interactions with medical students in a student wellness setting. In his five years as a student affairs administrator at a college of medicine, he conducted numerous wellness programs and medical students' interventions. He witnessed that the students who participated in wellness programs and showed signs of resilience from an early point of their education displayed less stress, frustration, and anxiety as they approached major education milestones. Due to his exposure to the research population and his involvement in wellness programs and interventions, the researcher will possess an inherent population bias. However, the study's quantitative design will allow the researcher to be objective when analyzing the data.

Table 2

Variables and Research Questions

Research question	Independent variable	Dependent variable	Data analysis
1. To what extent does resilience, as measured by the Brief Resilience Scale, differ from the second year of undergraduate medical education to the third year of undergraduate medical education?	Year of undergraduate medical education	Resilience	Independent samples t-test
2. To what extent does burnout, as measured by the Maslach Burnout Inventory, differ from the second year of undergraduate medical education to the third year of undergraduate medical education?	Year of undergraduate medical education	Burnout	Independent samples t-test
3. What is the relationship between burnout, as measured by the Maslach Burnout Inventory, and resilience, as measured by the Brief Resilience Scale, during the second year of medical school?	Selection variable: 2nd year students	Variables: Burnout and Resilience	Pearson Correlation
4. What is the relationship between burnout, as measured by the Maslach Burnout Inventory, and resilience, as measured by the Brief Resilience Scale, during the third year of medical school?	Selection variable: 3rd Year students)	Variables: Burnout and Resilience	Pearson Correlation
5. Do scores on the Brief Resilience Scale differ among students of different ages, genders, and state of residency in students in the second year of medical school?	• Age, gender, and state of residency • Selection variable: Year of undergraduate medical education (second)	Resilience	Pearson Correlation: Age with Resilience Score ANOVA resilience scores by gender and state of residency

Table 2 (continued)

6. Do scores on the Brief Resilience Scale differ among students of different ages, genders, and state of residency in students in the third year of medical school?	• Age, gender, and state of residency • Selection Variable: Year of undergraduate medical education (third)	Resilience	Pearson Correlation: Age with Resilience Score ANOVA resilience scores by gender and state of residency
7. Do scores on the Maslach Burnout Inventory differ among students of different ages, genders, and state of residency in students in the second year of medical school?	• Age, gender, and state of residency • Selection variable: Year of undergraduate medical education (second)	Burnout	Pearson Correlation: Age with Burnout sub scores ANOVA burnout sub scores by gender and state of residency
8. Do scores on the Maslach Burnout Inventory differ among students of different ages, genders, and state of residency in students in the third year of medical school?	Selection variable: Year of undergraduate medical education (third)	Burnout	Pearson Correlation: Age with Burnout sub scores ANOVA burnout sub scores by gender and state of residency

Summary of the Methods

Both the Brief Resilience Scale and the Maslach Burnout Inventory were given to medical students' cohorts as they began their second-and third-years of medical school. The research's primary focus was to learn the extent of how both resilience and burnout differ from the second-year of undergraduate medical education to the third-year of undergraduate medical education, before and after students complete USMLE Step 1. Additionally, the research will focus on the relationship between burnout and resilience during each measured year of medical school.

CHAPTER FOUR: ANALYSIS OF THE DATA

This study aimed to examine the burnout and resilience of two cohorts of undergraduate medical students in second-and third-years of medical school. The IBM Statistical Package for the Social Sciences 26 package (SPSS) was used to analyze the data. This chapter also reports the results of this qualitative study, which explored the relationship of burnout and resilience and demographic characteristics of the sample and population, descriptive statistics of the variables, research question findings, and observations. Data collected in response to the research questions are presented in this chapter. Before completing the analysis to address the questions, the data were reviewed to ensure collinearity was not a problem. Any meaningful and significant correlations among the variables and potential predictors are identified.

Demographic Profile of the Sample and Population

After removing incomplete surveys, as indicated in Chapter Three, the final data set included 106 students who met all inclusion criteria based on their completed BRS and MBI responses. Demographic data were collected, including gender, cohort, age range, and state of residency. The demographic analysis for the 106 respondents based on the self-reported data from the BRS and MBI are shown in Tables 3, 4, 5, and 6 and included 46 (43.4%) male students and 60 (56.6%), female students. Second-year medical students made up 65.1% of the sample (n = 69) and third-year medical students made up 34.9% of the sample (n = 37). A majority, 76.4% (n = 81) of students are in the 21-25-year age range, 17% (n = 18) were 26-30, 3.8% (n = 4) were 31-35, 1.9% (n = 2) were 18-20, and .9% (n = 1) preferred not to reveal their age for this survey. Finally, of the sample, 76 students (71.7%) reported being a Florida resident, and 30 students

(28.3%) reported being a non-Florida resident.

Table 3

Frequency Distribution by Gender

Variable	Frequency	Percent	Valid Percent	Cumulative Percent
Male	46	43.4	43.4	43.4
Female	60	56.6	56.6	100
Total	106	100	100	

Table 4

Frequency Distribution by Cohort

Variable	Frequency	Percent	Valid Percent	Cumulative Percent
Year 2	69	65.1	65.1	65.1
Year 3	37	34.9	34.9	100
Total	106	100	100	

Table 5

Frequency Distribution by Age

Variable	Frequency	Percent	Valid Percent	Cumulative Percent
18 – 20	2	1.9	1.9	1.9
21 – 25	81	76.4	76.4	78.3
26 – 30	18	17	17	95.3
31 – 35	4	3.8	3.8	99.1
Prefer Not to Answer	1	.9	.9	100
Total	106	100	100	

Table 6

Frequency Table by State of Residency

Variable	Frequency	Percent	Valid Percent	Cumulative Percent
Florida Resident	76	71.7	71.7	71.7
Non-Florida Resident	30	28.3	28.3	100
Total	106	100	100	

Analysis of the Research Questions

This section includes inferential statistics based on the Statistical Package results for the Social Sciences (SPSS) program used to analyze the data to answer the eight research questions formed to guide this study. For each statistical test, a significance level of α=.05 was used. Analysis of each research question used varying methods to determine statistical significance, including Independent Sample T-Test, Pearson Product Correlation Coefficient, and one-way Analysis of Variance (ANOVA).

Before using the Independent T-test and ANOVA, the assumptions of normality and homoscedasticity need to be tested. The data were examined for normality and homogeneity of variance (HOV) using Levene's test to test whether the two samples' variances are approximately equal. Levene's test is less sensitive to departures of normality. The data were normally distributed for the dependent variable resilience, with skewness of 2.96 (SE = 0.236) and kurtosis of .440 (SE = 0.467). For the dependent variable burnout, each subscale was measured separately for normal distribution tendencies. Exhaustion was normally distributed, with skewness of -.166 (SE = .235) and kurtosis of -.527 (SE = .465). Cynicism was normally distributed with skewness of .280 (SE = .235) and kurtosis of -.339 (SE = .465). Professional Efficacy was normally distributed with skewness of -.635 (SE = .235) and kurtosis of .429 (SE = .465).

Question One. The following section presents a discussion on the data analysis on the first research question: "To what extent does resilience, as measured by the Brief Resilience Scale, differ from the second year of undergraduate medical education to the third year of undergraduate medical education?" The independent variable, year of medical school, identified the student's cohort. The dependent variable, resilience, was measured using the Brief Resilience Scale. An independent sample T-Test was conducted to determine whether medical students in

the second-year of medical school demonstrated a different amount of resilience than their peers in the third-year of medical school.

The analysis revealed that the groups did not differ significantly, $t(103) = -.519$, $p > .05$ (p=.605), d = .0585, 95% CI [-.1463, .0856]. The mean for the second-year cohort (M = 2.9426, SD = .2645) was not significantly different than the third-year cohort (M = 2.9730, SD = .3228). The results of the independent samples t-test are summarized in Table 7.

Table 7

Independent Samples t-test for Resilience by Year in Medical School

		t-test for Equality of Means						
		t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Resilience	Equal variances assumed	-.519	103	.605	-.0303259	.0584678	-.1462830	.0856312
	Equal variances not assumed	-.489	62.615	.626	-.0303259	.0620039	-.1542457	.0935939

Linear regression analysis produced a weak relationship between resilience and year of undergraduate medical education. Pearson r = .051, R2 = .003, p = .605.

Question Two. The following section presents a discussion on the data analysis on the second research question: "To what extent does burnout, as measured by the Maslach Burnout Inventory, differ from the second year of undergraduate medical education to the third year of undergraduate medical education?" The independent variable, year of medical school, identified the student's cohort. The dependent variable, burnout, was measured using the Maslach Burnout Inventory. An independent sample T-Test was conducted to determine whether students in the second-year of medical school demonstrated a different amount of burnout than their peers in the

third-year of medical school. The Maslach Burnout Inventory is measured using the following three subscales to determine varying degrees of burnout: Exhaustion, Cynicism, and Professional Efficacy. Each subscale was analyzed separately. The burnout score data of the two cohorts of medical students were interpreted as aggregate groups and compared only to each other.

The analysis for the Maslach Burnout Inventory Exhaustion subscale revealed that the groups did not differ significantly, $t(104) = -.822$, $p = .413$, $d = .2557$, 95% CI [-.7173, .2967]. The mean for the second-year cohort (M = 3.3681, SD = 1.1386) was not significantly different than the third-year cohort (M = 3.5784, SD = 1.4490). The results of the independent sample T-Test are summarized in Table 8.

The analysis for the Maslach Burnout Inventory Cynicism subscale revealed that the groups did not differ significantly, $t(104) = -.942$, $p = .348$, $d = .2174$, 95% CI [-.6360, .2260]. The mean for the second-year cohort (M = 2.5681, SD = 1.0730) was not significantly different than the third-year cohort (M = 2.7730, SD = 1.0553). The results of the independent sample T-Test are summarized in Table 8.

The analysis for the Maslach Burnout Inventory Professional Efficacy subscale revealed that the groups did not differ significantly, $t(104) = 1.188$, $p = .238$, $d = .2027$, 95% CI [-.1612, .6429]. The mean for the second-year cohort (M = 4.331, SD = 0.9482) was not significantly different than the third-year cohort (M = 4.0901, SD = 1.0777). The results of the independent samples t-test are summarized in Table 8.

Table 8

Independent Samples Test for Burnout by Year in Medical School

		t-test for Equality of Means						
		t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Exhaustion	Equal variances assumed	-.822	104	.413	-.2102624	.2556731	-.7172718	.2967469
	Equal variances not assumed	-.765	60.287	.447	-.2102624	.2748310	-.7599525	.3394276
Cynicism	Equal variances Assumed	-.942	104	.348	-.2048570	.2173978	-.6359651	.2262510
	Equal Variances not assumed	-.947	74.806	.347	-.2048570	.2162999	-.6357669	.2260528
Professional Efficacy	Equal variances assumed	1.188	104	.238	.2408278	.2027321	-.1611976	.6428532
	Equal variances not assumed	1.143	66.065	.257	.2408278	.2107602	-.1799608	.6616164

Linear regression analysis produced a weak relationship between Exhaustion and year of undergraduate medical education. Pearson r = .080, R2 = .006, p = .413. Linear regression analysis produced a weak relationship between Cynicism and year of undergraduate medical education. Pearson r = .092, R2 = .008, p = .348. Linear regression analysis produced a weak relationship between Professional Efficacy and year of undergraduate medical education. Pearson r = .116, R2 = .013, p = .238.

Question Three. The following section presents a discussion on the data analysis of the third research question: "What is the relationship between burnout, as measured by the Maslach Burnout Inventory, and resilience, as measured by the Brief Resilience Scale, during the second year of medical school?" To answer this question, a Pearson product-moment correlation was conducted to determine the level of relationship between second-year medical students' perceptions of burnout and resilience using the two instruments. The Pearson product-moment correlation coefficient was used to explore the relationship between student's self-reported behaviors of resilience and burnout.

For the independent variable, Class Level, respondents were identified as second-year medical students and were coded with a value of two (2) in SPSS.

For the dependent variable attributes demonstrated by the Brief Resilience Scale, an average score was reported for each respondent with a value ranging from one (1) to five (5) for the six (6) item survey. For the three subscales of the Maslach Burnout Inventory, an average numerical score was separately reported. Exhaustion, Cynicism, and Professional Efficacy were assessed and analyzed individually; an overall burnout score is not advised by the creators of the tool. The average score of survey items 1, 2, 3, 4, and 6 are assigned to Exhaustion. Similarly, items 8, 9, 13, 14, and 15 are assigned to Cynicism. Finally, the average score of items 5, 7, 10, 11, 12, and 16 are assigned to Professional Efficacy. Aggregate scores were used for the entire sample.

No significant correlations were found between burnout subscale scores and scores on the resilience measure. No significant correlation was found between scores on the Exhaustion measure of the MBI and resilience scores of the BRS in second-year medical students, $r(68) = .03$, $p = .806$. No significant correlation was found between scores on the Cynicism measure of

the MBI and resilience scores of the BRS in second-year medical students, $r(68) = .08$, $p = .498$. No significant correlation was found between scores on the Professional Efficacy measure of the MBI and resilience scores of the BRS in second-year medical students, $r(68) = .10$, $p = .397$. The Pearson product-moment correlation analysis is shown in Table 9 for the self-reported MBI subscales and resilience behaviors in second-year medical students.

Table 9

Correlation of Resilience and Burnout in Year 2

		Resilience	Exhaustion	Cynicism	Efficacy
Resilience	Pearson Correlation	1	.030	-.084	.104
	Sig (2-tailed)		.806	.498	.397
	N	68	68	68	68
Burnout: Exhaustion	Pearson Correlation	.030	1	.400**	-.146
	Sig (2-tailed)	.806		.001	.232
	N	68	69	69	69
Burnout: Cynicism	Pearson Correlation	-.084	.400**	1	-.469**
	Sig (2-tailed)	.498	.001		.000
	N	68	69	69	69
Burnout: Professional Efficacy	Pearson Correlation	.104	-.146	-.469**	1
	Sig (2-tailed)	.397	.232	.000	
	N	68	69	69	69

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Question Four. The following section presents a discussion on the data analysis of the fourth research question: "What is the relationship between burnout, as measured by the Maslach Burnout Inventory, and resilience, as measured by the Brief Resilience Scale, during the third-year of medical school?" To answer this question, a Pearson product-moment correlation was conducted to determine the level of relationship between third-year medical students' perceptions of burnout and resilience using the two instruments. The Pearson product-moment

correlation coefficient was used to explore the relationship between student's self-reported behaviors of resilience and burnout.

For the independent variable, Class Level, respondents were identified as third-year medical students and were coded with a value of three (3) in SPSS.

Table 10

Correlation of Resilience and Burnout in Year 3

		Resilience	Exhaustion	Cynicism	Efficacy
Resilience	Pearson Correlation	1	.308	-.090	-.201
	Sig (2-tailed)		.064	.595	.232
	N	37	37	37	37
Burnout: Exhaustion	Pearson Correlation	.308	1	.585**	-.408*
	Sig (2-tailed)	.064		.000	.012
	N	37	37	37	37
Burnout: Cynicism	Pearson Correlation	.090	.585**	1	-.179
	Sig (2-tailed)	.595	.000		.288
	N	37	37	37	37
Burnout: Professional Efficacy	Pearson Correlation	-.201	-.408*	-.179	1
	Sig (2-tailed)	.232	.012	.288	
	N	37	37	37	37

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

No significant correlations were found on the three burnout subscale scores and scores on the resilience measure. No significant correlation was found between scores on the Exhaustion measure of the MBI and resilience scores of the BRS in third-year medical students, $r(37) = .31$, $p = .064$. No significant correlation was found between scores on the Cynicism measure of the MBI and resilience scores of the BRS in third-year medical students, $r(37) = .09$, $p = .595$. No significant correlation was found between scores on the Professional Efficacy measure of the

MBI and resilience scores of the BRS in third-year medical students, $r(37) = -.20$, $p = .232$. The Pearson product-moment correlation analysis is shown in Table 10 for the self-reported MBI subscales and resilience behaviors in third-year medical students.

Question Five. The following section presents a discussion on the data analysis of the fifth research question: "Do scores on the Brief Resilience Scale differ among students of different ages, genders, and state of residency in students in the second-year of medical school?" To answer this question, an independent sample T-Test was first conducted to understand how gender in the second-year of medical school affected resilience, if at all. The analysis for the Brief Resilience Scale revealed that the gender groups did not differ significantly, $t(66) = -1.091$, $p = .279$, $d = .0645$, 95% CI [-.1991, .0584]. The second-year cohort was coded with a value of one (1) for male and two (2) for female in SPSS to identify gender. Resilience scores in the male second-year group (n = 30, M = 2.903, SD = .2565) was not significantly different than the female second-year group (n = 38, M = 2.974, SD = .2699). The results of the independent samples t-test are summarized in Table 11.

Within the second-year group of medical students, those with a permanent Florida residency (N = 50) were associated with resilience scores using the Brief Resilience Scale (M = 2.902, SD = 033). By comparison, the second-year group of medical students with a non-Florida permanent residency (N = 19) was associated with a numerically larger resilience score from the Brief Resilience Scale (M = 3.056, SD = .075).

Table 11

Independent Samples Test for Resilience and Gender in Year 2

		t-test for Equality of Means						
		t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Resilience	Equal variances assumed	-1.091	66	.279	-.0703509	.0645011	-.1991315	.0584297
	Equal variances not assumed	-1.097	63.711	.277	-.0703509	.0641085	-.1984334	.0577317

Table 12

Independent Samples Test for Resilience and Residency in Year 2

		t-test for Equality of Means						
		t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Resilience	Equal variances assumed	-2.170	66	.034	-1.535556	.0707641	-.2948406	-.0122705
	Equal variances not assumed	-1.874	23.862	.073	-1.535556	.8919185	-.3226788	0.155677

Finally, a one-way ANOVA was conducted to understand how the age of students in the second-year of medical school affected resilience, if at all. The independent variable of Age was coded with a value of one (1) for students ranging from 18 - 20 years old, a value of two (2) for students ranging from 21 – 25 years old, a value of three (3) for students ranging from 26 – 30 years old, a value of four (4) for students ranging from 31 – 35 years old, a value of five (5) for students 36 – 40 years old, six (6) for students over 40 years old, and a value of seven (7) for

students who preferred not to answer. In this study, there were no students in the 31 – 35 category or 36 – 40 categories, so those values do not appear.

The results of the ANOVA, presented in Table 13, indicated there was not a significant effect of Age on a student's self-reported resilience level in the second-year of medical school [$F(2, 67) = 0.843$, $p = .44$]. Because the results were not significant, a post hoc test was not required.

Table 13

ANOVA for Resilience and Age in Year 2

Resilience	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.119	2	.059	.843	.435
Within Groups	4.568	65	.070		
Total	4.686	67			

Question Six. The following section presents a discussion on the data analysis of the fifth research question: "Do scores on the Brief Resilience Scale differ among students of different ages, genders, and state of residency in students in the third-year of medical school?" To answer this question, an independent sample T-Test was first conducted to understand how gender in the third-year of medical school affected resilience, if at all. The analysis for the Brief Resilience Scale revealed that the gender groups did not differ significantly, $t(35) = .957$, $p = .345$, $d = .1072$, 95% CI [-.1150, .3204]. The third-year cohort was coded with a value of one (1) for male and two (2) for female in SPSS to identify gender. Resilience scores in the male third-year group (n = 16, M = 3.0313, SD = .3560) was not significantly different than the female third-year group (n = 21, M = 2.929, SD = .2961). The results of the independent samples t-test are summarized in Table 14.

Table 14

Independent Samples Test for Resilience and Gender in Year 3

		t-test for Equality of Means						
		t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Resilience	Equal variances assumed	.957	35	.345	.1026786	.1072362	-.1150225	.3203797
	Equal variances not assumed	.934	28.951	.358	.1026786	.1099869	-.1222866	.3276437

Next, the analysis for the Brief Resilience Scale revealed that the student's state of permanent state of residency did not differ significantly, $t(35) = -.144$, $p = .887$, $d = .1178$, 95% CI [-.2559, .2220]. Resilience scores for Florida residency in the third-year group (n = 26, M = 2.968, SD = .3300) was not significantly different than the non-Florida residency third-year group (n = 11, M = 2.9849, SD = .3202). The results of the independent samples t-test are summarized in Table 15.

Table 15

Independent Samples Test for Resilience and Residency in Year 3

		t-test for Equality of Means						
		t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Resilience	Equal variances assumed	-2.170	66	.034	-1.535556	.0707641	-.2948406	-.0122705
	Equal variances not assumed	-1.874	23.862	.073	-1.535556	.8919185	-.3226788	0.155677

Finally, a one-way ANOVA was conducted to understand how the age of students in the third-year of medical school affected resilience, if at all. The independent variable of Age was coded with a value of one (1) for students ranging from 18 - 20 years old, a value of two (2) for students ranging from 21 – 25 years old, a value of three (3) for students ranging from 26 – 30 years old, a value of four (4) for students ranging from 31 – 35 years old, a value of five (5) for students 36 – 40 years old, six (6) for students over 40 years old, and a value of seven (7) for students who preferred not to answer. In this study, there were no third-year students in the 31 – 35 category or 36 – 40 categories, so those values do not appear.

The results of the ANOVA, presented in Table 16, indicated there was a significant effect of Age on a student's self-reported resilience level in the third-year of medical school [$F(3, 36) = 2.987$, $p = .045$].

Table 16

ANOVA for Resilience and Age Year 3

Resilience	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.801	3	.267	2.987	.045
Within Groups	2.950	33	.089		
Total	3.751	36			

Question Seven. The following section presents a discussion on the data analysis of the seventh research question: "Do scores on the Maslach Burnout Inventory differ among students of different ages, genders, and state of residency in students in the second year of medical school?"

To answer this question, an independent sample T-Test was first conducted to understand how gender in the second-year of medical school affected burnout, if at all. The analysis for the

three subscales of the Maslach Burnout Inventory revealed that the gender groups did not differ significantly for each subscale. When measuring Exhaustion scores of burnout in the second-year, $t(67) = 1.497$, $p = .139$, $d = .2740$, 95% CI [-.1367, .9572]. When measuring Cynicism scores of burnout in the second-year, $t(67) = .001$, $p = 3.509$, $d = .2413$, 95% CI [.3651, 1.3282]. When measuring Professional Efficacy scores of burnout in the second-year, $t(67) = -.704$, $p = .484$, $d = .2311$, 95% CI [-.6242, .2985]. Students in the second-year cohort were coded with a value of one (1) for male and two (2) for female in SPSS to identify gender. Burnout scores in the male second-year group are separated for each subscale. Male students (n = 30) with Exhaustion scores (M = 3.600, SD = .7755) were not significantly different than responses from the female group (n = 39, M = 3.1900, SD = 1.3363). Male students (n = 30) with Cynicism scores (M = 3.0467, SD = 1.0434) were not significantly different than responses from the female group (n = 39, M = 2.2000, SD = .95366). Professional Efficacy scores of male students (n = 30, M = 4.2389, SD = .9783) were not significantly different than responses from the female group (n = 39, M = 4.4017, SD = .9309). The results of the independent samples T-Test are summarized in Table 17.

Next, an independent samples t-test was conducted to understand how state of residency in the second-year of medical school affected burnout, if at all. The analysis for the three subscales of the Maslach Burnout Inventory revealed that the student's state of permanent residency did not differ significantly. When reviewing Exhaustion, $t(67) = 1.430$, $p = .157$, $d = .3045$, 95% CI [-.1725, 1.0432]. The Cynicism subscale for second-year medical students showed, $t(67) = 1.105$, $p = .225$, $d = .3191$, 95% CI [-.2571, 8954]. Finally, testing the Professional Efficacy subscale for state of residency and second-year medical students demonstrated $t(67) = 647$, $p = .520$, $d = .1661$, 95% CI [-.3461, 6784].The second-year cohort

was coded with a value of one (1) for Florida residency and two (2) for non-Florida residency in SPSS. Each of the subscales of the Maslach Burnout Inventory was used to determine mean and standard deviation values for state of residency in the second-year student group. For each subscale, fifty (50) second-year students were Florida residents and nineteen (19) were non-Florida residents. The results of the independent sample T-Test are summarized in Table 18.

Table 17

Independent Samples Test for Burnout and Gender in Year 2

		t-test for Equality of Means						
		t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Exhaustion	Equal variances assumed	1.497	67	.139	.4102564	.2740129	-.1366756	.9571885
	Equal variances not assumed	1.599	62786	.115	.4102564	.2565854	-.1025227	.9230355
Cynicism	Equal variances assumed	3.509	67	.001	.8466667	.2412730	.3650837	1.3282497
	Equal variances not assumed	3.468	59.495	.001	.8466667	.2441568	.3581950	1.3351383
Professional Efficacy	Equal variances assumed	-.704	67	.484	-1.628205	.2311261	-.6241502	.2985092
	Equal variances not assumed	-.700	60.910	.487	-.1628205	.2326530	-.6280528	.3024117

Finally, a one-way ANOVA was conducted to understand how the age of students in the second-year of medical school affected burnout, if at all. The independent variable of Age was coded with a value of one (1) for students ranging from 18 - 20 years old, a value of two (2) for

students ranging from 21 – 25 years old, a value of three (3) for students ranging from 26 – 30 years old, a value of four (4) for students ranging from 31 – 35 years old, a value of five (5) for students 36 – 40 years old, six (6) for students over 40 years old, and a value of seven (7) for students who preferred not to answer. In this study, there were no second-year students in the 31 – 35 category or 36 – 40 categories, so those values do not appear.

Table 18

Independent Samples Test for Burnout and Residency in Year 2

		t-test for Equality of Means						
		t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Exhaustion	Equal variances assumed	1.430	67	.157	.4353684	.3045251	-.1724662	1.0432031
	Equal variances not assumed	1.614	42.592	.114	.4353684	.2696710	-.1086257	.973625
Cynicism	Equal variances assumed	1.105	67	.273	.3191579	.2887041	-.2570979	.8954137
	Equal variances not assumed	1.231	41.183	.225	.3191579	.2592651	-.2043681	.8426839
Professional Efficacy	Equal variances assumed	.647	67	.520	.1661404	.2566426	-.3263338	.6586145
	Equal variances not assumed	.684	36.497	.498	.1661404	.2429410	-.3263338	.6586145

The results of the ANOVA, presented in Table 19, indicated there was not a significant effect of Age on a student's self-reported MBI Exhaustion level in the second-year of medical school [$F(2, 66) = .370$, $p = .692$]. No significant effect of Age on a student's MBI Cynicism

level in the second-year of medical school was shared [$F(2, 67) = 1.217$, $p = .303$]. No significant effect of Age on a student's MBI Professional Efficacy level in the second-year of medical school was shared [$F(2, 67) = 1.460$, $p = .240$].

Table 19

ANOVA for Age and Burnout in Year 2

Burnout		Sum of Squares	df	Mean Square	F	Sig.
Exhaustion	Between Groups	.976	2	.488	.370	.692
	Within Groups	87.179	66	1.321		
	Total	88.155	68			
Cynicism	Between Groups	2.785	2	1.392	1.217	.303
	Within Groups	75.505	66	1.144		
	Total	78.290	68			
Professional Efficacy	Between Groups	2.591	2	1.295	1.460	.240
	Within Groups	58.548	66	.887		
	Total	61.138	68			

Question Eight. The following section presents a discussion on the data analysis of the eighth research question: "Do scores on the Maslach Burnout Inventory differ among students of different ages, genders, and state of residency in students in the third-year of medical school?"

To answer this question, an independent sample T-Test was first conducted to understand how gender in the third-year of medical school affected burnout, if at all. The analysis for the three subscales of the Maslach Burnout Inventory revealed that the gender groups did not differ significantly for each subscale. When measuring Exhaustion scores of burnout in the third-year, $t(35) = .078$, $p = .938$, $d = .4876$, 95% CI [-.9518, 1.0280]. When measuring Cynicism scores of burnout in the third-year, $t(35) = -.238$, $p = .813$, $d = .3549$, 95% CI [-.8050, .6359]. When measuring Professional Efficacy scores of burnout in the third-year, $t(35) = .322$, $p = .749$, $d = .3621$, 95% CI [-.6187, .8518].Students in the third-year cohort was coded with a value of one

(1) for male and two (2) for female in SPSS to identify gender. Burnout scores in the male third-year group are separated for each subscale. Male students (n = 16) with Exhaustion scores (M = 3.600, SD = 1.4606) were not significantly different than responses from the female group (n = 21, M = 3.5619, SD = 1.4760). Male students (n = 16) with Cynicism scores (M = 2.7250, SD = .9602) were not significantly different than responses from the female group (n = 21, M = 2.8095, SD = 1.1445). Professional Efficacy scores of male students (n = 16, M = 4.1563, SD = 1.0843) were not significantly different than responses from the female group (n = 21, M = 4.0397, SD = 1.0966). The results of the independent samples T-Test are summarized in Table 20.

Table 20

Independent Samples Test for Burnout and Gender in Year 3

		t-test for Equality of Means						
		t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Exhaustion	Equal variances assumed	.078	35	.938	.0380952	.4876077	-.9518010	1.0279915
	Equal variances not assumed	.078	32.614	.938	.0380952	.4868986	-.9529530	1.0291435
Cynicism	Equal variances assumed	-.238	35	.813	-.0845238	.3548785	-.8049654	.6359178
	Equal variances not assumed	-.244	34.623	.809	-.0845238	.3464122	-.7880517	.6190041
Professional Efficacy	Equal variances assumed	.322	35	.749	.1165675	.3621593	-.6186551	.8517900
	Equal variances not assumed	.322	32.626	.749	.1165675	.3615946	-.6194224	.8525573

Next, an independent samples t-test was conducted to understand how state of residency in the third-year of medical school affected burnout, if at all. The analysis for the three subscales of the Maslach Burnout Inventory revealed that the student's state of permanent residency did not differ significantly. When reviewing Exhaustion, $t(35) = .681$, $p = .501$, $d = .5251$, 95% CI [-.7087, 1.4233]. The Cynicism subscale for third-year medical students showed, $t(35) = 1.105$, $p = .921$, $d = .3849$, 95% CI [-.8199, .7429]. Finally, testing the Professional Efficacy subscale for state of residency and third-year medical students demonstrated $t(35) = -.721$, $p = .476$, $d = .3902$, 95% CI [-1.0737, .5107].The third-year cohort was coded with a value of one (1) for Florida residency and two (2) for non-Florida residency in SPSS. Each of the subscales of the Maslach Burnout Inventory was used to determine mean and standard deviation values for state of residency in the third-year student group. For each subscale, twenty-six (26) third-year students were Florida residents and eleven (11) were non-Florida residents. The results of the independent sample T-Test are summarized in Table 21.

The results of the ANOVA, presented in Table 22, indicated there was not a significant effect of Age on a student's self-reported MBI Exhaustion level in the third-year of medical school [$F(3, 33) = .454$, $p = .716$]. No significant effect of Age on a student's MBI Cynicism level in the third-year of medical school was shared [$F(3, 33) = .705$, $p = .556$]. No significant effect of Age on a student's MBI Professional Efficacy level in the third-year of medical school was shared [$F(3, 33) = .128$, $p = .943$].

Table 21

Independent Samples Test for Burnout and Residency in Year 2

		t-test for Equality of Means						
		t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Exhaustion	Equal variances assumed	.681	35	.501	.3573427	.520983	-.7086636	1.4233489
	Equal variances not assumed	.655	17.433	.521	.3573427	.5453389	-.7910489	1.5057342
Cynicism	Equal variances assumed	-.100	35	.921	-.0384615	.3849072	-.8198647	.7429416
	Equal variances not assumed	-.111	24.094	.913	-.0384615	.3476710	-.7558703	.6789472
Professional Efficacy	Equal variances assumed	-.721	35	.476	-.2814685	.3902331	-1.0736839	.5107468
	Equal variances not assumed	-.721	18.886	.480	-.2814685	.3903478	-1.0988093	.5358723

Table 22

ANOVA for Age and Burnout in Year 2

Burnout		Sum of Squares	df	Mean Square	F	Sig.
Exhaustion	Between Groups	2.996	3	.999	.454	.716
	Within Groups	72.587	33	2.200		
	Total	75.583	36			
Cynicism	Between Groups	2.415	3	.805	.705	.556
	Within Groups	37.678	33	1.142		
	Total	40.093	36			
Professional Efficacy	Between Groups	.483	3	.161	.128	.943
	Within Groups	41.328	33	1.252		
	Total	41.811	36			

Summary of the Data

Chapter Four provided an analysis of the results using statistical techniques consistent with the research questions. The eight questions were analyzed using self-reported data gathered from second-and third-year medical students responding to the Brief Resilience Scale and the Maslach Burnout Inventory. Chapter Five will summarize the results, discuss the study limitations, review implications for practice, and make recommendations for future research.

CHAPTER FIVE: DISCUSSION

This chapter will summarize the research study, interpretations of the findings within the context of other relevant research, the implications of the study for practice, and implications for further research. Lastly, this chapter will offer a model for future implementation of how resilience and burnout affect medical students during and after their preparation for significant licensure examinations.

Summary of the Problem and Purpose of the Study

Statement of the Problem. Burnout is a concern for medical schools (Dyrbye et al., 2010). Medical students attempt to master a new type of academic rigor and a large volume of information (Dyrbye et al., 2005). High-stakes exams, such as the USMLE Step 1 examination, become critical to students' overall success and pass rates (Rosenthal, Rosenthal, & Edwards, 1990). Additionally, students may be concerned about financial issues, long work hours, student abuse, and exposure to human suffering (Wolf, Faucett, Randall, & Balson, 1988).

Before beginning a formal clinical education, medical students must pass the USMLE Step 1 exam. The exam assesses students' understanding and ability to apply important basic science concepts integral to medicine. In most cases, USMLE Step 1 is taken between the second and third years of medical school. Until the time of their Step 1 examination date, second-year medical students are consistently enrolled in regular coursework while simultaneously beginning solitary or small group preparation for USMLE Step 1. Scores of USMLE Step 1 are heavily weighed when students apply for medical residency positions.

Medical residency program directors are likely to inherit medical school graduates with a substantial burden of burnout symptoms who are subsequently ill-prepared to remain resilient. The burden of burnout symptoms continues during the transitional period from medical school into residency programs.

The purpose of this study was to investigate the extent of the relationship between burnout and resilience in second-and third-year medical students before and after taking the first significant milestone licensure exam required for progression into more advanced clinical study. This was accomplished by using survey data of medical students in two consecutive cohorts about their current self-reported behaviors of resilience in their daily life and their feelings of burnout before and after the completion of USMLE Step 1. Medical students may experience a change in resilience and burnout. Additionally, increased reports of depression, anxiety, and stress may decrease reports of resilience and burnout. Data analysis in this study was done with these hypotheses in mind.

Review of the Methods. This quantitative, non-experimental study was conducted at a large, public research institution located in a metropolitan area in Florida, which provided the setting for this research study. The institution is comprised of the main campus, which includes the College of Medicine, and two regional campuses. To homogenize the population, this study only focused on students pursuing a medical doctor degree. The university currently reports an unduplicated headcount of more than 50,000 individual students, with a medical student population of 727 students.

The research population included two cohorts of medical students enrolled in the second- and third-year medical school during the 2020-2021 academic year. Additionally, this population

included students who began at the university, left to pursue a leave of absence for health, educational, or research reasons, and returned to the university.

Summary Findings

Question One. This research question examined the difference, if any, of resilience, as measured by the Brief Resilience Scale, from the second year of medical school to the third. For this study, resilience was defined as how well individuals deal with stressful situations, challenges, and setbacks. An independent samples T-Test analysis showed no statistically significant relationship between the two variables at the $p<.05$ level between years two and three using the Brief Resilience Scale.

As they begin to prepare for USMLE Step 1 between their second-and third-years of medical education, students may rely upon inherent or learned resiliency traits to help them with the taxing study periods. Preparation for the exam is often mentally draining, physically taxing, and socially isolating. At times, students may feel overwhelmed by the amount of information they must master and may think that they will never remember it all. This stressful situation calls for students to understand how they are resilient and can demonstrate this trait. Although no statistically significant differences between the cohorts were shown in this study, it is essential to see how resilient both groups were because of years of preparation to enter medical school demands. High-achieving students and rigorous academic loads may be a contributing factor that allows for these individuals to have demonstrable abilities to persevere through demanding situations.

Question Two. This research question examined the difference, if any, of burnout, as measured by the Maslach Burnout Inventory, from the second year of medical school to the third. The Maslach Burnout Inventory is calculated using three subscales to determine varying

degrees of burnout: Exhaustion, Cynicism, and Professional Efficacy. Each subscale was analyzed separately. The burnout score data of the two cohorts of medical students were interpreted as aggregate groups and compared only to each other. For this study, burnout is defined as experiencing extreme exhaustion. One cannot contribute emotionally and physically at work, being cynical, accompanied by withdrawal or detached from work, lacking a sense of personal accomplishment, feeling inefficient, and unproductive. An independent samples T-Test analysis showed no statistically significant relationship between the two variables at the $p<.05$ level between years 2 and 3 using the Maslach Burnout Inventory.

1. **Exhaustion**. An independent samples T-Test analysis showed no statistically significant relationship between the two variables at the $p<.05$ level between years 2 and 3 using the Maslach Burnout Inventory.
2. **Cynicism**. An independent samples T-Test analysis showed no statistically significant relationship between the two variables at the $p<.05$ level between years 2 and 3 using the Maslach Burnout Inventory.
3. **Professional Efficacy.** An independent samples T-Test analysis showed no statistically significant relationship between the two variables at the $p<.05$ level between years 2 and 3 using the Maslach Burnout Inventory.

Linear regression analysis produced a weak relationship for all three subscales, Exhaustion, Cynicism, and Professional Efficacy using the Maslach Burnout Inventory in the second-and third-years of medical school. Interestingly, students in the third year did demonstrate slightly numerically higher levels of exhaustion and cynicism and lower professional efficacy than their second-year peers. The MBI specifies that burnout is reflected in the following combination of subscale scores: a high degree of burnout is reflected in high scores on the Exhaustion and

Cynicism subscales and low scores on the Professional Efficacy subscale (Maslach, 1996). Therefore, third-year medical students may have demonstrated a higher degree of burnout because of having recently studied and taken USMLE Step 1 than their second-year counterparts. However, the results are not statistically or drastically significant.

Question Three. The third research question focused on the relationship between burnout, measured by the Maslach Burnout Inventory, and resilience, as measured by the Brief Resilience Scale, during the second year of medical school. A Pearson product-moment correlation compared students' self-reported perceptions of both burnout and resilience.

No statistically significant correlations were found between the Maslach Burnout Inventory's three subscales and the Brief Resilience Scale in second-year medical students. No significant correlation was found between scores on the Exhaustion measure of the MBI and BRS resilience scores in second-year medical students, $r(68) = .03$, $p = .806$. No significant correlation was found between scores on the Cynicism measure of the MBI and BRS resilience scores in second-year medical students, $r(68) = .08$, $p = .498$. No significant correlation was found between scores on the Professional Efficacy measure of the MBI and BRS resilience scores in second-year medical students, $r(68) = .10$, $p = .397$. Second-year medical students completed these instruments at the beginning of the academic year. They had just returned from summer break after completing their first year of medical school. They were presumed to be rested, yet anxious and eager for the start of the second year.

Question Four. The fourth research question focused on the relationship between burnout, as measured by the Maslach Burnout Inventory, and resilience, as measured by the Brief Resilience Scale, during the third year of medical school. A Pearson product-moment correlation compared students' self-reported perceptions of both burnout and resilience.

No significant correlations were found on the three burnout subscale scores and scores on the resilience measure. No significant correlation was found between scores on the Exhaustion measure of the MBI and BRS resilience scores in third-year medical students, $r(37) = .31$, $p = .064$. No significant correlation was found between scores on the Cynicism measure of the MBI and BRS resilience scores in third-year medical students, $r(37) = .09$, $p = .595$. No significant correlation was found between scores on the Professional Efficacy measure of the MBI and BRS resilience scores in third-year medical students, $r(37) = -.20$, $p = .232$.

Second-year medical students completed these instruments at the beginning of the academic year. They had just returned from summer break after completing their first year of medical school. They were presumed to be rested, yet anxious and eager to start didactic learning in the second-year.

Question Five. This research question explored the differences, if any, of second-year medical students' self-reported resilience scores and their relationship to age, gender, and state of permanent residency. An independent samples T-Test was conducted to understand how gender affected resilience, if at all. The Brief Resilience Scale analysis revealed that the gender groups did not have any statistically significant difference between them among second-year medical students, $t(66) = -1.09$, $p = .279$.

To test the hypothesis that students whose permanent residency and support system is outside the state of Florida and geographically farther away from the medical school must have more demonstrable resilience as indicated through a higher resilience score, than their peers with a Florida residency, and to understand any statistically significant differences from the Brief Resilience Scale in the second year of medical school, an independent samples t-test was performed. Within the second-year group of medical students, those with a permanent Florida

residency (N = 50) were associated with resilience scores using the Brief Resilience Scale (M = 2.902, SD = 033). By comparison, the second-year group of medical students with a non-Florida permanent residency (N = 19) was associated with a numerically larger resilience score from the Brief Resilience Scale (M = 3.056, SD = .075).

Finally, a one-way ANOVA was conducted to understand how students' age in the second year of medical school affected resilience, if at all. The ANOVA results indicated no significant effect of age on a student's self-reported resilience level in the second-year medical school [$F(2, 67) = 0.843$, $p = .44$].

Gender, age, and state of residency do not significantly affect a second-year medical student's perceived resilience. Resilience includes positive personality characteristics that enhance individual adaptation (Ahern, Kiehl, Lou Sole, & Byers, 2006).

Question Six. This research question explored the differences, if any, of third-year medical students' self-reported resilience scores and their relationship to age, gender, and state of permanent residency. An independent samples T-Test was conducted to understand how gender affected resilience, if at all. Like the second-year students, the Brief Resilience Scale analysis revealed that the gender groups did not significantly differ among second-year medical students, $t(35) = .957$, $p = .345$.

Again, to test the hypothesis that students whose permanent residency, and support system, is outside the state of Florida and geographically farther away from the medical school must have more demonstrable resilience as indicated through a higher resilience score, than their peers with a Florida residency, and to understand any statistically significant differences from the Brief Resilience Scale in the third year of medical school, an independent samples t-test was performed. Within the third-year group of medical students, those with a permanent Florida

residency (N = 26) were associated with resilience scores using the Brief Resilience Scale (M = 2.968, SD = .3300). By comparison, the third-year group of medical students with a non-Florida permanent residency (N = 11) was associated with a numerically larger resilience score from the Brief Resilience Scale (M = 2.9849, SD = .3202).

Finally, a one-way ANOVA was conducted to understand how students' age in the second year of medical school affected resilience, if at all. The ANOVA results indicated a significant effect of age on a student's self-reported resilience level in the third-year medical school [F (3, 36) = 2.987, p = .045].

Interestingly, gender and state of residency do not significantly affect a third-year medical student's perceived resilience. However, a third-year medical student's age showed statistical significance regarding their perceived resilience. A student with more advanced age and more life experience could bounce back more quickly after having experienced the difficulty of studying for and taking USMLE Step 1 in between the second-and third-years of medical school.

Question Seven. The seventh research question examined the differences, if any, of second-year medical students' self-reported burnout scores from the Maslach Burnout Inventory and its three subscales, Exhaustion, Cynicism, and Professional Efficacy, and their relationship to age, gender, and state of permanent residency. An independent samples T-Test was conducted to understand how gender affected resilience, if at all.

1. **Exhaustion**. An independent samples T-Test analysis showed no statistically significant relationship at the p<.05 level between male and female second-year medical students using the Maslach Burnout Inventory when measuring MBI Exhaustion. Male students (n = 30) with Exhaustion scores (M = 3.600, SD = .7755) were not significantly different

than responses from the female group (n = 39, M = 3.1900, SD = 1.3363). Next, an independent samples T-Test was conducted. No statistical significance was found between state of permanent residency and MBI Exhaustion in second-year medical students, t (67) = 1.430, p = .157, d = .3045, 95% CI [-.1725, 1.0432]. The ANOVA results indicated no significant effect of age on a student's self-reported MBI Exhaustion level in the second-year medical school [F (2, 66) = .370 p = .692]. As measured by the Exhaustion scale from the Maslach Burnout Inventory, a second-year medical student's perceived level of burnout is not statistically significant before students begin this notoriously strenuous year of undergraduate medical education.

2. **Cynicism**. An independent samples T-Test analysis showed no statistically significant relationship at the p<.05 level between male and female second-year medical students using the Maslach Burnout Inventory when measuring cynicism. Male students (n = 30) with Cynicism scores (M = 3.0467, SD = 1.0434) were not significantly different than responses from the female group (n = 39, M = 2.2000, SD = .95366). An independent samples T-Test proved that no statistical significance was found between permanent residency and MBI Cynicism in second-year medical students, t (67) = 1.105, p = .225, d = .3191, 95% CI [-.2571, 8954]. The ANOVA results indicated no significant effect of age on a student's self-reported MBI Cynicism level in the second-year medical school [F (2, 67) = 1.217, p = .303]. As measured by the Cynicism scale from the Maslach Burnout Inventory, a second-year medical student's perceived level of burnout is not statistically significant before students begin officially preparing for and studying for USMLE Step 1.

3. **Professional Efficacy.** An independent samples T-Test analysis showed no statistically significant relationship at the p<.05 level between male and female second-year medical students using the Maslach Burnout Inventory when measuring Professional Efficacy. MBI Professional Efficacy scores of male students (n = 30, M = 4.2389, SD = .9783) were not significantly different than responses from the female group (n = 39, M = 4.4017, SD = .9309). An independent samples T-Test proved that no statistical significance was found between permanent residency and MBI Professional Efficacy in second-year medical students, t (67) = 647, p = .520, d = .1661, 95% CI [-.3461, 6784]. The ANOVA results indicated no significant effect of age on a student's self-reported MBI Professional Efficacy level in the second-year medical school [F (2, 67) = 1.460 p = .240]. As measured by the Professional Efficacy scale from the Maslach Burnout Inventory, a second-year medical student's perceived level of burnout is not statistically significant before students begin officially preparing for and studying for USMLE Step 1.

Second-year medical students have not yet completed USMLE Step 1 or formally begun studying. As medical students in their second year, they have developed routines and understand the best practices for researching and learning material from the first-year. It may be assumed that older students could have more domestic obligations in addition to medical school requirements, and students without defined support systems nearby could have to lean on their peers for support. However, both assumptions did not prove statistically significant for this study.

Question Eight. The eighth research question examined the differences, if any, of third-year medical students' self-reported burnout scores from the Maslach Burnout Inventory and its three

subscales, Exhaustion, Cynicism, and Professional Efficacy, and their relationship to age, gender, and state of permanent residency. An independent samples T-Test was conducted to understand how gender affected resilience, if at all.

1. **Exhaustion**. An independent samples T-Test analysis showed no statistically significant relationship at the p<.05 level between male and female third-year medical students using the Maslach Burnout Inventory when measuring MBI Exhaustion. Male students (n = 16) with Exhaustion scores (M = 3.600, SD = 1.4606) were not significantly different than responses from the female group (n = 21, M = 3.5619, SD = 1.4760). Next, an independent samples T-Test was conducted. No statistical significance was found between state of permanent residency and MBI Exhaustion in third-year medical students, t (35) = .681, p = .501, d = .5251, 95% CI [-.7087, 1.4233]. The ANOVA results indicated no significant effect of age on a student's self-reported MBI Exhaustion level in the third-year medical school [F (3, 33) = .454 p = .716]. A third-year medical student's perceived level of burnout, measured by the Exhaustion scale from the Maslach Burnout Inventory, is not statistically significant after students complete USMLE Step 1 and begin clinical rotations.
2. **Cynicism**. An independent samples T-Test analysis showed no statistically significant relationship at the p<.05 level between male and female second-year medical students using the Maslach Burnout Inventory when measuring cynicism. Male students (n = 16) with Cynicism scores (M = 2.7250, SD = .9602) were not significantly different than responses from the female group (n = 21, M = 2.8095, SD = 1.1445). An independent samples T-Test proved that no statistical significance was found between permanent residency and MBI Cynicism in third-year medical students, t (35) = 1.105, p = .921, d =

.3849, 95% CI [-.8199, .7429]. The ANOVA results indicated no significant effect of age on a student's self-reported MBI Cynicism level in the third-year medical school [*F* (3, 33) = .705 *p* = .556]. A third-year medical student's perceived level of burnout, measured by the Maslach Burnout Inventory's Cynicism scale, is not statistically significant after completing USMLE Step 1.

3. **Professional Efficacy.** An independent samples T-Test analysis showed no statistically significant relationship at the p<.05 level between male and female third-year medical students using the Maslach Burnout Inventory when measuring Professional Efficacy. MBI Professional Efficacy scores of male students (n = 16, M = 4.1563, SD = 1.0843) were not significantly different than responses from the female group (n = 21, M = 4.0397, SD = 1.0966). An independent samples T-Test proved that no statistical significance was found between state of permanent residency and MBI Professional Efficacy in third-year medical students, *t* (35) = -.721, *p* = .476, *d* = .3902, 95% CI [-1.0737, .5107]. The ANOVA results indicated no significant effect of age on a student's self-reported MBI Professional Efficacy level in the third-year medical school [*F* (3, 33) = .128, *p* = .943]. A third-year medical student's perceived level of burnout, as measured by the Professional Efficacy scale from the Maslach Burnout Inventory, is not statistically significant after students officially complete USMLE Step 1 and enter the clinical years of undergraduate medical education.

Third-year medical students have recently completed USMLE Step 1. Students, regardless of age, gender, or state of residency, must meet all facets of the exam and have similar pressures to retain didactic knowledge from the first two years of the medical school curriculum. It was hypothesized that the student's age and state might influence any burnout students experience

during the USMLE Step 1 study period. Older students may have more domestic obligations in addition to exam preparation, and students without defined support systems nearby would feel more isolated. However, both assumptions did not prove statistically significant for this study.

Implications for Practice

This study suggests no statistically significant relationship between resilience and burnout in either the second- or third-year medical school. Additionally, age, gender, and state of residency do not significantly impact medical students' self-reported perceptions of either resilience or burnout before attempting their first major licensure exam, USMLE Step 1. Additionally, as medical students continue to build upon their medical knowledge and skillset and continue to advance into demanding healthcare fields, resilience and burnout may be factors that these individuals should continue to explore and refine introspectively.

As Rak and Patterson (1996) stated, resilience is affected by a variety of factors, including an individuals' personality characteristics, their beliefs and self-perception, their coping strategies, social skills, and their learning factors, a medical student must understand how they deal with stress, emotional fatigue, and cognitive load. These strategies enable the student, turned future medical doctor, to classify their pressure when working with varying needs and emotional strain patients. Medical students endure tremendous tests, literally and figuratively, in their education. They experience fatigue, stress, and an enormous cognitive influx. Entering medical school with fine-tuned resilience skills enables the student to be prepared for peaks and valleys of success and failure, emotional highs and lows, and persistent study and content-mastery stress. Students without strong resilience skills will not bounce back when failure or near-failure affects their educational and career goals.

In this study, medical students may not have demonstrated a statistically significant relationship to Exhaustion, Cynicism, or Professional Efficacy in either the second- or third-year medical school as measured by the Maslach Burnout Inventory. However, their stress levels, anxiety, and interest in their career from constant daily studying were noticeable. As medical students advance from the second-to third-year medical school, they encounter more prolonged periods of isolation, extended periods of study, and increased expectation of content mastery from their medical school curriculum. They learn more advanced doctoring skills, interacting with real or standardized patients in actual or scenario-based clinic environments. Their skillset, vocabulary, and medical knowledge grows exponentially as they move through the program. In the meantime, second-year medical students understand that they must maintain this knowledge and begin studying for USMLE Step 1. They must excel at, or at least pass, USMLE Step 1, to remain competitive for a residency position, of which there are fewer than the number of medical students in the country. The nagging notion of building and maintaining knowledge, honing skills, creating a resume, volunteerism, and extracurricular activities, for residency application – which is more than two years away – may lead to burnout.

Recommendations for Future Research

This study is the beginning of a trail to understanding better how the perceived levels of resilience and burnout for medical students, as indicated by exhaustion, cynicism, and professional efficacy, may impact their abilities to prepare for prolonged periods of exam study, extended work hours, and the demands of the medical field.

This study could have likely yielded different and more significant results had it investigated one cohort instead of two, and over a more longitudinal period of time. It would have been interesting to understand how medical students' perceptions of burnout and resilience change and

evolve from years one through four of their programs. A lengthier study would have demonstrated more robust results, especially if a mixed-methods approach was used to interview subjects along the way. In addition to the quantitative study described above, qualitative research could help to analyze medical student feelings about the process of burnout and the ways in which resilience ebbs and flows throughout the medical education journey.

Additionally, the medical college in which this study took place has a longstanding history of wellness support for its medical students. Over the past decade, the college has implemented robust wellness co-curriculum and support services for its students. The results of this study might have proven more significant at a medical school where there was the need for a developing wellness curriculum, or one in its infancy. The results of this study are therefore not generalizable for all medical schools but do demonstrate the importance of continuing to further understand the importance of the ways in which medical students experience burnout and practice resilience.

This study may have garnered the results it did, and not have been universally statistically significant because the results were aggregated. In reviewing individual responses, respondents may have demonstrated spikes of burnout with high MBI scores and an inability demonstrate resilience with low scores on the BRS. Because the student responses were anonymous, there was no way to understand what confounding variables they were experiencing alongside their year two or year three curriculum. If the respondents were identified, the IRB protocol permitted it, and individuals demonstrated either high MBI scores or low BRS scores, it would have caused alarm such that university officials could have been warned for intervention due to the reality of the conditions resulting from high burnout and an importance to prevent suicide in medical school.

The lack of statistically significant results suggests that additional research avenues are available and warranted. Based on this study, the following suggestions for future research are recommended:

1. Continue or create wellness programming for medical students to alleviate stress, particularly in the program's second-and third-years. Medical schools should integrate or continue to incorporate practices that encourage students to nurture their mind, body, and social wellness to continuously reduce burnout and promote resilience (Drolet & Rodgers, 2010).
2. Self-care habits should be studied and examined during the period that students end second-year coursework and begin studying for USMLE Step 1 (Ball & Bax, 2002). Students are typically isolated during this time, do not visit campus regularly, and it is not easy to maintain contact. It is often not until the student registers a passing score on USMLE Step 1 that they are approved to begin the third-year medical school. During this particular study period, how students are preserving self-care to reduce burnout and remain resilient may be of interest to future research.
3. A medical student with more resilience can better manage and deal with stresses for future developments than a less resilient one. Resiliency is a characteristic of personal development in all individuals; it can be an effective intervention to defend against burnout. To achieve an effective intervention, a clinical definition is needed for the commonly known abstract trait. Carl Bell (2001) states that by understanding resiliency in terms of characteristics that can be strengthened through emotional exercise. Medical schools should continuously find suitable and compelling programming that helps students exercise emotional resiliency as a primary intervention to combat burnout.

Cultivating resilience will strengthen the student's character and understand how to use the trait better later as a practicing physician.

Conclusion

Resilience allows a person to cope with, and overcome, times of stress and transition. Medical students who experience burnout demonstrate emotional exhaustion, cynicism, and low professional efficacy (Dyrbe et al., 2005). Stress and performance have an indirect relationship, meaning that medical students who experience burnout could have impaired academic and clinical performance. The most severe result of burnout is suicide.

Medical student distress is a growing concern for healthcare educators (Rohe, Barrier, Clark, Cook, Vickers, & Decker, 2006). Some medical education aspects have unintended negative consequences for medical students' health (Dyrbye, Thomas, & Shanafelt, 2005). The stress that medical students experience throughout their education can limit their knowledge base, skills, and professionalism (Dyrbye et al., 2010). This mentality can transfer to residency and beyond hurting patient care, as physicians have an overwhelmingly high rate of burnout, suicide, and depression (Slavin et al., 2014).

Medical students are more likely to be resilient to the stressors that lead to burnout if they perceive their learning environment positively and have adequate social support (Dyrbe et al. 2010). Once burnout develops, there are few factors to protect students against its dangers, and eventually, once they become physicians, the risks for their patients (Shanafelt et al., 2009). Students who demonstrated resiliency are less likely to experience depression, burnout, and other dimensions of distress while having a higher quality of life (Dyrbye et al., 2010).

Create a medical school learning environment that supports students and their mental and emotional well-being. Schools should advocate for medical students to find outlets that bolster

their resilience skills and remind them of their pursuit of the career to reduce burnout feelings. In working to provide medical students with these skills, coping mechanisms, and strategies, they may feel more successful in the academic environment and patient encounters and eliminate the side effects of burnout through any hidden curriculum they think they may endure.

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APPENDIX A: MASLACH BURNOUT INVENTORY AND LICENSE TO REPRODUCE

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To Whom It May Concern,

The above-named person has made a license purchase from Mind Garden, Inc. and has permission to administer the following copyrighted instrument up to that quantity purchased:

Maslach Burnout Inventory forms: Human Services Survey, Human Services Survey for Medical Personnel, Educators Survey, General Survey, or General Survey for Students.

The three sample items only from this instrument as specified below may be included in your thesis or dissertation. Any other use must receive prior written permission from Mind Garden. The entire instrument form may not be included or reproduced at any time in any other published material. Please understand that disclosing more than we have authorized will compromise the integrity and value of the test.

Citation of the instrument must include the applicable copyright statement listed below.
Sample Items:

MBI - Human Services Survey - MBI-HSS:
I feel emotionally drained from my work.
I have accomplished many worthwhile things in this job.
I don't really care what happens to some recipients.

MBI - Human Services Survey for Medical Personnel - MBI-HSS (MP):
I feel emotionally drained from my work.
I have accomplished many worthwhile things in this job.
I don't really care what happens to some patients.

MBI - Educators Survey - MBI-ES:
I feel emotionally drained from my work.
I have accomplished many worthwhile things in this job.
I don't really care what happens to some students.

Cont'd on next page

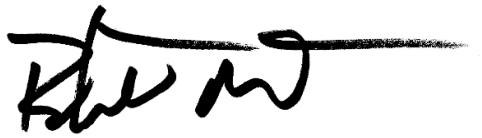
MBI - General Survey - MBI-GS:

I feel emotionally drained from my work.
In my opinion, I am good at my job.
I doubt the significance of my work.

MBI - General Survey for Students - MBI-GS (S):

I feel emotionally drained by my studies.
In my opinion, I am a good student.
I doubt the significance of my studies.

Sincerely,



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APPENDIX B: BRIEF RESILIENCE SCALE

Brief Resilience Scale
(Smith et al., 2008)

Please respond to each item by marking one box per row	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I tend to bounce back quickly after hard times.	1	2	3	4	5
I have a hard time making it through stressful events.	1	2	3	4	5
It does not take me long to recover from a stressful event.	1	2	3	4	5
It is hard for me to snap back when something bad happens.	1	2	3	4	5
I usually come through difficult times with a little trouble.	1	2	3	4	5
I tend to take a longer time to get over setbacks in my life.	1	2	3	4	5

Scoring: Add the responses varying from 1-5 for all six items giving a range from 6-30. Divide the total sum by the total number of questions answered.
My score: _____ item
average/6