5-2024

Impostor Phenomenon, Perfectionism, Psychological Distress, and Burnout in Pre-Health Undergraduate Students

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IMPOSTOR PHENOMENON, PERFECTIONISM, PSYCHOLOGICAL DISTRESS, AND BURNOUT IN PRE-HEALTH UNDERGRADUATE STUDENTS

By

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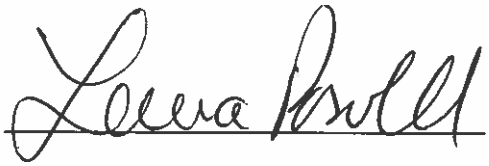
A thesis submitted in partial fulfillment of the requirements of the Honors College at University of South Alabama and the Bachelor of Arts in the Psychology Department

University of South Alabama

Mobile

May 2024

Approved by:



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DEDICATION

This undergraduate thesis is dedicated to all of my friends and family who may be at risk for developing burnout in their respective fields, specifically those in healthcare. You all serve as inspirations to so many who follow in your footsteps, and you deserve to be invested in the same way you invest in your communities. It is my sincerest hope that this research continues to be conducted to adequately support and prepare our future healthcare professionals in the pursuit of their careers.

ACKNOWLEDGEMENTS

I am grateful to all of those with whom I have had the pleasure to work during this project. Each of the members of my Honors Thesis Committee has provided me with extensive personal and professional guidance and taught me so much throughout the process of developing this thesis. I would like to extend special thanks to Dr. Powell for spearheading this study with me and taking so much of her time to ensure that I felt confident about this project. Thank you to Dr. Shelley-Tremblay for providing insight into the methodology of the study, and thank you to Mrs. Patricia Davis for her contributions to helping me reach my target population. Thank you to Dr. Clance, Dr. Schaufeli, and Dr. Frost for allowing me to use their scales in my study; their support of my research through providing their scales for use allowed me to pursue my investigation into a topic I care so deeply about. I would also like to extend my deepest gratitude to Kimberlyn Williams and Dr. Marshall for helping me develop the idea for the project in the first place. Without them, nothing would have been possible

ABSTRACT

Preparing for a career in the healthcare field is incredibly strenuous and demanding, and previous research endeavors have demonstrated that students in professional healthcare programs show an increased susceptibility to impostor phenomenon, perfectionism, psychological distress, and burnout. Previous studies have indicated a possible link between impostor phenomenon, perfectionism, psychological distress, and burnout; however, these studies only considered two or three constructs at a time in graduate students (Rosenthal, et al., 2021; Seong, et al., 2020; Garratt-Reed, et al., 2018). The current study's purpose was to investigate the whether or not impostor phenomenon, perfectionism, and psychological distress could be potential predictors of burnout in pre-health undergraduate students at the University of South Alabama. This main purpose was studied along with four other hypotheses. To accomplish this, the study utilized the Clance Impostor Phenomenon Scale, Frost Multidimensional Perfectionism Scale, the Distress Questionnaire-5, and the Burnout Assessment Tool. The scales were distributed to undergraduate students at the university through Qualtrics and SONA softwares. It was found that there were no statistically significant differences between pre-health concentrations in any of these constructs; however, it was found that pre-health students had a statistically significant difference from non-pre-health-students in terms of the Personal Standards subscale score on the FMPS. It was found that perfectionism and psychological distress are statistically significant predictors of burnout in both pre-health and non-pre-health participants; however, impostor phenomenon is not considered to be a predictor.

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LIST OF ABBREVIATIONS

ANOVA - Analysis of Variance

APA - American Psychological Association

BAT - Burnout Assessment Tool

CIPS - Clance Impostor Phenomenon Scale

DQ5 - Distress Questionnaire 5

DSM-V - Diagnostics and Statistical Manual of Mental Disorders V

FMPS - Frost Multidimensional Perfectionism Scale

HIPS - Harvey Impostor Phenomenon Scale

HMPS - Hewitt Multidimensional Perfectionism Scale

LIS - Leary Impostor Scale

MANCOVA - Multivariate Analysis of Covariance

MBI - Maslach Burnout Inventory

PFS - Perceived Fraudulence Scale

SD - Standard Deviation

STEM - Science, Technology, Engineering, and Math

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INTRODUCTION

In the modern age of education, entry into multiple professions has become more competitive and strenuous, specifically those of the healthcare field. With each new generation of nurses, physicians, physical therapists, psychologists, and other healthcare professionals, there are job shortages in virtually every sub-field. A career in medicine and other similar health professions is demanding, with each stage in education and training increasing in both competitiveness and related contribution to stress.

Burnout, impostor phenomenon, perfectionism, and mental distress are broad, multidimensional topics; thus, there is still much discussion surrounding the establishment of concrete definitions and methods of analysis. There have been multiple studies conducted to determine the relationship between these variables in groups of two or three; however, there have not been many studies that focus on trying to find potential relationships between all of the topics simultaneously.

Due to this study's ambitious range of psychological constructs, several clarifications need to be made to ensure the study's success. Since burnout, impostor phenomenon, perfectionism, and psychological distress are such vast topics, I will first focus entirely on establishing the commonly accepted definitions for each, then review frequently used, validated measures of each construct. Subsequently, a review of the studies in which they are investigated together is important to review. There have been multiple studies that consider the level of impostor phenomenon and perfectionism in medical students (Rosenthal, et al., 2021; Villwock,

et al., 2016), and there have been many studies conducted to determine the relationship between these two variables (Pannhausen, et al., 2022; Campos, et al., 2022; Garrat-Reed, et al., 2018; Thomas & Bigatti, 2020). However, there have not been very many studies that focus on trying to find a relationship between impostor phenomenon, perfectionism, psychological distress, and burnout. The following studies represent what the majority of the literature currently available discusses. Current research endeavors pursue finding a correlation significant enough to imply that these terms are heavily related to one another, but there seems to be limitations as to how representative the studies are in terms of their replication.

Defining Impostor Phenomenon, Perfectionism, Psychological Distress, and Burnout

Burnout is a relatively new idea, so the operational definition is not entirely conclusive. The American Psychological Association (APA, 2018a) states that burnout is "physical, emotional, or mental exhaustion accompanied by decreased motivation, lowered performance, and negative attitudes toward oneself and others" (Para. 1). Because of the alarming statistics of healthcare professionals leaving the field in the wake of the Covid-19 pandemic, researchers have begun to consider all the factors that might contribute to a professional's burnout. An interesting development in this process is the identification of a factor (called the impostor phenomenon) as a possible source. APA (2018b) defines impostor phenomenon as "the situation in which highly accomplished, successful individuals paradoxically believe they are frauds who ultimately will fail and be unmasked as incompetent" (Para. 1). Because of an increase in awareness of the topic, an increasing amount of research has been conducted in more recent

graduate students, mostly first year medical students of varying universities (Rosenthal, et al., 2021; Seong, et al., 2020; Thomas & Bigatti, 2020).

A personality trait commonly linked to impostor phenomenon is perfectionism. This trait is defined by APA (2018c) as "the tendency to demand of others or of oneself an extremely high or even flawless level of performance, in excess of what is required by the situation" (Para. 1). Perfectionism has not been proven to substantially contribute to burnout within its own right; however, there has been some research into whether or not maladaptive perfectionist tendencies could work in conjunction with impostor phenomenon to contribute to further mental distress and burnout (Collin, et al., 2020; Garrat-Reed, et al., 2018).

In addition to impostor phenomenon and perfectionism, another trait claimed to be common amongst healthcare students is mental distress, most commonly referred to as psychological distress. APA (2018d) contributes to the definition of psychological distress with the following statement: "[Psychological distress is] a set of painful mental and physical symptoms that are associated with normal fluctuations of mood in most people" (Para. 1). Psychological distress is a broadly generalizable concept due to the various characteristics and sub-categories that fall beneath this label, and there has been a shift in research to find how psychological distress is linked to several different psychological disorders. Despite this effort, it is still unclear to what extent psychological distress contributes to constructs such as burnout.

Measuring Impostor Phenomenon, Perfectionism, Psychological Distress, and Burnout

Impostor phenomenon, due to its recent development as an established concept in psychology, does not have a "gold standard" to measure and diagnose it, unlike the other factors explored in this study. Mak, et al. (2019) set out to "systematically identify self-report measures of the impostor phenomenon" (Para. 6) currently present in psychological literature while assessing the psychometrics presented in these self-report measures through a comparison to a standardized quality appraisal tool. Mak, et al. (2019) reviewed four self-report measures of impostor phenomenon: the Harvey Impostor Phenomenon Scale, the Clance Impostor Phenomenon Scale, the Perceived Fraudulence Scale, and the Leary Impostor Scale. Because these scales are vastly different from one another in terms of structure and diversity of questions, they needed to be systematically compared to one another in terms of their different ability to accurately measure the degree to which impostor phenomenon is present in participants of different studies.

The Clance Impostor Phenomenon Scale (CIPS) is a 20-item measurement tool that pays attention to a participant's fear of evaluation, feeling like they have a lesser ability than peers. The questions are positively phrased to counteract any leading of negative feelings that the questions might pose onto the participants (Mak, et al., 2019). The Harvey Impostor Phenomenon Scale (HIPS), was the previously accepted scale until the formation of the CIPS. The HIPS scale is a 14 item measurement tool consisting of Likert scales that can be ranked from

1 (“Not at all true”) to 7 (“Very true”). The statements in each of the questions are negatively phrased, which has the possibility of leading participants to answer in a specific manner.

Mak, et al. (2019) also reviewed the Perceived Fraudulence Scale (PFS) and the Leary Impostor Scale (LIS). The PFS is 51 items in length, multidimensional, and looks specifically at impression managing characteristics of the participants. The LIS, on the other hand, is 7 items long and serves a unidimensional approach to impostor phenomenon that considers it to only be limited to feelings of being a fraud. They evaluated these two scales in the same manner as the CIPS, looking into the psychometric and methodological qualities of each measurement tool (Mak, et al., 2019).

In terms of content validity, the researchers found that all of the scales demonstrated adequate measurement aim, target population, and concepts to be measured (Mak, et al., 2019). They found that the HIPS scale was statistically the most favorable option in terms of content validity because the item selection reflected both the theoretical and therapeutic factors of impostor phenomenon. The PFS scale was also rated positively in terms of its content validity because there was adequate item selection information given in the literature. The LIS scale was not able to be given a score due to the fact that it is so new that the information for how exactly the items were selected was not available to the researchers at the time. When considering the internal consistency of the different measurement techniques, the CIPS scale had internal validity scores that were more consistent across all the studies that it was used in. The HIPS scale was found to not have as much information to compare in terms of subscales, yet it had higher

internal validity scores than expected. The PFS scale was found to be already accounted for in the CIPS scale, so the internal validity score was consistent but not substantially set apart enough to make it stand out against the other scales like the CIPS. The LIS scale did not have high internal validity scores, so this discounted its usefulness in the field (Mak, et al., 2019).

Following these discussions, they statistically compared the CIPS and HIPS scales to find out which one had a higher sensitivity and reliability of recognizing subtle nuances to impostor phenomenon. They found that the CIPS surpasses the HIPS in terms of sensitivity to high levels and low levels of impostor phenomenon, and they also found that the CIPS scale showed lower levels of false positives and negatives. Upon further analysis, it was suggested that the CIPS scale is more efficient because it is shorter than the PFS scale; however, in terms of discriminant data, CIPS and PFS could not be substantially distinguished from one another. While the evidence pointed in the direction of CIPS and HIPS being more reliable than the PFS and LIS scales, choosing between one or the other to be the "gold standard" is not feasible because they each have factors that counteract each other to produce an overall equivalence in utility (Mak, et al., 2019).

Lee, et al. (2020) ventured to establish the complexity of impostor phenomenon in STEM and medicine. Through their research, they examined the psychometric properties of the CIPS to recognize operational and conceptual problems when identifying impostor phenomenon. They did address that while the CIPS is the most frequently used scale to measure impostor phenomenon, there is a possibility that convergent validity might be compromised among the

Self-Doubt and Fear of Evaluation factors. Regardless of this, they did confer that high scores on the impostor phenomenon scales indicated issues with self-evaluation and social images. Their review found that marginalized groups in the field of STEM had higher rates of impostor phenomenon, and they attributed this to the stress and social pressure related to breaking glass ceilings and stigma associated with their demographics. They also express that individuals with impostor phenomenon have varying degrees of each subcategory, meaning that no case of impostor phenomenon is identical to another (Lee, et al., 2020). This supports the call for further research on the topic to help identify more specificity of impostor phenomenon and to collect more data that would benefit future endeavors on this topic.

Psychological Distress is in a similar dilemma of measurement tool reliability due to the fact that there are so many different scales to choose from when designing research studies. Batterham, et al. (2017) ventured to take a look into the eight different measurement scales for psychological distress: Patient Health Questionnaire-4, Kessler-10/Kessler-6, Distress Questionnaire-5, Mental Health Inventory-5, Hopkins Symptom Checklist-25, Self-Report Questionnaire-20, and Distress Thermometer. In this study, the researchers assessed participants with each of the eight measurement tools, and then used the DSM-V symptom checklist to compare the indication of psychological distress scales to the clinical diagnosis of different mental disorders in what is called a “crosswalk study.” They identified that a scale measuring psychological distress should have a high combination of sensitivity and specificity to make sure that nothing is overlooked or set at a specific disadvantage.

The researchers found that all measurements of psychological distress in this study had a high degree of correlation to each other, and they all had high internal consistency measurement scores. The scale with the highest sensitivity score was the Self-Report Questionnaire-20, but the scale with the highest specificity score was the Distress Questionnaire-5. The researchers indicated that the Distress Questionnaire-5 was the most generalizable and the most consistent across the board with scoring, with sensitivity and specificity levels that were not significantly different from the highest performing scales in each of those respective categories (Batterham, et al., 2017). It was also determined that the scales with more items were mostly able to provide more information for an accurate indication of potential diagnosis. The Distress Questionnaire-5 still performed at the optimal levels, while other scales fell beneath the target functioning level in one category or the other.

Perfectionism is a psychological construct that is hard to pinpoint due to its high comorbidity with other mental disorders, so finding a scale to specifically measure perfectionism within itself is crucial to understanding the construct at a deeper level. Perfectionism is also a multidimensional construct, consisting of a variety of different manifestations and levels of severity. Stairs, et al. (2012) wanted to isolate a specific scale to measure perfectionism in a way that unidimensionally identifies the varying underlying constructs that comprise perfectionism. In their study, they evaluated 15 different existing perfectionism scales along with the specific items in each method of measurement, but they mostly focused on determining what exactly

makes each scale applicable to the participants. From these results, they comprised a scale of their own and proceeded to test this new found scale with a set of participants.

The Frost Multidimensional Perfectionism Scale (FMPS) is a 35 item self-report scale comprised of questions that cover six factors: Concern over Mistakes, Doubts about Actions, Personal Standards, Organization, Parental Expectations, and Parental Criticism (Stairs, et al 2012). The Hewitt Multidimensional Perfectionism Scale (HMPS) is a 23 item scale that is an empirically and analytically derived measure of perfectionism, and it consists of three scales: Discrepancy, High Standards, and Order. The Almost Perfect Scale-Revised is a 45 item questionnaire consisting of three factors: Self-Oriented Perfectionism, Socially Prescribed Perfectionism, and Other Oriented Perfectionism. The Perfectionism Questionnaire demonstrates a 34 item measurement which covers the different sides to the mental construct: healthy perfectionism and dysfunctional perfectionism. The Positive and Negative Perfectionism Scale consists of 40 items, and it measures the positive and negative aspects of perfectionism. The Burns Perfectionism Scale is significantly shorter than the other scales used in this study at only 10 items in total and measures a unidimensional definition of perfectionism as deemed by Burns (1980). In addition to these specific scales, there were also several others that focused on only one aspect of their measurements as indicators of perfectionism; however, these were not deemed to be entirely comprehensive to identify the multidimensional aspects of perfectionist tendencies. It was determined that the most consistent scales in terms of generalizability of results and comprehensiveness were the FMPS and HMPS scales (Stairs, et al., 2012).

Previously in psychological research, the “gold standard” for assessing and measuring burnout has been the Maslach Burnout Inventory (MBI). However, when placed under strict scrutiny, Schaufeli and colleagues (2020) found that there were issues with the MBI’s method of approaching the topic of burnout, mostly due to its attribution of burnout being linked to malfunctioning of a person’s cognitive state and possible deficit. They also identified that there are clear overlapping symptoms between burnout, distress, and depression that need to be accounted for when assessing burnout. Schaufeli et al (2020) also identified that the MBI has some psychometric issues that are substandard such as the extreme wording in some of the test items that have the potential to lead to a low reliability. In addition to these two qualities, they also found that the MBI lacks to a certain degree of applicability in a practical sense because it was developed solely for research purposes and not as a formal diagnostic tool. These attributes of the MBI led Schaufeli, et al. (2020) to develop their own scale to measure burnout that addresses the problems of the MBI and other similar scales by constructing the Burnout Assessment Tool (BAT). The BAT is a 22 item assessment tool consisting of Likert statements each ranked from never (1) to always (5). Upon the formation of the scale, these researchers compared the internal consistency, construct validity, factorial validity, and reliability of the BAT to other scales commonly used to assess burnout, namely the MBI. They found that the internal consistency of the BAT is slightly higher than that of the MBI, and the construct validity was roughly the same as the MBI. They found that the factorial validity of the BAT was slightly

better than that of the MBI due to its high correlations among factors and the single composite score of burnout.

Literature Supporting the Connection Between Impostor Phenomenon, Perfectionism, and Psychological Distress

Finding a relationship between these concepts is vital to understanding the implications of self-doubt and the stressors of further professionalism and education. Pannhausen, et al. (2022) aimed to address the relationship and the correlation between impostor phenomenon and perfectionism. They used the CIPS, FMPS, and the HMPS (Shortened) to adequately measure the correlation between characteristics of each psychological construct.

The researchers found that male and female participants differed substantially in their scores on the CIPS and FMPS scales, with females scoring higher on both scales than males. They found a strong, significant positive correlation (+ 0.63) between impostor phenomenon and overall level of perfectionism when gender and age are kept constant. High scores of impostor tendencies were also associated with a high degree of Concern over Mistakes (+ 0.67) and Doubts about Actions (+ 0.67). There was no correlation between the Organization dimension of perfectionism and impostor phenomenon (Pannhausen, et al., 2022). The researchers conducted a hierarchical regression analysis for predicting the manifestation of impostor phenomenon by the perfectionism dimensions. In this regression analysis, it was determined that Perfectionistic Concerns served as a powerful predictor of impostor phenomenon due to “the reliance on others’

standards, doubts about oneself to fulfill them, and the concern about drastic consequences in the case of mistakes" (Pannhausen, et al., 2022, para. 37).

A study that poses the correlation between impostor phenomenon and psychological distress, specifically in medical students, was conducted by Rosenthal, et al. (2021). In this study, the mental distress associated with high achievers who have impostor phenomenon was investigated by the research team. They conducted the study on 257 medical students, and the longitudinal study utilized the CIPS, the Jefferson Scale of Empathy, Self-Compassion Scale, and Zuckerman-Kuhlman Personality Questionnaire before beginning their first year of medical school and following the conclusion of their first year of medical school.

They found that approximately 87% of students entering medical school reported high degrees of impostor phenomenon and simultaneously demonstrated lower average scores on self-compassion, sociability, and self-esteem (Rosenthal, et al., 2021). Interestingly, this study also found that women, on average, scored higher on the impostor phenomenon scale than men, with 35% of females indicating high impostor phenomenon and 29% of males indicating high impostor phenomenon. The researchers indicated that lower scores on the impostor phenomenon scale correlated with lower scores on neuroticism and loneliness. Following the conclusion of the first year of medical school, students actually increased in impostor phenomenon with a total of 49% indicating high levels of impostor phenomenon compared to the 29% that indicated high levels of impostor phenomenon at the beginning of the academic year. This study presented the idea that there are underlying causes due to medical school that increase a student's feelings of

self-doubt and perfectionist characteristics, but it did not elaborate further on what exactly contributes to the increase in expression of these personality traits.

To consider the relationship between impostor phenomenon and burnout syndrome, Campos, et al. (2022) conducted a cross-sectional, descriptive, and quantitative study utilizing self-report surveys within a sample population of 425 undergraduate university students in Brazil. This study utilized four different scales of measurement: Sociodemographic Questionnaire, CIPS, Maslach Burnout Inventory — Student Survey, and the Patient Health Questionnaire-9. In their study, the researchers found no statistical differences in either impostor phenomenon or burnout syndrome when evaluating gender, age, semester in school, or activity involvement; however, they did find that individuals who are not married and do not contribute to the family income were more likely to be associated with high levels of impostor phenomenon. They found that there was a strong, positive correlation between higher scores of impostor phenomenon and the Emotional Exhaustion, Cynicism, and Professional efficacy components of burnout syndrome. When the burnout syndrome levels were two-dimensionally evaluated (using Emotional Exhaustion and Cynicism specifically), there was a statistical association found between impostor phenomenon and burnout syndrome. This study acknowledges the limited research conducted in this field, and asks that more research follow their study to confirm the trends that they discovered.

With a similar intention to the study above, Villwock, et al. (2016) piloted a study focusing on impostor phenomenon and burnout among American medical students. This study

consisted of 138 medical students who entered medical school at Jefferson Medical College between the years 2002 and 2012. The researchers utilized the Young Impostor Scale to assess the participants for impostor phenomenon and the MBI for assessment of burnout. Using chi-squared tests, it was found that impostor phenomenon was significantly associated with several different components of burnout such as exhaustion, cynicism, depersonalization, and emotional exhaustion. They found that in this pool of participants, impostor phenomenon was most prevalent in the fourth year of medical school, and impostor phenomenon was more commonly demonstrated by females rather than males.

To answer whether or not perfectionism could be associated with academic burnout, Garratt-Reed, et al. (2018) conducted a research study with 126 undergraduate students at a university in Australia. In this study, the FMPS was used to measure perfectionism and the School Burnout Inventory was used to measure academic burnout in three dimensions: Exhaustion, Cynicism, and Inadequacy. Through multiple path analysis models, the researchers found that there were statistically significant positive effects of Perfectionistic Concerns on Burnout Exhaustion, Burnout Inadequacy, and Burnout Cynicism. They also found that there were significant positive effects of Perfectionistic Strivings on Burnout Inadequacy and Burnout Cynicism. They did not find a direct relationship between Perfectionistic Strivings and Burnout Exhaustion.

Seong, et al. (2020) endeavored to interpret the extension of the bifactor model of perfectionism into academic burnout. In their study, they studied a group of 336 secondary

school students across a six-month timeframe. They conducted confirmatory analysis and a longitudinal invariance test to see if the bifactor model better explained multidimensional perfectionism in comparison to the two-factor model. They found that the specific concerns regarding perfectionism were still unreliable, and the cross-lagged analyses showed that the general perfectionism predicted increases in exhaustion and cynicism (Seong, et al., 2020). This called into question the current analysis and characterization of perfectionism as it relates to being the cause of further burnout or other mental disorders.

Interestingly, some researchers have found that personality characteristics of both impostor phenomenon and perfectionism are associated with negative effects of the mental health of medical students, residents, and physicians. Thomas and Bigatti (2020) conducted a literature review of these studies relating to the prevalence of impostor phenomenon and perfectionism in previously mentioned populations. They found that in several studies, medical students did not generally have statistically significant differences in perfectionism levels when compared to undergraduates and other health profession students. They did, however, find that medical students in Canada had the highest mean score of impostor phenomenon, while medical students in Nigeria had the lowest mean score. In their review, they also found that impostor phenomenon was commonly found to be positively correlated with depersonalization, emotional exhaustion, and cynicism components of burnout (Thomas & Bigatti, 2020).

In their review, Thomas and Bigatti (2020) also discovered that perfectionism and impostor phenomenon are both associated with poor mental health conditions; furthermore, they

found perfectionism to be positively correlated with depression, anxiety, burnout, and several other psychological conditions. Their literature review is the first to actively summarize all available data specifically in medical students, and they found that this trend is reflected in multiple areas of the globe, indicating that the problems associated with mental distress, perfectionism, and impostor phenomenon are not selective to countries of the Western World (Thomas & Bigatti 2020).

Collin, et al. (2020) wanted to investigate the links between stress, psychological distress, burnout, and perfectionism in dental students in the United Kingdom. The study consisted of 412 students who were members of the British Dental Association. To measure stress, the researchers used the Dental Environment Stress questionnaire and the Perceived Stress Scale, and to measure financial stress, the researchers used questions from the Ohio Financial Wellness Survey with some additional questions, asking respondents to rate from a scale of 1 to 5 of how strongly they agreed or disagreed with the statements. To measure psychological distress, they utilized the General Population Clinical Outcomes in Routine Evaluation, and to measure burnout, they used the Oldenburg Burnout Inventory. To measure perfectionism, the group used the Short Almost Perfect Scale, and to evaluate coping strategies, they used an adapted version of the Brief-COPE measure. The team conducted descriptive and inferential statistics using t-tests and ANOVAs with post-hoc tests for multiple comparisons. Their study demonstrated that the dental students exhibited high levels of stress, and the results of the study indicated that those with high scores of perfectionism also had high scores for stress, psychological distress, and burnout.

Henning, et al. (1998) wanted to compare perfectionism, impostor phenomenon, and psychological adjustment in various health professional students such as nursing, pharmacy, dental, and medicine. Their study focused on 477 students from the Medical University of South Carolina. Of those 477, 221 were medical students, 102 were dental students, 82 were nursing students, and 72 were pharmacy students. To measure psychological adjustment, The Brief Symptom Inventory was used, and to measure perfectionism, the Multidimensional Perfectionism Scale was used. Finally, to measure impostor phenomenon, the CIPS was used by the researchers. A MANCOVA analysis was used to compare the four personality scales across each of the academic programs. It was concluded that pharmacy students were more distressed than the other pre-health students who did not differ from one another. Additionally, a higher percentage of pharmacy students were in the clinical range of the Brief Symptom Inventory. The researchers then conducted a multiple regression analysis to see all of the unique contributions to the prediction of psychological distress in each respective health professional student group. They found that in medical students and in dental students, the CIPS had the largest proportion of unique variance, and when jointly working with socially prescribed perfectionism, it was highly correlated with the Global Severity Index Score. In nursing students, it was found that the CIPS, gender, and socially prescribed perfectionism contributed to a significant portion of unique variance in responses, but in pharmacy students, the Multidimensional Perfectionism Scale and CIPS were significantly related to the Global Severity Index Score (Henning, et al., 1998).

Each literature source calls for further research into the relationship between these topics in undergraduate students. This supports the foundation of the current research project, as the contributions made through the data found in this project will be useful to further the discussion of mental health in the healthcare fields. While it is important to have understanding of the mental issues affecting current practicing healthcare providers and future healthcare providers while they are in graduate school, the underlying issues resulting from years of competition in undergraduate study have yet to be fully investigated or identified. There is a current gap in literature for this subject area, which helped support the formation of the current study. The study aims to answer the questions left by these other studies, and it aims to promote a better understanding of these concepts in students who are still at the undergraduate level.

The goal of the present study is to investigate and examine the severity of impostor phenomenon, perfectionism, psychological distress, and burnout in undergraduate pre-health students at the University of South Alabama. It is also hypothesized that impostor phenomenon, perfectionism, psychological distress, and burnout are all correlated with one another, and impostor phenomenon, perfectionism, and psychological distress are predictors of burnout. In addition to these three psychological factors, the study aims to determine whether or not characteristics of impostor phenomenon, perfectionism, and mental distress presented any significance to the characteristics of burnout in the student population. Additionally, the study took interest in running a comparison between students of different pre-health concentrations (i.e. pre-medicine, pre-nursing, etc.) to determine if any one pre-health concentration was more

at-risk for the development of psychological maladjustment than the others. Finally, since the dataset did include non-pre-health students, we decided to look at comparisons between pre-health and non-pre-health students on all 4 constructs. If any differences are found, we predict that pre-health students will be higher than non-pre-health students.

EXPERIMENTAL METHODS

Participants

The study survey was distributed to all pre-health students and introductory psychology students enrolled for the Fall 2023 and Spring 2024 semesters at the University of South Alabama. Of the 403 students who responded to the survey, 350 responses were used in the analysis of the data. The other responses were eliminated from the study due to the responses lacking data or having response biases. Of those undergraduate students participating in the study, 226 were designated as pre-health and 124 were designated as non-pre-health. The participants were between 17 and 39 years of age, with a mean age of 19.7 years. Participants included students from all four undergraduate years: freshman, sophomore, junior, and senior. The pre-health participants were grouped by pre-health concentration, and 58 were pre-medicine, 97 were pre-nursing, and 71 were students of other pre-health concentrations. The pre-health participants were between 18 and 39 years of age, with a mean age of 19.9 years. Participant demographic by gender, race/ethnicity, and year in school for all and pre-health students can be seen in Table 1.

Table 1

Participant Demographics

Gender	All	Pre-Health
Woman	251	172
Man	93	52
Trans	2	1
Nonbinary	4	1
Race/Ethnicity		
White/European American	199	128
Black/African American	100	62
American Indian/Alaskan Native	3	2
Asian/Asian American	18	12
Latino/Hispanic/Hispanic American	7	5
Native Hawaiian/ Other Pacific Islander	0	0
Mixed Race/Ethnicity	22	17
Year in School		
Freshman	221	149
Sophomore	65	36
Junior	41	23
Senior	22	18

Measures

A total of four scales were used in the study: Burnout Assessment Tool, Clance Impostor Phenomenon Scale, Distress Questionnaire-5, and the Frost Multidimensional Perfectionism Scale (see Appendix for full scale questions). A description of the scales and what they measure is as follows:

Burnout

The Burnout Assessment Tool (BAT) is used to measure the level of burnout complaints of the participant. The scale consists of 22 Likert statements, and participants are asked to rate on a scale from Never (1) to Always (5) on how much they feel the statements apply to them. There

are a total of 4 subscales to the BAT, which are the following: Exhaustion (E), Mental Distance (MD), Cognitive Impairment (CI), and Emotional Impairment (EI). The participant's responses within each of these categories are averaged to produce the mean score for each of the subscales. The participant's entire set of responses are averaged to yield the participant's total level of burnout complaint. For the total-core score, low is considered 1.00-2.58; average is considered 2.59-3.01; and high is considered 3.02-5.00. For this study, the total-core scores were used in the majority of data analysis, although the sub-scores were collected and calculated as well, contributing to a portion of the analysis (Schaufeli, et al., 2020).

Impostor Phenomenon

The Clance Impostor Phenomenon Scale (CIPS) is a scale used to measure whether or not participants have impostor phenomenon characteristics, and if so, to what extent they are suffering. The scale consists of 20 Likert statements, and participants must answer on a scale from 1 (not at all true) to 5 (very true) on how much they feel the statement applies to them. The scores are summed together to yield a total score. If the total score is 40 or less, the participant shows few impostor phenomenon characteristics; if the score falls between 41 and 60, the participant demonstrates moderate impostor phenomenon experiences. A score between 61 and 80 indicates that the participant has frequent impostor phenomenon characteristics, and a score higher than 80 means that the participant experiences intense impostor phenomenon characteristics (Clance, 1985).

Psychological Distress

The Distress Questionnaire-5 (DQ-5) is used to screen participants for psychological distress, allowing for a rapid and accurate assessment. The scale consists of 5 Likert statements, and the participants were asked to respond on a scale from 1 (never) to 5 (always) regarding how

often they felt like those statements applied to them in the last 30 days. The responses are summed together to yield a total score of psychological distress ranging from 5 to 25. Higher scores on this scale indicate more psychological distress in the participant. According to the National Center for Epidemiology and Population Health, a score of 11-14 indicates elevated distress, and a score greater than 14 indicates high psychological distress (Batterham, et al., 2016).

Perfectionism

The Frost Multidimensional Perfectionism Scale (FMPS) is used to measure perfectionism in participants. There are 35 Likert statements, and participants answer on a scale from 1 (strongly disagree) to 5 (strongly agree) on how much each statement corresponds to their beliefs. There are six subscales used to measure different dimensions of the perfectionistic traits: Concern over Mistakes (CM) reflecting negative reactions to mistakes, Personal Standards (PS) reflecting the setting of high personal standards and excessive importance of these standards in a participant's self-evaluation, Parent Expectations (PE) reflecting the belief that the participant's parents set high expectations for them, Parental Criticism (PC) reflecting the participant's perception of their parents being overly critical of them, Doubting of Actions (D) reflecting the extent to which the participants doubt their ability to accomplish tasks, and Organization (O) reflecting the tendency to be organized and place an emphasis on order or orderliness. Each of the subscales totals are summed together, and there also is a total sum score of the scale, excluding the Organization dimension, that reflects the participant's overall perfectionistic tendencies. The total scores possible on this scale range from 35 to 145. Higher scores on this scale and its subscales indicate more perfectionistic qualities present in the participant (Frost, et al., 1990). The interpretation of severity can be found by using the commonly accepted reference

percentiles from a study that was conducted on a large sample shortly following the creation of the scale (Stober, 1997).

Procedure

This study was approved by the Institutional Review Board at the University of South Alabama (Board Reference # 23-452). All four scales (CIPS, FMPS, DQ-5, and BAT) were compiled into one survey that was distributed via Qualtrics online software. The survey was advertised to all pre-health students through the pre-health advising newsletter and the pre-health honors society meeting. The survey was also available for participants by all introductory psychology students at the university through SONA systems, offering research participation credit as an incentive for completing the survey. The study began collecting responses in October of 2023 and ended the collection of responses in February of 2024.

Participants were asked to complete the survey, and no personal identifying information was collected. The survey began with the CIPS, followed by the FMPS, then the DQ-5, and finally the BAT. All questions for these scales were in the form of Likert statements, and following the completion of these scales, the participants were asked to answer a series of questions regarding demographics (see Appendix). The last question asked of participants was whether or not they were pre-health, and their answer to this question, if yes, prompted a follow-up question asking their pre-health concentration. The average response time to complete the entire survey was 20 minutes. Upon completion of the data collection process, the responses were cleaned and analyzed using the Jamovi online statistical software.

Analyses

Previously conducted studies demonstrated that, at the graduate level, there is an increased prevalence of impostor phenomenon, perfectionism, psychological distress, and

burnout in the students. While the current literature on this topic focuses on graduate students, the question still remains whether or not these factors develop earlier in a student's academic career and whether or not which graduate program the students are preparing for contributes to their development of these factors. To attempt to answer the questions posed in the study, the following methods of analysis were utilized: Analysis of Variance (ANOVA), Correlation Matrix, and Multiple Regression Analysis.

Before fully analyzing the data collected, the reliability analysis for each of the scales was determined using Cronbach's alpha. A Cronbach's alpha is used to examine the reliability and internal consistency of a set of scale items, measuring how consistent the concept is measured. This value is calculated by correlating the score for each scale item with the total score for each individual response, then comparing that to the variance for all individual item scores. The Cronbach's alpha can range on a scale of 0 to 1; the higher the coefficient, the more items have shared covariance and measure the same underlying concept. For the CIPS, the Chronbach's alpha score was a 0.914, indicating that the scale had high internal consistency. For the FMPS, the Cronbach's alpha score was found to be 0.924, meaning that the scale had a high consistency as well. For the DQ-5 scale, the Cronbach's alpha was 0.852, showing that this scale's internal consistency was reliable. Finally, for the BAT scale, the Cronbach's alpha was 0.948, indicating that its internal consistency was also high. All of these numbers did not breach above 0.95, indicating that they had high reliability without being too redundant.

To investigate the severity of impostor phenomenon, perfectionism, psychological distress, and burnout in pre-health students, the total mean scores for each of the scales (CIPS, FMPS, DQ-5, and BAT) were taken into account and compared to their respective interpretation guidelines. For the BAT, any value above 3.02 as the mean score indicates high levels of burnout,

and for the DQ-5, any value over 14 demonstrates high levels of psychological distress. For the CIPS, a score between 61 and 80 indicates frequent impostor phenomenon characteristics, and a score above 80 shows intense impostor phenomenon experiences. For the FMPS, the mean total score was compared to the percentiles calculated from the data analysis of Stober's 1997 study on the FMPS and perfectionism.

Several ANOVAs were run to determine whether or not there were statistically significant differences between impostor phenomenon, perfectionism, psychological distress and burnout in pre-health students versus non-pre-health students and to determine whether or not these constructs differed between the concentrations (pre-medicine, pre-nursing, and other pre-health) of pre-health students.

A correlation matrix was run to determine whether or not the scores of each scale were correlated with one another. A correlation matrix is a statistical analysis technique used to evaluate the relationship between two variables in a data set. The matrix is presented in a table in which every cell contains a correlation coefficient, otherwise known as the Pearson's r value. In terms of the Pearson's r value, the closer a value is to 1 (either positive or negative) indicates the strength of the relationship, with 0 indicating no relationship. A positive value indicates a positive correlation, meaning that higher values of one variable can predict higher values of another variable. A negative value indicates a negative correlation, meaning that higher values of one variable can predict lower values of another. For the correlation matrix in this study, each of the total scale scores (CIPS, FMPS, DQ-5, and BAT) were entered into the matrix. The Pearson's r values and p-values were considered to determine whether or not a correlation found in the matrix was significant.

Two multiple regressions were used in the study to determine whether or not there was a relationship between burnout and the other factors (impostor phenomenon, perfectionism, psychological distress, etc.). The first multiple regression analysis aimed to find whether or not impostor phenomenon, perfectionism, psychological distress, age, gender, year in school, and pre-health concentration could be predictors of burnout. To assess this, the total CIPS scores, total FMPS scores, total DQ-5 scores, ages, genders, years in school, and races/ethnicities were entered into the model as independent variables against the dependent variable being the total BAT scores. The second multiple regression aimed to determine whether or not a student was pre-health could be a potential indicator of burnout, and this regression used identical parameters and independent variables, with the only change being that pre-health designation was swapped in place of pre-health concentration.

RESULTS

Severity of Impostor Phenomenon, Perfectionism, Psychological Distress, and Burnout in Pre-Health Students

To evaluate the severity of impostor phenomenon, perfectionism, psychological distress, and burnout in pre-health students, the mean participant scores were taken into consideration and compared to the designated values for each scale. The first construct evaluated was impostor phenomenon through the CIPS, and it was found that the mean score for the pre-health respondents was 63.7 (SD = 14.4). This mean score falls in the category of respondents frequently having impostor feelings, which is important to note because this indicates that pre-health students have above average frequencies of feelings associated with impostor phenomenon. The second construct evaluated was perfectionism through the FMPS, and it was found that the mean score for the pre-health respondents was 90.3 (SD = 19.1). In comparison to the data from Stober's 1997 study, the pre-health respondents' mean score fell within the 86th percentile, indicating that the pre-health students in this study have an average perfectionism score higher than or equal to 86% of the respondents from the commonly accepted reference values. The third construct evaluated was psychological distress through the DQ-5, and it was found that the mean score for the pre-health respondents was 15.6 (SD = 4.63). The mean score fell higher than 14, meaning that the pre-health students in this study had high levels of psychological distress. The final construct evaluated was burnout through the BAT, and it was found that the mean score for the pre-health respondents was 3.08 (SD = 0.801). When comparing this mean score to the value ranges for the scale, it was found that the mean fell above the 3.02 threshold. This means that the pre-health students participating in this study also had high rates of burnout. These values show that pre-health students at the university are more

susceptible to psychological maladjustment across all four constructs, which was an encouraging result for further analysis of the data.

Correlations Between Impostor Phenomenon, Perfectionism, Psychological Distress, and Burnout

A correlation matrix was conducted to determine which, if any, of the scales were correlated with one another. Correlations between all total scores can be seen in Table 2. All correlations were significant at $p < 0.001$. All measures were moderately to strongly positively correlated.

Table 2

Correlation Matrix

Measure	CIPS	FMPS	DQ-5	BAT
CIPS	—			
FMPS	0.678**	—		
DQ-5	0.529**	0.479**	—	
BAT	0.485**	0.495**	0.824**	—

$^{**}p < 0.001$

These results were promising leading into further analysis of the data because it appeared that each of these scales had a statistically significant positive correlation with the other scales, indicating that a higher score on one scale is associated with high scores on another.

Multiple Regression Analysis

Two multiple regression analyses were conducted to examine the predictors of burnout. The first multiple regression (see Table 3, Model 1) was conducted to determine whether or not the CIPS, FMPS, DQ-5, age, gender, race/ethnicity, year in school, and general pre-health designation were significant predictors of the BAT. To accommodate the varying number of

responses for each category of race/ethnicity and gender identity, all races/ethnicities other than Black/African American and White/European American were combined into one group called "other race/ethnicity," and all gender identities other than male or female were combined into one group called "other gender." Eight predictors were entered into the model simultaneously: the CIPS total score, the FMPS total score, the DQ-5 total score, pre-health designation, age, gender, race/ethnicity, and year in school. Before examining the predictive power of the model, assumption checks were conducted. The *Durban-Watson* statistic was tested to rule out autocorrelation and confirm the independence of errors, and it was found to be 1.87 ($p = 0.230$), which confirms both of these assumptions. The *Shapiro-Wilk* statistic was calculated to be 0.993 ($p = 0.136$), and this value indicates that the data was normally distributed. The overall regression model was significant ($(8, 340) = 89.6$, $p < 0.001$), indicating that at least one predictor significantly affects the BAT total score. The model explains 67.1% of the variance in the BAT total score, with an adjusted R^2 of 0.671. While the model was significant, the only significant predictors in the model were the FMPS (beta = 0.153, $p < 0.001$) and the DQ-5 (beta = 0.703, $p < 0.001$) total scores.

Table 3

Multiple Regression Analysis

	Model 1		Model 2	
	Standard. Coef.	*p*-value	Standard. Coef.	*p*-value
CIPS	0.05713	0.215	-9.43e-4	0.986
FMPS	0.15274	< 0.001	0.13684	0.008
DQ-5	0.70325	< 0.001	0.75793	< 0.001
Age	-0.02936	0.415	-0.00897	0.842
Gender	0.02195	0.486	0.03713	0.330
Race/Ethnicity	-0.00823	0.793	-0.07522	0.051
Year in School	0.01975	0.574	0.01671	0.705
Pre-health	0.03332	0.283	—	—
Concentrations	—	—	0.00303	0.937
Constant	—	0.096	—	0.062

The second multiple regression (Table 3, Model 2) was conducted to determine whether or not the CIPS, FMPS, DQ-5, age, gender, race/ethnicity, year in school, and pre-health concentration type were significant predictors of the BAT. Eight predictors were entered into the model simultaneously: the CIPS total score, the FMPS total score, the DQ-5 total score, concentration type, age, gender, race/ethnicity, and year in school. Before examining the predictive power of the model, assumption checks were conducted. The *Durban-Watson* statistic was tested to rule out autocorrelation and confirm the independence of errors, and it was found to be 1.90 ($p = 0.388$), which confirms both of these assumptions. The *Shapiro-Wilk* statistic was calculated to be 0.990 ($p = 0.142$), and this value indicates that the data was normally distributed. The model was significant, $F(217) = 63.3$, $p < 0.001$, indicating that at least one predictor significantly affects the BAT total score. The model explains 68.9% of the variance in the BAT total score, with an adjusted R^2 of 0.689. Again, while the model was significant, the only

significant predictors were the FMPS (beta = 0.137, p = 0.008) and the DQ-5 (beta = 0.758, p<0.001) total scores.

Differences Between Concentrations of Pre-Health Students

To investigate differences between concentrations of pre-health students, ANOVA models were conducted on each of the scales used in the current study: CIPS, FMPS, DQ-5, and BAT. Among the pre-health students' responses, 11 pre-health concentrations were found, but many of those concentrations had less than 18 students (e.g. pre-physical therapy N = 18, pre-physician assistant N = 10, pre-optometry N = 1). Pre-medicine (N = 58) and pre-nursing (N = 97) had substantially more respondents. To ensure that the groups being evaluated through the analysis had around the same number of participants, all pre-health concentrations other than pre-medicine and pre-nursing were combined into one group called “other pre-health concentrations.” A between subjects ANOVA was conducted to examine the effect of concentration on the CIPS total score. This analysis revealed that there was not a statistically significant difference in the CIPS total score between the three groups, $F(2, 223) = 1.05$, $p = 0.353$. The mean total CIPS score for pre-medicine students was found to be 64.8 (SD = 13.0). The mean total CIPS score for pre-nursing students was found to be lower at 62.1 (SD = 14.1). The mean total CIPS score for other pre-health concentrations was found to be the highest at 64.9 (SD = 15.7).

A between subjects ANOVA was conducted to examine the effect of concentration on the FMPS total score. This analysis revealed that there was not a statistically significant difference in the FMPS total score between the three concentrations, $F(2, 223) = 1.48$, $p = 0.231$. The mean total FMPS score for pre-medicine students was found to be 90.2 (SD = 20.1). The mean total

FMPS score for pre-nursing students was found to be 88.2 (SD = 18.7). The mean total FMPS score for other pre-health concentrations was found to be the highest at 93.3 (SD = 18.7).

A between subjects ANOVA was conducted to examine the effect of concentration on the DQ-5 total score. This analysis revealed that there was not a statistically significant difference in the DQ-5 total score between the three concentration groups, $F(2, 223) = 0.220$, $p = 0.803$. The mean total DQ-5 score for pre-medicine students was found to be 15.6 (SD = 4.90). The mean total DQ-5 score for pre-nursing students was found to be slightly higher at 15.8 (SD = 4.60). The mean total DQ-5 score for other pre-health concentrations was found to be the lowest at 15.3 (SD = 4.48).

A between subjects ANOVA was conducted to examine the effect of concentration on the BAT total score. This analysis revealed that there was not a statistically significant difference in the BAT total score between the three concentration groups, $F(2,223) = 0.194$, $p = 0.824$. The mean total BAT score for pre-medicine students was found to be 3.13 (SD = 0.789). The mean total BAT score for pre-nursing students was found to be the lowest at 3.05 (SD = 0.818). The mean total BAT score for other pre-health concentrations was found to be 3.08 (SD = 0.795).

Differences Between Pre-Health and Non-Pre-Health Students

To investigate the difference between pre-health and non-pre-health students on all four measures (CIPS, FMPS, DQ-5, and BAT), four additional ANOVAs were conducted. A between subjects ANOVA was conducted to examine the effect of pre-health student status on the total CIPS score. This analysis revealed that there was not a statistically significant difference in the total CIPS score between the two groups, $F(1, 348) = 0.0725$, $p = 0.788$. The mean total CIPS score for pre-health students was found to be 63.7 (SD = 14.4). The mean total CIPS score for non-pre-health students was found to be 63.2 (SD = 13.4).

A between subjects ANOVA was conducted to examine the effect of pre-health student status on the total FMPS score. This analysis revealed that there was not a statistically significant difference in the total FMPS score between the two groups, $F(1, 348) = 2.54$, $p = 0.112$. The mean total FMPS score for pre-health students was found to be 90.3 (SD = 19.1). The mean total FMPS score for non-pre-health students was found to be 86.9 (SD = 19.1).

A between subjects ANOVA was conducted to examine the effect of pre-health student status on the total DQ-5 score. This analysis revealed that there was not a statistically significant difference in the total DQ-5 score between the two groups, $F(1,348) = 1.38$, $p = 0.240$. The mean total DQ-5 score for pre-health students was found to be 15.6 (SD = 4.63). The mean total DQ-5 score for non-pre-health students was found to be 15.0 (SD = 4.40).

A between subjects ANOVA was conducted to examine the effect of pre-health student status on the total BAT score. This analysis revealed that there was not a statistically significant difference in the total BAT scores between the two groups, $F(1, 348) = 0.233$, $p = 0.630$. The mean total BAT score for pre-health students was found to be 3.08 (SD = 0.801). The mean total BAT score for non-pre-health students was found to be 3.04 (SD = 0.770).

Between subjects ANOVAs were conducted on all the subscales of the FMPS and BAT to examine the effects of pre-health student status. When considering the subscale scores for the FMPS, it was found that only one subscale (Personal Standards) had a statistically significant difference between students who were pre-health and non-pre-health, $F(1, 348) = 20.2$, $p<0.001$. The mean FMPS Personal Standards subscale score for pre-health students was 26.1 (SD = 5.33), and the mean FMPS Personal Standards score for non-pre-health students was 23.4 (SD = 5.69). It was not found that any difference on the BAT subscale scores was statistically significant.

DISCUSSION

Careers in the healthcare field are stressful, with strenuous paths of education and training to establish a role as a healthcare provider. The paths of education and training for these healthcare careers consist of many years of dedication and hard work, and the implications of such a long-term commitment to a rigorous workload are yet to be fully understood or determined. Previous studies in the field have investigated burnout and the other constructs in this study (impostor phenomenon, perfectionism, and psychological distress) separately in students from graduate programs (Pannhausen, et al., 2022; Rosenthal, et al., 2021; Thomas & Bigatti, 2020; Villwock, et al., 2016). However, there has not been a study that looks into all four of these concepts at once, nor has there been a study that focuses primarily on undergraduate students preparing for healthcare graduate programs. This study aimed to fill this gap in current research and investigate all of these constructs in undergraduate students on a pre-health track.

The first hypothesis for this study was that pre-health students would have high levels of impostor phenomenon, perfectionism, psychological distress, and burnout. The data supported this hypothesis because the mean total scores for each of the scales fell above the threshold that indicated high levels of these constructs. Although the total mean score for the CIPS was not within the highest possible threshold of scores, the score indicated that the pre-health students frequently dealt with impostor phenomenon feelings, and this is more often than what is considered average by the CIPS. For the perfectionism construct, the mean total score on the FMPS was within the 86th percentile from Stober's 1997 study. This means that the perfectionism found in this study was considerably higher than what would be considered normal for the standard population. For psychological distress, the total mean score of the DQ-5 fell above the minimum threshold for high psychological distress. For burnout, the total mean score

of the BAT fell within the range of high burnout levels. All of these scores supported the hypothesis and contributed to a better understanding of the severity of each of these constructs in the pre-health students at the University of South Alabama.

A second hypothesis for this study was that the levels of impostor phenomenon, perfectionism, psychological distress, and burnout are all correlated with one another. The data analysis provided support for this hypothesis. All were found to be positively correlated with one another, indicating that higher results on one scale is associated with higher results on another scale. Most of the scales were found to be moderately correlated with one another, and the DQ-5 showed to be very strongly correlated with the BAT. This is likely due to the fact that all four of these factors share similar characteristics of human behavior in terms of being overly critical of one's performance, along with a few key differences in their presentation. Pre-existing literature indicates that these constructs are reinforced by similar patterns of behavior, mostly in terms of self-criticism and negative thinking (Garratt-Reed, et al., 2018; Rosenthal, et al., 2021), and this is reasonable to assume, given that the measurements for the scales themselves have similarly worded questions about similar concepts (see CIPS question 15 & FMPS question 24 or DQ-5 question 4 & BAT Cognitive Impairment question 1 in Appendix). There is significantly more overlap between the concepts of the DQ-5 and the BAT, and most of the DQ-5 questions are reiterated throughout the BAT with different wording.

A third hypothesis for this study was that impostor phenomenon, perfectionism, and psychological distress would be potential indicators of burnout. Through the multiple regression analyses, it was found that both perfectionism and psychological distress were significant predictors of burnout; however, impostor phenomenon was not found to be a significant predictor. While impostor phenomenon and burnout have been shown to be positively correlated,

it is only a moderate correlation. On the other hand, perfectionism and psychological distress had both higher correlations and significance in the multiple regressions. This means that perfectionism and psychological distress are better predictors of burnout than impostor phenomenon. Previously conducted research on impostor phenomenon (Rosenthal, et al., 2021) supports the idea that it is linked to the development of psychological distress, which could be the reason that impostor phenomenon did not show to be a predictor of burnout. Additional research only found certain dimensions of burnout to be associated with impostor phenomenon (Campos, et al., 2022), and these dimensions overlap with those of psychological distress. If psychological distress is predicted by impostor phenomenon and is considered a significant predictor of burnout, then psychological distress has a possibility of being a moderating variable between impostor phenomenon and burnout. While this assumption is sensible, more research is needed to confirm this hypothesis.

The fourth hypothesis in this study was that the concentrations of pre-health students would have differing results in their levels of impostor phenomenon, perfectionism, psychological distress, and burnout. The results of data analysis demonstrated that there was no difference between pre-medicine, pre-nursing, and other pre-health students in impostor phenomenon, perfectionism, psychological distress, or burnout. The data may not have supported the hypothesis because this study had a predominant presence of freshmen students, and the lack of upperclassmen respondents could contribute to lower levels of each construct due to the majority of students not being in their respective academic majors for an extended period of time.

A fifth hypothesis for this study was that there would be a difference between pre-health and non-pre-health students regarding their levels of impostor phenomenon, perfectionism,

psychological distress, and burnout. The results of data analysis demonstrated that there was no difference between pre-health and non-pre-health students in their levels of impostor phenomenon, psychological distress, and burnout; however, upon analysis of the subscale scores of perfectionism, it was found that pre-health students have a significant difference from non-pre-health students in the area of Personal Standards. The data indicated that pre-health students at the university showed higher levels of personal standards than those who were not pre-health students. This is an interesting result to find because it insinuates that pre-health students may place themselves under a higher level of scrutiny to meet the graduate program requirements than those who are not pre-health students.

Upon consideration of the questions for the Personal Standards subscale, most of the questions are phrased in such a way that places the respondent in a downward social comparison with others, specifically questions 4, 12, 24, and 30. Higher responses for pre-health students on these questions could be attributed to the stigma attached to certain STEM courses in the curriculum that might lead these students to feeling that they expect themselves to maintain a higher level of performance than others who may not be studying for a healthcare profession. A possible explanation for this would be the increased pressure on pre-health students to be "perfect" candidates for graduate programs, due in part to the highly competitive nature of the graduate school application and selection processes. This comparison also leads to the further question of whether the notion of self-importance in the healthcare field possibly contributes to the perfectionistic tendencies of the pre-health students. To answer whether or not this is true, further research needs to be conducted regarding how the perfectionism construct relates to the social view of healthcare occupations and the social attitudes toward pre-health programs.

The limitations of this study primarily surround the topics of time and data collection. As previously mentioned, this study relied heavily on data collected from freshman students at the university, and there was a noticeable difference in the number of responses from freshmen and upperclassmen. The study also was constrained by time in the sense that it was not open for the collection of data responses more than five months. The lack of time dedicated to data collection limited the number of responses received for data analysis, and it possibly contributed to the lack of upperclassmen, as higher level courses yield a higher workload on students and limit the time allotted to extracurricular involvement, such as participating in research studies like this one. There also was a limitation for the comparison between pre-health and non-pre-health students at the university due to a stark difference in the response rate for each respective category of participants. There were 102 more pre-health responses than non-pre-health responses, so this could account for the ANOVAs not showing a significant difference in the scores.

Future studies could expand upon the efforts made through this study by collecting responses from an increased number of upperclassmen and focusing on this demographic more than underclassmen. There also is room for a comparison to be made between upper and lower classmen and evaluate whether or not the severity of impostor phenomenon, perfectionism, psychological distress, and burnout increase with time. A proposed idea for further data analysis is matching underclassmen to upperclassmen to account for this difference in response number. It also would be interesting to conduct this research longitudinally and investigate whether these constructs increase or decrease among the same set of participants over time.

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APPENDIX

The Clance Impostor Phenomenon Scale:

For each question, please circle the number that best indicates how true the statement is of you. It is best to give the first response that enters your mind rather than dwelling on each statement and thinking about it over and over.

1. I have often succeeded on a test or task even though I was afraid that I would not do well before I undertook the task.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

2. I can give the impression that I'm more competent than I really am.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

3. I avoid evaluations if possible and have a dread of others evaluating me.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

4. When people praise me for something I've accomplished, I'm afraid I won't be able to live up to their expectations of me in the future.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

5. I sometimes think I obtained my present position or gained my present success because I happened to be in the right place at the right time or knew the right people.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

6. I'm afraid people important to me may find out that I'm not as capable as they think I am.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true

7. I tend to remember the incidents in which I have not done my best more than those times I have done my best.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

8. I rarely do a project or task as well as I'd like to do it.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

9. Sometimes I feel or believe that my success in my life or in my job has been the result of some kind of error.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

10. It's hard for me to accept compliments or praise about my intelligence or accomplishments.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

11. At times, I feel my success has been due to some kind of luck.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

12. I'm disappointed at times in my present accomplishments and think I should have accomplished much more.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

13. Sometimes I'm afraid others will discover how much knowledge or ability I really lack.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

14. I'm often afraid that I may fail at a new assignment or undertaking even though I generally do well at what I attempt.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

15. When I've succeeded at something and received recognition for my accomplishments, I have doubts that I can keep repeating that success.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

16. If I receive a great deal of praise and recognition for something I've accomplished, I tend to discount the importance of what I've done.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

17. I often compare my ability to those around me and think they may be more intelligent than I am.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

18. I often worry about not succeeding with a project or examination, even though others around me have considerable confidence that I will do well.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

19. If I'm going to receive a promotion or gain recognition of some kind, I hesitate to tell others until it is an accomplished fact.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

20. I feel bad and discouraged if I'm not "the best" or at least "very special" in situations that involve achievement.

1 2 3 4 5

(not at all true) (rarely) (sometimes) (often) (very true)

Note. From The Impostor Phenomenon: When Success Makes You Feel Like A Fake (pp. 20-22), by P.R. Clance, 1985, Toronto: Bantam Books.

Frost Multidimensional Perfectionism Scale:

Please circle the number that best corresponds to your agreement with each statement below. Use this rating system

Strongly disagree 1 2 3 4 5 Strongly agree

	Strongly Disagree……..Strongly Agree				
1. My parents set very high standards for me.	1	2	3	4	5
2. Organization is very important to me.	1	2	3	4	5
3. As a child, I was punished for doing things less than perfectly.	1	2	3	4	5
4. If I do not set the highest standards for myself, I am likely to end up a second rate person.	1	2	3	4	5
5. My parents never tried to understand my mistakes.	1	2	3	4	5
6. It is important to me that I be thoroughly competent in everything I do.	1	2	3	4	5
7. I am a neat person.	1	2	3	4	5
8. I try to be an organized person.	1	2	3	4	5
9. If I fail at work/school, I am a failure as a person.	1	2	3	4	5
10. I should be upset if I make a mistake.	1	2	3	4	5
11. My parents wanted me to be the best at everything.	1	2	3	4	5
12. I set higher goals for myself than most people.	1	2	3	4	5
13. If someone does a task at work/school better than me, then I feel like I failed the whole task.	1	2	3	4	5
14. If I fail partly, it is as bad as being a complete failure.	1	2	3	4	5
15. Only outstanding performance is good enough in my family.	1	2	3	4	5
16. I am very good at focusing my efforts on attaining a goal.	1	2	3	4	5
17. Even when I do something very carefully, I often feel that it is not quite done right.	1	2	3	4	5
18. I hate being less than the best at things.	1	2	3	4	5
19. I have extremely high goals.	1	2	3	4	5
20. My parents have expected excellence from me.	1	2	3	4	5
21. People will probably think less of me if I make a mistake.	1	2	3	4	5

22. I never felt like I could meet my parents' expectations.	1	2	3	4	5
23. If I do not do as well as other people, it means I am an inferior human being.	1	2	3	4	5
24. Other people seem to accept lower standards from themselves than I do.	1	2	3	4	5
25. If I do not do well all the time, people will not respect me.	1	2	3	4	5
26. My parents have always had higher expectations for my future than I have.	1	2	3	4	5
27. I try to be a neat person.	1	2	3	4	5
28. I usually have doubts about the simple everyday things I do.	1	2	3	4	5
29. Neatness is very important to me.	1	2	3	4	5
30. I expect higher performance in my daily tasks than most people.	1	2	3	4	5
31. I am an organized person.	1	2	3	4	5
32. I tend to get behind in my work because I repeat things over and over.	1	2	3	4	5
33. It takes me a long time to do something "right".	1	2	3	4	5
34. The fewer mistakes I make, the more people will like me.	1	2	3	4	5
35. I never felt like I could meet my parents' standards.	1	2	3	4	5

Distress Questionnaire-5:

”In the last 30 days…”

1. My worries overwhelmed me
2. I felt hopeless
3. I found social settings upsetting
4. I had trouble staying focused on tasks
5. Anxiety or fear interfered with my ability to do the things I needed to do at work or at home

The response scale for the DQ-5 is “Never” (1), “Rarely” (2), “Sometimes” (3), “Often” (4), or “Always” (5), with total scores on the scale ranging from 5-25 and higher scores indicating greater psychological distress.

Burnout Assessment Tool General Version:

Exhaustion

1) I feel mentally exhausted
2) Everything I do requires a great deal of effort
3) At the end of the day, I find it hard to recover my energy
4) I feel physically exhausted
5) When I get up in the morning, I lack the energy to start a new day
6) When I exert myself, I quickly get tired
7) At the end of my day, I feel mentally exhausted and drained

Mental Distance

1) I struggle to find any enthusiasm for my work and/or school
2) I feel a strong aversion towards my job and/or school
3) I feel indifferent about my job and/or school
4) I'm cynical about what my work and/or education means to others

Cognitive Impairment

1) I have trouble staying focused
2) I struggle to think clearly
3) I'm forgetful and distracted
4) I have trouble concentrating
5) I make mistakes because I have my mind on other things

Emotional Impairment

1) I feel unable to control my emotions
2) I do not recognize myself in the way I react emotionally

3) I become irritable when things don't go my way
4) I get upset or sad without knowing why
5) I may overreact unintentionally

Demographic Questions:

Select which of the following describes your commute to campus on the days you have class.

- I live on campus
- I live within a 5 minute drive to campus
- I live within a 15 minute drive to campus
- I live within a 30 minute drive to campus
- I live within an hour drive to campus
- I live more than an hour away from campus

Select which of the following describes your current employment status.

- Unemployed
- Working part time as a student worker for the university
- Working part time for another place
- Working full time
- Working full-time for the university

Please enter your age.

Please select your gender.

- Man
- Woman
- Intersex
- Transgender
- Nonbinary
- Other:

Please select your year in school.

Freshman (0-29 credit hours)

Sophomore (30-59 credit hours)

Junior (60-89 credit hours)

Senior (90+ credit hours)

Other:

Please select your race/ethnicity.

American Indian/Alaskan Native

Asian/Asian American

Black/African American

Latino/Hispanic/Hispanic American

Native Hawaiian or other Pacific Islander

White/European American

Other:

Are you a first generation college student?

Yes

No

Are you a transfer student?

Yes

No

Are you an international student?

Yes

No

Please select your major from the list.

Biomedical Sciences (BS)

Emergency Medical Services (BS)

Professional Health Sciences (BS)

Radiologic Sciences (BS)

Speech and Hearing Sciences (BS)

Biology (BS)

Chemistry (BS)

Communication (BA)

Criminal Justice (BA)

Dramatic Arts (BA)

English (BA)

Modern Languages and Literature (BA)

Geography (BS)

Geology (BS)

Gerontology (Certificate)

History (BA)

International Studies (BA)

Mathematics/Statistics (BS)

Meteorology (BS) - Professional Track

Meteorology (BS) - Graduate School Track

Meteorology (BS) - Broadcast Met Track

Music (BM)

Philosophy (BA)

Physics (BS)

Political Science (BA)

Psychology (BA)

Social Work (BSW)

Sociology (BS)

Theatre Arts (BFA)

Accounting (BSBA)

Economics & Finance (BSBA) - Economics Concentration

Economics & Finance (BSBA) - Finance Concentration

Economics & Finance (BSBA) - Real Estate Concentration

General Business (BSBA)

International Business (BSBA)

Management (BSBA) - Entrepreneurship Concentration

Management (BSBA) - General Management

Management (BSBA) - Human Resources Concentration

Marketing (BSBA) - Marketing Management Concentration

Marketing (BSBA) - Professional Sales Concentration

Supply Chain Management (BSBA)

Early Childhood Studies (BS)

Elementary Education K-6 (BS)

Exercise Science (BS) - Health and Fitness Concentration

Exercise Science (BS) - Pre-Professional Concentration

Heatth (BS) - Health Promotion

Health- Physical Ed (BS) - Physical Education P-12 and Health Education 6-12 Teacher Certification

Hospitality and Tourism Management (BS)

Interdisciplinary Studies (BA/BS)

Physical Education (BS) - P-12 Teacher Certification

Recreational Therapy (BS)

Secondary Education Biology (BS)

Secondary Education English Language Arts (BS)

Secondary Education General Sciences (BS)

Secondary Education Mathematics (BS)

Secondary Education Social Science (BS)

Special Education (BS)

Sport Management and Recreation Studies (BS) - Coaching Administration

Sport Management and Recreation Studies (BS) - Sport Administration

Chemical Engineering (BSChE)

Civil Engineering (BSCE)

Electrical Engineering (BSEE)

Mechanical Engineering (BSME)

Nursing

Computer Sciences (BSCS)

Health Informatics (BSHI)

Information Systems (BSIS)

Information Technology (BSIT)

Are you a pre-health student?

Yes

No

Which of the following is your pre-health concentration?

Pre-Medicine

Pre-Pharmacy

Pre-Dentistry

Pre-Occupational Therapy

Pre-Physical Therapy

Pre-Physician Assistant

Pre-Nursing

Pre-Optometry

Pre-Veterinary

Pre-Anesthesiologist Assistant

Pre-Genetic Counseling

Other (please specify):