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Exploring The Relationship Between Pre-Medical Student Motivation And Academic Performance: Strategies To Improve Student Success

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Exploring The Relationship Between Pre-Medical Student Motivation And Academic Performance: Strategies To Improve Student Success

by

Lauren Albaum

A dissertation submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in Curriculum and Instruction with an emphasis in Higher Education, Administration Department of Leadership, Counseling, Adult, Career, Higher ED College of Education University of South Florida

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Keywords: grade point average, goal orientation, achievement goal theory, mastery, performance, alienation

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DEDICATION

This dissertation is dedicated to my daughter, Nina Lee Albaum. You make me want to be a better human, mother, and scholar. Because of you, I strive for more.

“She was unstoppable, not because she did not have failures or doubts, but because she continued on despite them.”

– Beau Taplin
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# TABLE OF CONTENTS

LIST OF TABLES .................................................................................................................. iii

LIST OF FIGURES ................................................................................................................ iv

ABSTRACT ............................................................................................................................... v

INTRODUCTION TO THE STUDY .......................................................................................... 1
  Statement of the Problem ................................................................................................. 5
  Purpose of the Study ........................................................................................................ 5
  Research Questions ........................................................................................................ 8
  Theoretical Framework .................................................................................................... 8
  Significance of the Study ............................................................................................... 13
  Research Design ............................................................................................................. 14
  Assumptions ..................................................................................................................... 16
  Limitations ....................................................................................................................... 16
  Delimitations ................................................................................................................... 17
  Definition of Terms ......................................................................................................... 18
  Organization of Remaining Chapters ............................................................................. 20

LITERATURE REVIEW ......................................................................................................... 21
  Search Strategy ................................................................................................................ 21
  The Pre-Medical Student in the United States ............................................................... 22
  The Pre-Medical Experience in the United States ......................................................... 22
    Pre-medical majors & prerequisite courses .................................................................... 23
    Influence of the changing U.S. healthcare system on the medical school experience .............................................................................................................. 24
    Influence of the changing U.S. healthcare system on the pre-medical experience .................................................................................................................. 25
  Medical School Admission Practices: Their Impact on Medical School & Clinical Success ............................................................................................................. 27
    Medical College Admissions Test (MCAT) .................................................................... 27
    Academic records and pre-medical courses .................................................................. 29
    Extracurricular activities and competencies .................................................................. 30
    Personal statements ....................................................................................................... 33
    Letters of recommendation ............................................................................................ 33
    Interviews ....................................................................................................................... 34
  Motivation & Goal Orientation ....................................................................................... 35
  Foundational theories of motivation .............................................................................. 36
Archer’s Achievement Goal Theory .......................................................... 38
The Influence of Goal Orientation on Academic Performance and Resilience .......................................................... 40
Self-Efficacy ......................................................................................... 41
Goal Orientation and Lifelong Learning .................................................. 42
Summary ............................................................................................ 44

METHODS .......................................................................................... 46
Introduction ......................................................................................... 46
Research Design .................................................................................. 47
Population and Sample ........................................................................ 48
Variables ............................................................................................ 50
Instrument ........................................................................................... 51
Instrument Administration .................................................................... 53
Reliability and Validity of Data Source .................................................. 53
Data Analysis ..................................................................................... 54
Summary ............................................................................................ 55

PRESENTATION OF FINDINGS ................................................................. 57
Survey Responses ............................................................................... 58
Sample Population and Demographic Profile .......................................... 58
Reliability and Validity of Data Source .................................................. 61
Analysis of the Research Questions ....................................................... 62
Analysis of the Research Question One ................................................ 62
Analysis of the Research Question Two ................................................ 63
Analysis of the Research Question Three .............................................. 64
Analysis of the Research Question Four ................................................. 64
Analysis of the Research Question Five ................................................. 65
Analysis of the Research Question Six .................................................... 68
Summary ............................................................................................ 70

CONCLUSION AND RECOMMENDATIONS ........................................... 71
Summary of Findings ........................................................................... 71
  Findings Regarding Goal Orientation and Academic Performance .......... 72
  Findings Regarding Goal Orientation and Classification ........................ 74
  Findings Regarding Goal Orientation and Demographic Categories ........ 76
Limitations of the Study ....................................................................... 79
Implications from the Findings ............................................................. 81
Recommendations for Future Research ................................................ 84
Concluding Remarks .......................................................................... 86

REFERENCES .................................................................................... 88

APPENDICES ..................................................................................... 105
Appendix A: Search Terms .................................................................... 106
Appendix B: Modified Archers Health Professions Motivation Survey (MAHPMS) ... 107
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Foundational concepts and skills on the MCAT (AAMC, 2018d)</td>
<td>28</td>
</tr>
<tr>
<td>Table 2</td>
<td>Goal orientation and labels in related theory</td>
<td>39</td>
</tr>
<tr>
<td>Table 3</td>
<td>Inferential statistics for research questions</td>
<td>55</td>
</tr>
<tr>
<td>Table 4</td>
<td>Distribution of Pre-Med &amp; Pre-Vet Students by Classification</td>
<td>59</td>
</tr>
<tr>
<td>Table 5</td>
<td>Freshman Descriptive Statistics</td>
<td>62</td>
</tr>
<tr>
<td>Table 6</td>
<td>Sophomore Descriptive Statistics</td>
<td>63</td>
</tr>
<tr>
<td>Table 7</td>
<td>Junior Descriptive Statistics</td>
<td>64</td>
</tr>
<tr>
<td>Table 8</td>
<td>Senior Descriptive Statistics</td>
<td>65</td>
</tr>
<tr>
<td>Table 9</td>
<td>Linear Regression for Performance &amp; Mastery Preference Goal Orientations</td>
<td>65</td>
</tr>
<tr>
<td>Table 10</td>
<td>Cross-tabulation of Goal Orientation by Classification</td>
<td>66</td>
</tr>
<tr>
<td>Table 11</td>
<td>Demographic Proportions</td>
<td>69</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 1:  Booster and guzzler thoughts and behaviors (Martin, 2002) ................................................. 112

Figure 2:  Frequency distribution by classification .................................................................................. 60

Figure 3:  Frequency distribution by goal orientation preference .......................................................... 61

Figure 4:  Goal orientation preference by year ......................................................................................... 66

Figure 5:  Goal orientation preference: Subscale averages ..................................................................... 67

Figure 6:  Frequency distribution by participant age ................................................................................ 68
ABSTRACT

Colleges and universities are under increasing pressure to meet post-baccalaureate graduate and professional school outcomes, with the majority of students indicating their central reason for attending college is to “landing a better job” (Eagan et al., 2016). Thus, even as interest in medical school and veterinary medical school continues to rise (Eagan et al., 2016), thereby increasing the competition to obtain an acceptance, students and parents continue to hold an expectation that their undergraduate institution will adequately prepare them to successfully matriculate into medical school or veterinary medical school. Although a variety of factors influence acceptance to professional school, earning a high grade point average remains one of the most influential admissions factors (AAMC, 2018d; Dunleavy, Sondheimer, Castillo-Page, & Bletzinger, 2011; Elam, Stratton, Scott, Wilson, & Leiber, 2002; Kreiter & Kreiter, 2007; Monroe, Quinn, Samuelson, Dunleavy & Dowd, 2013). Therefore, it is important for colleges and universities to understand how characteristics of goal orientation, including motivation and resilience, may lead to greater academic success.

In order to explore the relationship between goal orientation and grade point average, this study utilized Archer’s (1994) achievement goal theory. Archer’s (1994) achievement goal theory is centered on the notion that students have a predisposition to align with one of three goal orientations: performance-goal orientation, mastery-goal orientation, or alienation-goal orientation, and that their goal orientation will have a significant impact on their academic achievement and resilience. Although motivation and resilience, as it relates to goal orientation, have been shown to positively impact academic achievement in general populations of collegiate
students (Amrai, Motlagh, Zalani, & Parhon, 2011; Garcia & Pinrich, 1994), studies evaluating the relationship of these variables among pre-health cohorts are extremely limited.

This study utilized portions of the Modified Archers Health Professions Motivation Survey (MAHPMS) which asked participants to answer questions on a Likert-type five-point scale, with each question aligning to one of three goal orientation subscales (either performance-goal oriented, mastery-goal oriented, or alienation-goal oriented). The survey was emailed to self-identified pre-health students at a small, private institution in central Florida during the fall 2019 semester. After delimiting the data to pre-medical and pre-veterinary medical students enrolled in a full time course load with at least seven credits of natural science coursework, the viable records were analyzed to determine each individual respondent’s preferred goal orientation. Individual mean scores were calculated for each subscale and the subscale with the highest average score represented an individual’s preferred goal orientation. Institutional data was used to incorporate demographic information and fall 2019 cumulative grade point average (GPA).

Results indicated that pre-medical and pre-veterinary medical students largely align with either a mastery-goal orientation or a performance-goal orientation, however, due to a lack of statistical significance, preference for mastery-goal orientation or performance-goal orientation cannot be attributed to grade point average. Statistically significant relationships were discovered between goal orientation and ethnicity and goal orientation and academic major, requiring further exploration. While this study did not reveal statistically significant differences between multiple variables, this research contributes to the lack of research on pre-medical and pre-veterinary medical students. More current research is needed on the population of pre-health
students to determine if goal orientation impacts academic success, as it has been shown to do for general college students.
CHAPTER ONE

INTRODUCTION TO THE STUDY

Students who wish to become Doctors of Allopathic Medicine (MD) or Doctors of Osteopathic Medicine (DO), the primary physicians licensed to practice medicine in the U.S., typically complete over a decade of training prior to licensure (U.S. National Library of Medicine, 2019a, 2019b). Beginning with a rigorous bachelor’s degree program, the road to medical school traditionally includes demanding natural science prerequisites coursework, participation in meaningful and time-consuming extracurricular activities, and completion of the Medical College Admissions Test (MCAT). Successful matriculants to MD or DO programs must subsequently complete four years of medical school, followed by a three to seven-year residency program (depending on their area of specialty), and pass multiple board examinations before they are able to practice medicine. All in all, students beginning their college career with aspirations of becoming a physician in the United States have, knowingly or unknowingly, signed up for a demanding eleven to fifteen-year academic journey.

Even in the face of these daunting requirements, undergraduate student interest in the medical profession continues to rise (Association of American Medical Colleges [AAMC], 2018a). The Cooperative Institutional Research Program (CIRP), which publishes an annual report outlining the national norms of each entering freshman class and is taken by over 137,000 first-time, full-time students entering 184 varied U.S. colleges and universities, reported that 10.2% of all incoming college students surveyed self-identified their career interest as “medical
doctor/surgeon” (Eagan et al., 2016). The only occupation selected more than “medical
doctor/surgeon” was “undecided” at 10.4% (Eagan et al., 2016).

Recent increases in the number of students applying to medical school indicate that the
physician career interest is shared not only by incoming first year college students, but has
endured, at least partially, into the upperclassmen years. From 2002 to 2016, the number of
applications to U.S. allopathic medical schools increased by almost 20,000 applicants per year
(AAMC, 2018a). While the number of applicants to allopathic medical schools has increased,
enrollment figures have remained stagnant, leaving more than 32,000 students unable to
matriculate to allopathic medical schools in the 2016-2017 application cycle (AAMC, 2018a).
Limited studies have examined why undergraduates pursue a pre-medical track, but initial
research suggests factors including a desire to help others and an affinity for both intellectual
stimulation and the study of human anatomy (Lovechio & Dundes, 2002). Yet, surveys of
students finishing medical school depart from these early ideals, indicating a tendency for
residency application decisions to be largely based on future income potential and ability to
provide a comfortable lifestyle (Dorsey, Jaroura, & Rutecki, 2003). Although not stated as a top
reason by pre-medical students, a desire for financial stability is a likely reason why
undergraduate students pursue medicine. With a median income greater than $208,000 per
year in 2017, and a projected 10-year job growth rate nearly twice that of the industry standard, it
is easy to see the allure for today’s pre-medical students, many of whom grew up in the shadow
of the great recession (U.S. Department of Labor, 2017).

For students pursuing medical school in the United States, the medical school selection
process is recognized as the greatest barrier to admission. With supply (seats in medical school)
unable to keep up with demand (the number of applicants), competition for admission continues
to rise. As a result, admissions committees are forced to evaluate their applicants more stringently. Although not the only admissions factor, undergraduate grade point average (GPA) remains one of the most important elements in determining admission to medical school (AAMC, 2018d; Dunleavy, Sondheimer, Castillo-Page, & Bletzinger, 2011; Elam, Stratton, Scott, Wilson, & Leiber, 2002; Kreiter & Kreiter, 2007; Monroe, Quinn, Samuelson, Dunleavy & Dowd, 2013). In 2016, the average GPA for allopathic medical school matriculants was 3.70 on a 4.00 scale (AAMC, 2018a). Since most US medical schools will review every attempt of every course in an applicant’s cumulative GPA calculation including any repeated coursework, earning a low grade in even one course can have devastating consequences for students who aspire to medical school. Maintaining such a high GPA can be especially difficult due to the rigorous nature of the required prerequisite courses which are steeped in challenging life and physical science content and coupled with the recommendation to participate in a variety of time-consuming extracurricular activities.

With such formidable standards, students must be willing to exert high levels of effort towards obtaining their educational goals. Pre-medical undergraduate students lacking adequate self-efficacy and academic resilience are prime targets for academic burnout and depression (Fang, Young, Golshan, Moutier, & Zisook, 2012). Difficulty experienced in rigorous undergraduate science courses, specifically in the field of chemistry, are commonly cited as a principal factor for a decline in interest in pre-medical studies (Barr, Matsui, Wanat, & Gonzalez, 2010; Lovecchio & Dundes, 2002). Additionally, research findings suggest that underrepresented racial and ethnic minority groups and women are disproportionately more likely to discontinue their pre-medical studies and to suffer from depressive symptoms throughout their pre-medical career (Barr, Gonzalez, & Wanat, 2008; Fiorentine & Cole, 1992; Grace, 2018).
Unfortunately, students who change their career aspirations part way through their undergraduate degree may experience costly delays in degree progression or, due to a lost sense of purpose, leave the institution altogether. According to the Educational Policy Institute, these instances of attrition cost undergraduate institutions an average of almost ten million dollars a year (Raisman, 2013).

Institutions are not the only ones suffering the negative effects of attrition. Many college students rely on student loans to attend institutions of higher education and those students who fail to complete a degree are 20% less likely to begin paying down their loans compared to students who graduate successfully (Itzkowitz, 2018). Those students who stay committed to their goal of medical school may struggle to maintain a competitive undergraduate GPA and, as a result, require additional coursework to improve their academic profile. In doing so, they may delay their time to graduation and increase the cost of their total financial investment. One tactic for students is to delay graduation from an undergraduate degree, either by taking additional elective courses or adding in a second major or minor, in order to improve their GPA before graduation. The emergence of highly controversial medical masters programs has provided yet another avenue for students to add to their growing pre-medical school debt. Labeled as “academic enhancer programs” by the AAMC, these programs specifically target pre-medical students who were unsuccessful in obtaining a competitive GPA during their undergraduate career. They market themselves as a quick (typically one-year) fix intended to improve a student’s academic profile, all while charging graduate-level tuition for a master’s degree that has little value in the current job market. Outside of debt, some students may suffer from adverse mental health effects from the stress of the pre-medical curriculum. One study by Fang
et al. (2012) found that the depression and emotional exhaustion suffered by pre-medical students can persist through medical school and into the medical career.

With such weighty implications, strides should be made to better understand the factors influencing pre-medical academic achievement, such as motivation as observed through a student’s goal orientation. Measures should be taken to identify pre-medical students considered motivationally at-risk and provide resources and timely interventions to protect their academic profile and mental health and, if necessary, facilitate discussions surrounding alternative career options. To this end, this study examined the relationship between the goal orientation and academic performance of pre-medical students, as measured by grade point average.

Statement of the Problem

Since the 1970s, much of the research on the pre-medical experience has focused on personality traits and factors influencing attrition (Lin et al., 2013). Research exploring the role of a pre-medical student’s motivation levels and the relationship to academic performance is limited (Lin et al., 2013). Although motivation has been linked to rates of persistence and performance for medical and health science students already in professional school (Babenko, Daniels, White, Oswald, & Ross, 2018; Barkur, Govindan, & Kamath, 2018; Khalaila, 2015; Kusurkar, Croiset, Kruitwagen, & ten Cate, 2011), a shortage of research exists for the pre-medical cohort (Lin et al., 2013). It is the aim of this researcher that this study might improve our understanding of motivational factors, such as an individual’s goal orientation, and the influence of goal orientation on academic achievement for students aspiring to medical school.

Purpose of the Study

The purpose of this study was to investigate the extent of the relationship between a pre-medical student’s goal orientation and their academic performance, as measured by
undergraduate, cumulative grade point average (GPA). The study analyzed whether a student’s GPA is related to their goal orientation, further delineated into mastery-goal oriented, performance-goal orientated or alienation-goal oriented. Furthermore, the study evaluated the trends in goal orientation of pre-medical students based on year in school.

The current generation of students and parents is looking towards college as a means to secure a career and economic stability. Data from the CIRP for the 2016 entering class show that 85% of students indicate their primary reason to attend college was to “be able to get a better job” (Eagan et al., 2016). With an attrition rate under 5%, those fortunate enough to matriculate to a U.S. medical school are very likely to graduate (Garrison, Mikesell & Matthew, 2007). Following graduation, these students will usually find the job security they are seeking, with a projected job growth for physicians and surgeons at 13% through 2026 (U.S. Department of Labor, 2017). Thus, many argue that institutions of higher education have a responsibility to prepare students for entrance into in-demand graduate programs and careers, such as medical school, by providing adequate resources and support.

Students who have identified a specific career objective, such as “medical doctor/surgeon”, have already outwardly adopted a specific professional goal. Literature from the last fifty years contends that intrinsic, motivational factors are vital to the persistence of achieving such personal goals (Archer, 1994, Maslow, 1970). More specifically, Archer (1994) used theories of goal orientation to conceptualize motivation for undergraduate students. Archer theorized that all students align with one of three different goal orientation preferences: mastery, performance, or alienation. While both master-oriented students and performance-goal oriented students are highly motivated, they are driven by very different desires. Alienation-goal oriented
students exhibit low levels of motivation due to their disinterest in demonstrating competence or showcasing achievement.

Motivation, as it relates to goal orientation, has also been shown to positively impact academic achievement in college students (Amrai, Motlagh, Zalani, & Parhon, 2011; Garcia & Pintrich, 1994). With interest in medical school on the rise and the competition for enrollment reaching a fevered pitch, a student’s undergraduate grade point average has become a critical factor for admissions committees to evaluate (AAMC, 2018d; Dunleavy et al., 2011; Monroe et al., 2013). Yet, as stated previously, this emphasis on grade point average puts many students under enormous pressure that may result in mental health issues, such as depression, or may lead to a costly change of major or total withdrawal from the institution (Barr et al., 2008: Barr et al., 2010; Fang et al., 2012; Fiorentine & Cole, 1992; Klink et al., 2008). Therefore, to encourage both persistence and academic achievement, it is valuable for administrators to evaluate and better understand the goal orientation of their pre-medical population.

As high academic performance is both an influential factor in the medical school admissions process and is correlated to academic performance in professional school (Dunleavy, Kroopnick, Dowd, Searcy, & Zhao, 2013; Forester, McWhorter, & Cole, 2002; Kreiter & Kreiter, 2007; Salvatori, 2001), this study sought to analyze the relationship between the motivation of pre-medical students and their overall GPA. By further exploring the relationship between goal orientation and GPA, motivation can be evaluated for its value as an early intervention indicator of academic success. Understanding the connection between motivation and student success will allow institutions to provide targeted support to students, based on their stated goal orientation.
**Research Questions**

This study intended to inform the body of literature on student motivation, specifically of pre-medical students. More specifically the study analyzed whether a student’s type of motivation, as inferred from goal orientation, has an impact on academic performance. To examine this topic, the following research questions were studied:

1. What is the relationship between goal orientation and academic performance for freshman pre-medical students?
2. What is the relationship between goal orientation and academic performance for sophomore pre-medical students?
3. What is the relationship between goal orientation and academic performance for junior pre-medical students?
4. What is the relationship between goal orientation and academic performance for senior pre-medical students?
5. What are the differences in goal orientation based on a student’s academic classification?
6. What are the differences in goal orientation between demographic categories?

**Theoretical Framework**

The theoretical framework that supports the academic implications of this study is achievement goal theory (Archer, 1994). Archer’s achievement goal theory (1994) argues that our actions, and the way in which we interpret and respond to the world, are largely affected by the goals we adopt. For this study, Archer’s theory creates the basis for the idea that pre-medical students are deeply influenced by the ways they develop and adhere to specific career goals. More specifically, their goal orientation will have a significant impact on academic achievement and resilience.
Derived from motivation theory, Archer’s achievement goal theory (1994) affirms that university students have a strong preference for one of three possible goal orientations: mastery-goal oriented, performance-goal oriented, or alienation-goal oriented. Mastery-goal oriented students, sometimes referred to as learning goal oriented or learning focused students, seek to increase their knowledge of a subject or improve their mastery of a task. In the face of obstacles, mastery-goal oriented students are more likely to persist and employ effective learning strategies (Ames & Archer, 1988; Dweck, 1986; Dweck & Leggett, 1988). Students with a performance-goal orientation are driven to outperform others for the purpose of gaining favorable judgements of their competence (Dweck, 1986; Dweck & Leggett, 1988; Elliott & Dweck, 1988). Alternatively, performance-goal oriented students will likely avoid tasks they believe to be challenging to evade negative judgements of their abilities (Ames & Archer, 1988; Elliott & Dweck, 1988). Since the goal of a performance-goal oriented student is to demonstrate competence to others, they are at high risk of experiencing shame, embarrassment, and anxiety following poor performance (Elliott & Dweck, 1988). To avoid this possibility, these individuals may also employ strategies to hide incompetence at the detriment of learning, such as rote learning (Elliott & Dweck, 1988; Meece, Blumfeld, & Hoyle, 1988). The third goal orientation, academic alienation oriented, describes students who desire to complete academic tasks with minimal effort (Meece et al., 1988; Nicholls, Patashnick, & Nolen, 1985). Although a performance-goal oriented student may also avoid difficult academic tasks, they are doing so in an attempt to keep their perceived academic competence unblemished (Ames & Archer, 1988; Elliott & Dweck, 1988). On the other hand, the academic alienation oriented student has interests and sources of self-esteem outside of the classroom and therefore is uninterested in putting effort toward schoolwork (Archer, 1994; Meece et al., 1988; Nicholls et al., 1985). In the
present study, a pre-medical student’s motivation level can be aligned to one of the three goal orientations from Archer’s achievement goal theory (1994). By categorizing students in this way, the research will better allow us to understand how a motivational predisposition may influence academic performance.

Informing Archer’s achievement goal theory are a variety of social-cognitive theories of achievement motivation including self-worth theory, self-efficacy theory, and control theory. The relationship between these theories and achievement goal theory are explored below.

Self-worth theory provides a theoretical basis for performance orientation though the belief that 1) a person’s value in society is dependent on their accomplishments and 2) societal acceptance is the highest human priority (Covington, 1984, 1992; Covington & Beery, 1976). In one study by Covington and Omelich (1984), having a reputation for intelligence elicited stronger positive feelings than being a hard worker. In fact, Covington and Omelich found that a reputation for brilliance was the most important factor influencing personal well-being in college. Covington (1984) describes this achievement behavior as follows,

Individuals are driven to succeed not only to reap the personal and social benefits of success, but also because success aggrandizes a reputation for one’s ability to achieve; and if success becomes unlikely, one’s first priority is to act in ways that minimize the implications of failure- namely, that one lacks ability (p. 8).

For students, believing that they are only as worthy as their accomplishments can have detrimental implications, especially the employment of harmful failure-avoidant strategies (Thompson, Davidson, & Barber, 1995).

Bandura (1997) defined self-efficacy as the “belief in one’s capabilities to organize and execute the courses of action required to produce given attainments” (p. 3). This “self-belief” in
turn influences an individual’s decisions; the amount of effort they will invest in a task; how they will handle stress, anxiety, and depression; how long they will persevere in the face of adversity; and their ultimate level of success (Bandura, 1997; Marsh, 1990). Therefore, self-efficacy is critical to a student’s motivation and resilience. When presented with a challenge, students with high self-efficacy are more motivated to perform and persist (Martin, 2002). In addition to believing in themselves, individuals must also believe in the goal. If the individual is not committed to the goal, as may happen when a goal is assigned rather than intrinsically motivated, any positive goal orientation effects are neutralized (Seijts & Latham, 2001). In the age of “helicopter parents” (Padilla-Walker & Nelson, 2012), the encouragement of well-intentioned but officious parents may lead students to develop goals to appeal to parental influence, rather than personal values.

When related to student learning, control theory refers to the “extent to which students feel they are able to avoid failure and achieve success” (Martin, 2002, p. 37). Therefore, students who perceive themselves to have little to no control over academic outcomes will feel less confident in their ability to succeed (Carver & Scheier, 1981; Martin, Marsh, & Debus, 2001; Weiner, 1985, 1994). With no hope of success, the loss of control may cause them to engage in self-sabotage or exhibit an academic alienation-goal oriented, also known as learned helplessness (Martin et al., 2001). Alternatively, a perception of high control is linked to a mastery-goal orientation (Harter & Connell, 1984). When students feel they can influence outcomes, they are free to believe that their efforts will be validated, thus encouraging student persistence, effort, and achievement (Harter & Connell, 1984).

Each of the three supporting theories—self-worth theory, self-efficacy theory, and control theory—present evidence that self-motivation and purposive action are cognitively determined
Theories of cognitively-generated motivation predicate that individuals are driven to exercise forethought, anticipate outcomes, set goals, and plan a course of action (Bandura, 1989). As such, constructs such as self-belief, failure avoidance, self-sabotage, and persistence have a direct influence on an individual’s motivation, or for the purposes of this study, their goal orientation.

Martin (2002) developed a model to efficiently categorize the influencers identified in the theories above as either motivation boosters or motivation guzzlers (Figure 1). Motivation boosters are the factors that enhance motivation and academic resilience while motivation guzzlers are those that reduce motivation and academic resilience and can include thoughts, feelings, and behaviors (Martin, 2002). Martin (2002), clarified the boosters and guzzlers as:

![Motivation Boosters and Guzzlers Diagram](image-url)
Booster thoughts are measured through self-belief, learning focus, and value of schooling; booster behaviors are measured through persistence, planning and monitoring, and study management; guzzler thoughts/feelings are measured through anxiety and low control; and guzzler behaviors are measured through failure avoidance and self-sabotage (p.40).

Through this visual model, we can clearly identify how constructs identified in the various theoretical perspectives (e.g. learning focus, self-sabotage, failure avoidance) increase or reduce student motivation. For many students, motivation boosters are the key to academic resilience, and thus a focal point of this study.

**Significance of the Study**

Despite the increased interest in medical education, very little research exists regarding the influence of non-academic indicators, such as an individual’s goal orientation, on the academic performance of pre-medical students (Lin et al., 2013). The results of this study will remedy a deficiency in research as, to the best of the researcher’s knowledge, this is only the second study addressing the goal orientation of pre-medical students and could serve as a foundation for future research.

This study will help administrators understand the relationship between student goal orientation, a type of motivation, and a significant admissions factor: GPA. Even though research has shown the limited ability of past academic performance to predict successful outcomes in medical school (Kreiter & Axelson, 2013), undergraduate GPA is still considered one of the most important factors in the medical school admissions process (AAMC, 2018d; Dunleavy et al., 2011; Kreiter & Kreiter, 2007; Monroe et al., 2013). Early identification of a student’s goal orientation would allow institutions to provide targeted outreach to students who
may need academic assistance or interventions to improve strength of resilience. Additionally, having a more cohesive understanding of the relationship of goal orientation and academic performance may encourage administrators to design institutional resources and programs to help build students skills and encourage strong performance.

Furthermore, this study will provide additional insight into the goal orientations of incoming students and how these predispositions influence student motivation. More specifically, this research may increase our understanding of goal orientation, and thus motivation, as an indicator of self-directed lifelong learning, a trait highly suggested for future healthcare professionals (Pintrich, 1999).

Research Design

The research design is a non-experimental, cross-sectional, relationship study. Premedical students at Florida Southern College (FSC) were asked to complete a portion of the Modified Archers Health Professions Motivation Survey (MAHPMS) in the fall of 2019. This 40 question Likert-type survey groups respondents into specific goal orientation categories by delineation of preference for a performance-goal orientation, mastery-goal orientation, or alienation-goal oriented. Performance-goal oriented students are driven by their desire to display competence in front of colleagues, friends, parents, and teachers, while mastery-goal oriented students are driven to master material. While both performance-goal oriented students and mastery-goal oriented students tend to be high achieving, their catalysts are very different. Additionally, mastery-goal oriented students are less interested in the final grade, so long as their ultimate learning objective was reached, while performance-goal oriented students will avoid any instances of perceived inability, even going so far as to self-sabotage rather than to try and risk failure. Alienation-goal oriented students, on the other hand, believe their strengths to be outside
of the classroom or are uninterested in achieving or mastering any academic material whatsoever (Archer, 1994).

Students were selected to participate based on their adherence to specific criteria during the fall 2019 semester including: enrollment in fourteen to sixteen credit hours, enrollment in at least eight credits of science coursework (biology, chemistry, physics, and math), and having self-identified as being a pre-health student. The Health Professions & STEM Career Development Center at FSC maintains a database of all pre-health students, from which this sample was drawn.

The instrument was administered via online survey by the researcher to students identified through the convenience sample. Students were invited by email and through on-campus poster recruitment. To ensure autonomy, all participants were given the option to voluntarily provide personally identifiable information with those who opted against completing this portion remaining anonymous. After the four week collection period, the researcher reviewed the survey results and delimited the data to only those who met the survey criteria at which point institutional data, including grade point average (GPA) and credit hours earned, were attributed to the sample.

This quasi-experiment attempted to measure whether there is a relationship between specific goal orientations (mastery, performance, alienation) and academic success, as measured by grade point average at the end of the academic year. To answer the posed research questions, descriptive statistical analyses of the demographic variables, \( t \)-tests, and Chi Square Test for Independence (Chi Square) were utilized.
Assumptions

Assumptions of the study include the following:

1. Undergraduate student motivation, specifically a pre-medical student’s motivation for medical school, can be sufficiently evaluated through goal orientation predispositions as outlined by Archer (1994).

2. Students responded to the Modified Archers Health Professions Motivation Survey (MAHPMS) survey truthfully and their answers honestly reflect their current motivation levels, as indicated by their goal orientation.

3. Students in this study have similar qualities and attributes to other pre-medical students across the United States and therefore represent an appropriate sample.

4. One semester of course work was sufficient to evaluate the relationship of motivation on academic performance.

5. Grade point average is an appropriate measure of academic performance.

6. Academic performance, as recognized by a student’s grade point average, is directly related to acceptance or denial to medical school.

7. Students in this study are not completely lacking in motivation.

Limitations

Limitations of the study include the following:

1. This sample only represents pre-medical students at one small, private undergraduate institution in the southeast United States and may not represent the entire pre-medical population nationwide.
2. Although efforts were taken to control for course rigor, pre-medical students do not abide by one set curriculum. Therefore, students in the sample inevitably had varying class schedules with various degrees of difficulty that may impact their grade point average.

3. External factors can have a large influence on a student’s grade point average. For example, pre-medical students who work more than 20 hours a week may find it difficult to invest the necessary time to succeed in their academic courses. External influences were not controlled or assessed in this study.

4. The timeframe of the study may present a limitation for some subsections of the larger population. For students in their first year of college, academic performance problems might not yet be evident.

5. Attrition rates within the pre-medical cohort resulted in skewed sample sizes. There was a higher proportion of freshman pre-medical students than there was senior pre-medical students. These variations in sample sizes impact the statistical analyses when evaluating the relationship between classifications of pre-medical students.

6. Many students pursuing graduate and professional school are highly competitive, and thus may exhibit response bias when responding to questions. Competitive participants may attempt to showcase themselves in a strong light leading them to respond with the answer they believe to be ‘best’, rather than what is most accurate.

**Delimitations**

Delimitations of the study include the following:

1. Only pre-medical students are included in the study. Undergraduate students pursuing other health profession programs, such as dentistry or veterinary medicine, are excluded.
2. Only pre-medical students who enroll in a full-time load, considered twelve or more credits, with at least seven of those credits coming from biology, chemistry, physics, or math courses, are included in the study. As GPA is being evaluated, students who did not take the specified course load are excluded to control for semester rigor.

3. Only students who self-identify as pre-medical are included. It is possible that a student does not report their intention of applying to medical school to the Health Professions & STEM Career Development Center, and therefore, is not included in the sample.

4. The study examined student answers at one specific point in time. Although it is common for college students to change their career intent throughout their undergraduate journey, this study will include all students who indicated that they were pre-medical at the time the survey was administered.

**Definition of Terms**

The following terms have been clarified to assist the reader:

**Achievement goal orientation.** A student’s preference towards one of three potential goal orientations: mastery-goal orientation, performance-goal orientation, alienation-goal oriented (Archer, 1994).

**Academic performance.** A student’s performance in their college courses, generally evaluated by their grade point average and/or written evaluations.

**Alienation-goal orientation.** Students with a preference for an alienation-goal orientation have no desire to develop or demonstrate competence. These students desire to complete tasks with minimum effort. Also referred to as work-avoidant, failure accepting, or learned helplessness (Archer, 1994).
**Applicant.** An individual who is applying for something. For purposes of this study, the applicants are undergraduate students applying to medical school, traditionally in their junior or senior year of a bachelor’s degree program.

**Attrition rate.** The rate at which students leave an institution.

**Freshman.** A student who has completed between 0 and 29 college credits.

**Goal orientation.** Refers to an individual’s level of motivation, or lack thereof, to achieve certain goals (Dweck, 1986). For this study, goal orientation will specifically refer to academic goals set within a formalized academic setting.

**Grade point average (GPA).** The average of all grades received, weighted to reflect the number of credits, for courses completed at an institution.

**Junior.** A student who has completed between 60 and 89 college credits.

**Mastery-goal orientation.** Students with a mastery-goal orientation wish to develop competence or increase understanding. These students are less interested in outward expressions of competence (such as grades) so long as eventual mastery is obtained. These students are also referred to as success oriented, achievement oriented, and learning focused/learning oriented (Archer, 1994).

**Matriculate.** To begin classes in a specific academic program.

**Matriculant.** A student who enrolls and begins classes in an academic program.

**Performance-goal orientation.** Students with a performance-goal orientation are driven to demonstrate their competence. As such, these students may also avoid challenging tasks or anything that will lead to shame or embarrassment. These students are also referred to as failure avoidant and ability focused (Archer, 1994).
**Pre-medical student.** A student who aspires to attend medical school following completion of his/her undergraduate/Bachelor’s degree.

**Pre-medical coursework/prerequisite coursework.** Specific undergraduate courses that must be completed to meet admissions requirements. For this report, prerequisite coursework or pre-medical coursework refers to the courses that must be completed prior to enrolling in medical school. These courses generally evaluated by admissions committees to evaluate competitiveness for admission.

**Senior.** A student who has completed 90 or more college credits.

**Sophomore.** A student who has completed between 30 and 59 college credits.

**Organization of Remaining Chapters**

Chapter Two provides a review of the relevant literature concerning the pre-medical experiences, admission to U.S. medical schools, and factors influencing student success. Specifically, this chapter explores the influence of motivation, goal orientation, and GPA. Chapter Two also overviews programs and interventions to help students who are at-risk. Chapter Three discusses the survey methods including participants, variables, and instrumentation.
CHAPTER TWO

LITERATURE REVIEW

To provide context to the reader, this literature review begins with an overview of the current pre-medical experience and medical school admissions practices in the United States. Next, the author introduces relevant theories of motivation and their influence on academic resilience, including a review of the current research studies on motivation and academic performance for undergraduates and students within a health profession program. A breakdown of the search strategy used to identify the texts used in the literature review is also included.

Search Strategy

EBSCO Information Services was initially used to identify articles in databases relevant to education and social science research. The databases most utilized in the search included: ERIC, JSTOR, PubMed, Academic Search Premier, PsycINFO, and ScienceDirect. A search was run using appropriate combinations of the keywords related to pre-medical education, student motivation, and academic success. A list of search terms can be found in Appendix A. No limits were placed on the date, article type, or country in which the text was published. However, due to language limitations on behalf of the researcher, only articles written or already translated into English were considered. Articles were discarded if they were not published in a book or a peer-reviewed journal.

Information on the U.S. pre-medical experience and medical school admissions practices was gathered from the Association of American Medical Colleges (AAMC) website or printed materials. The AAMC is a not-for-profit association representing all 154 accredited U.S. and 17
accredited Canadian medical schools (AAMC, 2019). A wealth of helpful resources, research findings, and workforce and educational data are provided by the AAMC as open-access content.

**The Pre-Medical Student in the United States**

Unlike students in many other countries, students in the United States must first complete a bachelor’s degree before matriculating to medical school (AAMC, 2018c). These undergraduate students, pursuing both a bachelor’s degree and acceptance to medical school, are commonly referred to as pre-medical students.

A critical review of the research on pre-medical students between the mid-1980s to 2010 by Lin et al. (2013) included multiple studies on personality types and traits. From their analysis of the research, Lin et al. (2013) concluded that pre-medical students are competitive, but not cutthroat, value taking a diverse range of courses, cooperate well with others, and are interested in mastering material. It is worth noting, and was similarly referenced by Lin et al. (2013), that a scarcity of research exists on the pre-medical cohort. Additional and more recent studies are necessary to build a deeper understanding of the traits of pre-medical students.

**The Pre-Medical Experience in the United States**

Although there is no standard pathway into medical school, pre-medical students must balance a multitude of curricular requirements and extra-curricular expectations. For example, competitive pre-medical students typically complete rigorous academic semesters while striving to obtain a strong grade point average (GPA). They must score well on the Medical College Admissions Test (MCAT) while also highlighting high levels of emotional intelligence, maturity, service orientation and leadership. Finally, they should show a commitment to the healthcare profession through extracurricular activities while balancing the above requirements against competing social and personal responsibilities (AAMC, 2018c).
Many have argued that the entire pre-medical experience, both the academic (Dunleavy et al., 2013; Forester, McWhorter, & Cole, 2002; Kreiter & Kreiter, 2007; Lin et al., 2013) and “hidden curriculum” (Gross, Mommaerts, Earl & De Vries, 2008), not only affect admission to medical school, but have a direct influence on the medical school years and beyond. A few studies have even identified a correlation between the pre-medical years and the future character and well-being of a physician (Fang et al., 2013; Gross et al., 2008). To better understand the factors influencing admission to medical school and the development of the U.S. physician, this section of the literature review provides an in-depth look at the influential pre-medical experience.

**Pre-medical majors & prerequisite courses.** The undergraduate curriculum for pre-medical students varies as medical schools do not require a specific major (AAMC, 2018c). However, many medical schools require specific prerequisite coursework, which tend to consist largely of natural science courses. Most medical schools require between fifty to sixty credits of specific prerequisites, while the average academic major requires approximately one hundred and twenty credits (AAMC, 2018c). Due to the efficient overlap between the requirements for both graduation and admission to medical school, the most popular academic majors are those in the natural sciences, with over 50% of all applicants stemming from biological science majors in 2018 (AAMC, 2018b). Additionally, many pre-medical students will major in a science field due to their affinity for science coursework.

However, an increasing number of students are completing the required medical school prerequisites while pursuing a non-science degree program (AAMC, 2018b). Some argue that students majoring in degree fields outside of the natural sciences may be more competitive than their peers by showing both a diversity of interests and the ability to effectively balance science
Influence of the changing U.S. healthcare system on the medical school experience.
The U.S. healthcare system and the population it serves are continuing to change at a rapid pace. The current landscape includes a new and different mix of patients who are older, more diverse, requiring expanded insurance coverage, and who have more complicated medical problems (Pershing & Fuchs, 2013; Schwartzstein, Rosenfeld, Hilborn, Oyewole & Mitchell, 2013). More than ever, social and behavioral factors play a crucial role in health and illness (Cuff & Vanselow, 2004; Kaplan, Satterfield & Kinton, 2012). For example, most preventable diseases in the United States, such as lung cancer, heart disease and stroke, are linked to social and behavioral factors such as smoking, alcoholism and obesity (Cuff & Vanselow, 2004). Physicians today are required to not only prescribe medications but to also understand the effect of culture on a patient’s probability of adhering to their medication (Kaplan et al., 2012).

In order to compensate for the changes in healthcare delivery and the changing needs of our population, advocates have argued that the medical school curriculum adapt to our evolving healthcare system (Pershing & Fuchs, 2013). To meet these aims, may medical schools have implemented a social and behavioral science-heavy curriculum emphasizing the following competencies into the UME: 1) prepare students to work collaboratively in teams, 2) help

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1 Undergraduate medical education (UME) constitutes the first four years of medical school education and is not to be confused with a student’s undergraduate bachelor’s degree coursework, which is also typically four years in length, but is commonly referred to as the “pre-medical” period.
students understand the link between medical care and population health, 3) utilize multiple mediums to provide care and 4) communicate effectively with patients in an open yet culturally sensitive manner (Pershing & Fuchs, 2013).

Influence of the changing U.S. healthcare system on the pre-medical experience.

Changes to the medical school curriculum have trickled down to the pre-medical student experience (Emanuel, 2006; Gunderman & Kanter, 2008). As the first step in the medical school journey, the curriculum for pre-meds is directly influenced by external factors such as the changing healthcare environment and modifications to the curriculum during the first four years of medical school. Many scholars agree that the new emphasis on health and human behavior coursework within the medical school curriculum necessitates prior exposure during the undergraduate years (Association of American Medical Colleges and the Howard Hughes Medical Institute, 2009; Kaplan et al., 2012; Schwartzstein et al., 2013). As exemplified by Kaplan et al. (2012), “Teaching cognitive-behavioral intervention to [Medical School] students without a background in learning theory is analogous to teaching pathophysiology to students who have not been exposed to basic biologic principles” (p. 1267). In reaction, most medical schools now require multiple introductory to advanced level psychology and sociology courses, as well as varied coursework in the humanities, as prerequisites.

Changes to the Medical College Admissions Test (MCAT). The need for physicians competent in human and social aspects of medicine and scientific inquiry, in addition to natural science proficiency, also prompted a major revision to the MCAT, the first of its kind in 23 years (Kaplan et al., 2012; Kroopnick, 2013; Schwartzstein et al., 2013). When assessing whether students are academically prepared for the rigor and content of medical school, the MCAT is the preferred indicator by admissions committees (Elam, et al., 2002; Donnon, Paolucci, & Violato,
As most medical schools require the MCAT examination for admission, the MCAT was quickly recognized as a tool to screen for basic behavioral and social science knowledge. In 2015, the MCAT was revised to include two new sections: *Psychological, Social, and Biological Foundations of Behavior* and *Critical Analysis and Reasoning Skills* (Kroopnick, 2013; Schwartzstein et al., 2013). The exam’s new, broader focus provides another avenue for medical school admissions committees to identify future professionals who can think critically, reason, empathize and understand the needs of our society (Kaplan et al., 2012; Schwartzstein et al., 2013).

**Changes to the pre-medical coursework.** Like the changes made to the medical school curriculum, many scholars believe that the pre-med coursework should emphasize competencies rather than courses (AAMC, 2015; Association of American Medical Colleges and the Howard Hughes Medical Institute, 2009; Emanuel, 2006; Gunderman & Kanter, 2008; Koenig et al., 2013). Foundational publications recommended personal competencies and an extensive listing of expectations be adopted as standard for entering medical students (Koenig et al., 2013; AAMC, 2011). Using the reports from these and other committees and advisory panels, most of which are included in this literature review, the AAMC (2015) developed a list of 15 core competencies for entering medical students (known as the *AAMC Core Competencies for Entering Medical School Students*) including various interpersonal, intrapersonal, thinking and reasoning, and science competencies. Appropriately, these core competencies align with competencies created for graduating medical school students and should also help students to work collaboratively in teams, recognize the link between medical care and population health, and communicate effectively with patients in an open yet culturally sensitive manner (Institute of Medicine, 2001; Pershing & Fuchs, 2013; Schwartzstein et al., 2013).
Medical School Admission Practices: Their Impact on Medical School & Clinical Success

As competitions for enrollment increases, medical schools are under increased pressure to select the “best” candidates (Kreiter & Axelson, 2013; Patterson et al., 2016). It is therefore not surprising that over the last 30 years, a large body of research has emerged on medical school selection methods including the MCAT, academic records, extracurricular activities, personal statements, letters of recommendation, and interviews (Kreiter & Axelson, 2013; Patterson et al., 2016). Medical schools, policy makers, and scholars have debated which academic experiences, co-curricular opportunities, and intrinsic values will ultimately shape the best healthcare provider (Lin et al., 2013). As a result, a myriad of studies have evaluated the reliability of academic and non-academic attributes to predict success and satisfaction in medical school and board examinations, and into medical practice (Kreiter & Axelson, 2013; Patterson et al., 2016). Interestingly, even with these studies, research suggests that little changes have been made to admissions practices over the last three decades (Kreiter & Axelson, 2013; Monroe et al., 2013). A summary of the current admissions practices are included below to provide a context into the barriers, nuances, and realities facing today’s pre-medical students. Additionally, this section of the literature review outlines available, current research on the predictive validity for each admissions factor.

Medical College Admissions Test (MCAT). The MCAT is a quantitative metric used by admissions committees to identify students who are academically prepared for medical school. Currently, the MCAT is a high-stakes, seven and half hour exam required for admission to virtually all U.S. medical schools (AAMC, 2018c, 2018d). According to a 2015 AAMC survey of admissions officers, the MCAT exam and GPA remain the most important academic
metrics when determining medical school admission (AAMC, 2018d). Studies by researchers confirm the influence of MCAT exam scores on admissions decisions (Dunleavy et al., 2011; Elam et al., 2002; Monroe et al., 2013).

Following a redesign in 2015, the MCAT exam now covers four foundational concepts and seven skills, outlined in Table 1 (AAMC, 2018d). Prior to 2015, the MCAT exam focused entirely on concepts in biology, chemistry, and physics (Schwartzstein et al., 2013). The redesigned exam kept a strong focus on the natural sciences in two sections (biological & biochemical foundations of living systems and chemical & physical foundations of biological systems) while incorporating a monumental shift - half of the exam - towards the humanities and social sciences (Schwartzstein, et al., 2013).

<table>
<thead>
<tr>
<th>Foundational Concepts</th>
<th>Skills</th>
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<tbody>
<tr>
<td>1) Biological &amp; biochemical foundations of living systems</td>
<td>1) Knowledge of scientific concepts and principles</td>
</tr>
<tr>
<td>2) Chemical &amp; physical foundations of biological systems</td>
<td>2) Scientific reasoning and problem solving</td>
</tr>
<tr>
<td>3) Psychological, social, and biological foundations of behavior</td>
<td>3) Reasoning about the design and execution of research</td>
</tr>
<tr>
<td>4) Critical analysis and reasoning skills</td>
<td>4) Data-based and statistical reasoning</td>
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<td></td>
<td>5) Foundations of comprehension</td>
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<td></td>
<td>6) Reasoning within the text</td>
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<td></td>
<td>7) Reasoning beyond the text</td>
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Table 1. Foundational concepts and skills on the MCAT (AAMC, 2018d)

The AAMC (2018d) states, “the MCAT exam tests the foundational concepts and reasoning skills needed to be ready for today’s medical school” (pg. 1). However, a consensus on the predictive validity of the MCAT in medical student selection and success in medical school has not been reached among researchers (Donnon et al., 2007; Kreiter & Axelson, 2013; Patterson et al., 2016). Over the last two decades, multiple studies have indicated that the MCAT either alone or in combination with GPA is a strong predictor of academic performance.
in medical school and on licensing examinations (Callahan, Hojat, Veloski, Erdmann, & Gonnella, 2010; Dunleavy et al., 2013; Gauer, Wolff & Jackson, 2016; Kreiter & Kreiter, 2007) while other research found that the MCAT score was an inconsistent or weak predictor of success in medical school (Bills, VanHouten, Grundy, Chalkley, & Dermody, 2016; Evans & Wen, 2007; Saguil et al., 2015). However, limited studies are available on the validity of the new MCAT exam (AAMC, 2018d). Further research is needed to better understand the validity of the MCAT following the changes made in 2015.

**Academic records and pre-medical courses.** Although each U.S. medical school dictates its own, individual admissions requirements, most programs require common science prerequisite courses (AAMC, 2018c). At a minimum, most applicants need to complete one year in each of the following subjects prior to matriculation: biology, physics, and English as well as two years of chemistry through organic chemistry (AAMC, 2018c). Following the revision to the MCAT exam in 2015, most applicants are also encouraged to take courses in psychology, sociology, and biochemistry before taking the MCAT, and subsequently before applying to medical school (AAMC, 2018c).

A cornerstone of the American higher education model, grades have long been used to evaluate student performance, and for medical school admission committees, undergraduate GPA continues to hold substantial weight (AAMC, 2018d; Dunleavy et al., 2011; Kreiter & Kreiter, 2007). A few studies found that GPA was less useful in the final decision process, but was highly considered when selecting individuals to complete secondary applications and determining who to invite to an interview (Monroe et al., 2013; Dunleavy et al., 2011).

Although the influence of undergraduate GPA on admissions decisions is high, the research on the ability of GPA to predict success in medical school is mixed. One explanation is
the high variability within grading practices between institutions and among disciplines (Jones & Adams, 1983; Sarnacki, 1982). The lack of an internally consistent GPA has led to a variety of findings, with many studies only finding validity within specific aspects of a student’s undergraduate GPA and/or specific areas of future performance. For example, a few studies found that undergraduate GPA is associated with academic performance in medical school, but only in the pre-clinical years (Dunleavy et al., 2013; Salvatori, 2001; Reede, 1999).

Contradicting these findings is research by Murden et al. (1978), which found a small but significant relationship between undergraduate GPA and clinical year success while Veloski, Callahan, Xu, Hojat, & Nash (2000) found a relationship between specifically non-science GPA and clinical year performance. Similar studies found a relationship specifically between medical school grades and a student’s undergraduate science GPA, including all courses in biology, chemistry, physics, and math subjects (Forester, McWhorter, & Cole, 2002; Veloski et al., 2000).

Unfortunately, there is a pronounced lack of current research, within the last 10 years, on the academic performance of pre-medical students.

**Extracurricular activities and competencies.** Unlike historical enrollment trends, a strong GPA and MCAT score alone is no longer sufficient to obtain medical school acceptance in most situations (AAMC, 2018a; Dunleavy et al., 2011). Future healthcare professions are expected to exude self-awareness, exemplary communication and relationship building skills and have a health understanding of the social context affecting their patients (AAMC, 2011; Cuff & Vanselow, 2004; Kaplan et al., 2012; Koenig et al., 2013). Many of these personal characteristics, such as motivation, empathy, maturity, leadership ability, and integrity, correlate better to success in medical school and as a physician than to scores on the MCAT exam (Ferguson, James, & Madeley, 2002; Meridith, Dunlap & Baker, 1982).
To outline the desired qualities and skills more clearly, the AAMC (2015) developed the *Core Competencies for Entering Medical Students*. The *AAMC Core Competencies for Entering Medical Students* (2015) include service orientation, social skills, cultural competence, teamwork, oral communication, ethical responsibility to self and others, reliability and dependability, resilience and adaptability, capacity for improvement, critical thinking, quantitative reasoning, scientific inquiry, written communication, knowledge of living systems, and knowledge of human behavior. Pre-medical students are encouraged to participate in a variety of extracurricular activities, both within healthcare environments and outside of the clinical setting, to exemplify these competencies within their application (AAMC, 2018c).

*Healthcare experiences.* Quality healthcare experiences provide an opportunity for applicants to display empathy, service orientation, ethical responsibility to self and others, an awareness of what a career as a practicing physician (AAMC, 2019b). Traditionally, healthcare experiences take the form of clinical volunteering, shadowing a physician, or employment within a healthcare facility (AAMC, 2018c). Each of these experiences provide valuable insight into the practice of medicine, day-to-day responsibilities of a health care provider, and the patient perspective (AAMC, 2018c).

Volunteering in a clinical setting provides healthcare exposure while allowing a student to show a commitment to the profession (AAMC, 2019a). As a clinical volunteer, students may be asked to take part in basic activities such as transporting patients or materials, reading to children waiting for procedures, providing comfort and support to hospice patients and families, or greeting new arrivals to a clinic (AAMC, 2019a). Although this experience is unpaid, students volunteering in healthcare facilities have the opportunity to observe numerous healthcare professionals and the inner workings of a hospital or clinic (AAMC, 2019a).
Shadowing is another unpaid, educational exploration where students observe a practitioner in their professional environment (AAMC, 2019c). When shadowing, students follow the physician during their appointments, or rounds, but do not have set responsibilities (AAMC, 2019c). Students are encouraged to ask questions and take notes while reflecting on the experience to determine if that position would be a good career fit (AAMC, 2019c).

Students willing to obtain an entry-level certifications, such as Certified Nursing Assistant (CNA) or Emergency Medical Technician (EMT), may find paid employment opportunities in healthcare (AAMC, 2019b). Although paid clinical employment was ranked by admissions officers as slightly less important in the admissions decision-making process than clinical volunteer and physician shadowing, these experiences are still extremely valuable (AAMC, 2018d). Paid employment in healthcare provides an in-depth look at the healthcare system, exposure to healthcare needs within a community, and hands-on experiences with patients (AAMC, 2019b). However, obtaining healthcare experience through part-time employment is less common for full-time undergraduate students, due to the challenge of balancing the responsibilities of a job against a rigorous academic program.

*Experiences outside of healthcare.* Non-clinical experiences also provide an opportunity for students to exemplify the *AAMC Core Competencies for Entering Medical Students* (2015). A 2015 survey of medical school admissions committees found that outside of healthcare, community service and leadership experiences were the most important factors in determining acceptance (AAMC, 2018d). Next most important were research or lab experience and military service (AAMC, 2018d). The least important non-clinical experiences included serving as a tutor or teaching assistant, intercollegiate athletics, conference presentations, publications, non-medical employment, and honors and awards (AAMC, 2018d).
**Personal statements.** The personal statement, also known as the personal essay, provides an opportunity for applicants to describe how their experiences, motivations, and attributes make them an ideal candidate for medical school and a career in medicine (AAMC, 2018c). When applying to medical school in the United States, applicants submit their materials through a centralized application portal (AAMC, 2018c). As of 2019, there were three application portals for U.S. medical schools: the American Medical College Application Service (AMCAS) for all MD programs outside of Texas, the American Association of Colleges of Osteopathic Medicine Application Services (AACOMAS) representing all DO schools outside of Texas, and the Texas Medical & Dental Schools Application Service (TMDSAS) hosting all schools in the state of Texas. Each portal asks students to fill out or upload their academic coursework, demographic information, and a single personal statement. Each portal has a specific character limit for the personal statement (AAMC, 2018c). The AMCAS allows 5,300 characters, the TMDSAS is limited to 5,000 characters, and the AACOMAS has the smallest character limit at a maximum of 4,500 characters. Applicants can send their completed application packet electronically to the schools of their choice, although it will cost them incrementally per school to submit (AACM, 2018c).

There is limited evidence on the usefulness and validity of the personal statement (Albanese, Snow, Skochelak, Huggett & Farrell, 2003; Kreiter & Axelson, 2013; Patterson et al., 2016). Furthermore, the free-form nature allows for a high degree of variability between individual statements making it hard to evaluate one applicant’s self-reported personal characteristics against another applicant’s.

**Letters of recommendation.** Like the personal statement, letters of recommendation are a medical school applicant requirement with a limited predictive validity (Salvatori, 2001; Siu &
Reiter, 2009). Variations in letter quality, length, format, and writer credentials make interpretation of the letters challenging (Albanese et al., 2003; Kreiter & Axelson, 2013). What may be interpreted as a strong letter by one individual could come across as mediocre to another reviewer. Compounding the effectiveness of letters of recommendation is the risk of fraudulent letters, a common occurrence (Albanese et al., 2003). Even still, letters of recommendation are required by all U.S. medical schools and are widely valued as an important aspect by admissions committees when evaluating candidates (Geiger & Dunleavy, 2013).

**Interviews.** With rare exception, all U.S. medical schools require an interview as part of their admissions process. The interview provides an opportunity for admissions committees to assess nonacademic information that would otherwise be impossible or difficult to obtain (Edwards, Johnson, & Molidor, 1990; Monroe et al., 2013). With the current emphasis on selecting students in alignment with the AAMC Core Competencies for Entering Medical Students (2015), the interview is seen as one of the most useful tools to evaluate personal characteristics (Albanese et al., 2003; Monroe et al., 2013). For more than forty years, the evaluation of compelling personal characteristics such as maturity, honesty, motivation for pursuing medicine, commitment to serving others, leadership ability, friendliness, communication skills, and other non-cognitive, non-teachable traits have directly influenced the interview ranking, and ultimately admission to medical school (Collins, White, Petrie, & Willoughby, 1995; Murden et al., 1978; Nowacek, Bailey, & Sturgill, 1996; Shaw, Martz, Lancaster, & Sade, 1995).

However, without a standardized interview system or rubric, there is a lack of consistency in interview methods, assessment, and type (Patterson et al., 2016). Interviews may be structured or unstructured, blind (interviewers do not have access to the applicant’s file) or
open-file (interviewers have access to the application materials prior to the interview), one-on-one or in front of a panel (Patterson et al., 2016). One study by Taylor (1990) indicated that as many as 87 unique characteristics are evaluated across different medical schools.

Multiple articles and studies have confirmed the weight of the interview ranking on the final admissions decision (AAMC, 2018d; Dunleavey et al., 2011; Monroe et al., 2013; Murden et al., 1978; Nowacek et al., 1996; Puyear & Lewis, 1981). Research by Dunleavey et al. (2011) and Monroe et al. (2013) indicates that the interview and letters of recommendation are the most important factors considered by admissions committees in deciding who to accept. However, there are limited studies supporting the interview as a reliable means for predicting performance in medical school (Elam, Studts, & Johnson, 1997; Meridith, Dunlap & Baker, 1982). Many more studies provide evidence that an applicant’s interview ranking is actually a poor predictor of future performance (Basco, Gilbert, Chessman, & Blue, 2000; Basco, Lancaster, Gilbert, Carey & Blue, 2008; Salvatori, 2001) and lacks predictive validity (Benbassat & Baumal, 2007; Kreiter, Yin, Solow & Brennan, 2004; Streyffeler, Altmaier, Kuperman & Patrick, 2005). Critics argue that the traditional interview should not be an influential factor in the admissions process and that alternative methods, such as the multiple mini interview (MMI) should be further explored (Kreiter & Axelson, 2013).

**Motivation & Goal Orientation**

In North American psychology, scholarly research in the field of motivation is relatively new. When the topic of studying motivation was introduced in the 1950s and 1960s, many scholars argued that motivation lay outside of the customary areas of study for a field dominated by traditional behaviorists (Locke & Latham, 2002). Therefore, it wasn’t until 1970, with the
research of Thomas Ryan, that the trend of studying the causes of human actions became popular (Martin, 2002).

Below the researcher outlines a brief history of the theories of motivation beginning with Atkinson’s need achievement theory (1957). Closely related to need achievement theory are theories of achievement motivation (Ames & Archer, 1988; Dweck, 1986; Dweck & Leggett, 1988; Elliott & Dweck, 1988) which form the basis for Archer’s (1994) achievement goal theory that guides this study. Rooted in social cognitive theory, these theories of motivation are largely influenced by personal, behavioral, and environmental influences (Bandura, 1986).

**Foundational theories of motivation.** In the 1950s, John Atkinson’s theory of need achievement (1957) proposed that behavior is governed by one of two motives: experiencing success or avoiding failure. Atkinson (1957) believed that human nature encourages us to avoid the humiliation and shame we feel when we fail and to seek pride in our accomplishments when we succeed. This emotional anticipation is said to be the driving force behind our actions (Atkinson, 1957). Covington (1992) clarified this theory further with the following examples,

> Persons with a high need to achieve anticipate pride, a feeling that propels them toward further successes. On the other hand, persons with low need achievement anticipate shame (caused by failure) and attempt to avoid its noxious effects by withdrawing or not trying (p. 28).

Following initial work by Atkinson (1957), researchers began to study alternative conceptualizations of achievement motivation including the self-worth approach (Covington & Beery, 1976) and the achievement goal approach (Dweck, 1986). Historically, the achievement goal approach has been most clearly studied in relationship to educational attainment, beginning with research by Covington & Omelich (1984), Nichols et al. (1985), and Dweck (1986).
Achievement goal theory contends that students can be characterized by three typologies: success oriented (also labeled as task mastery-goal oriented or learning focused/learning oriented), failure avoidant (also labeled as ego/social goal oriented or ability focused), or failure accepting (also sometimes labeled as learned helplessness or work avoidant goal oriented) (Ames, 1984; Covington & Beery, 1976; Covington & Omelich, 1984; Dweck, 1986; Nicholls et al., 1985). Although different theorists have used different labels for the goal types, the various frameworks are exceedingly similar.

Success/learning oriented students are driven to master material and are generally both optimistic and hold a positive orientation towards their studies (Ames & Archer, 1988; Dweck, 1986; Dweck & Leggett, 1988). When confronted with setbacks, success oriented students respond with energy and a drive to tackle the problem (Covington & Omelich, 1991; Dweck & Leggett; 1988; Elliott & Dweck, 1986). Dweck & Leggett (1988) observed overwhelmingly positive personal prognosis from success oriented students who responded to problems with such sentiments as, “I did it before, [therefore] I can do it again.”

Failure avoidant students are consumed by the desire to conceal any perceived lack of ability. These students are motivated by a fear of failure and their self-esteem is tied to how others perceive their abilities (Ames, 1984; Ames & Archer, 1988; Covington & Beery, 1976; Covington & Omelich, 1991; Elliott & Dweck, 1988; Martin et al., 2001). Failure avoidant students seek out opportunities to display their performance and may work hard to do so, although opportunities to achieve with little effort are preferred. Alternatively, failure avoidant students are easily derailed by setbacks or situations that challenge their ability to display high performance. Due to increased self-doubt, failure avoidant students may quit or display self-
sabotage rather than allow their true efforts to display poor performance (Covington & Omelich, 1991; Elliott & Dweck, 1988; Martin et al., 2001).

The main concern for failure accepting/work avoidant students is getting through their coursework with the minimum amount of effort (Covington & Omelich, 1985; Covington, 1992; Martin et al., 2001; Meece et al., 1988; Nicholls et al., 1985). Although failure avoidant students may, at times, also exhibit little apparent effort, they should not be confused with failure accepting students. For failure avoidant students, the ultimate goal is still to demonstrate competence (Covington & Omelich, 1991; Elliott & Dweck, 1988). On the other hand, failure accepting students are uninterested in how their competence is perceived and will continually display minimum effort within an education setting as they believe their self-worth is realized is outside of the classroom (Nicholls et al., 1985).

Archers Achievement Goal Theory. Evolving from the tenants of achievement motivation theory, Archer’s achievement goal theory (1994) stems from the last 60 years of research on motivation and goal setting. Archer’s achievement goal theory (1994) both guides this study and provided the basis for the survey instrument.

Ames (1992) described goals as a way to define “an integrated pattern of beliefs, attributions, and affect that produces the intentions of behavior…represented by different ways of approaching, engaging in, and responding to achievement-type activities” (p. 261). Research by Latham & Lock (1983) and Ames (1992) highlighted the influence of goal setting on our behavior, approaches, and mindset with a direct correlation to our motivational process. Elliot (1999) believed a student’s goals and reasons for engaging in learning activities can influence effort, value of the learning activity, strategies for learning, persistence, and academic outcomes. Using the previously discussed theories of motivation and goal setting, Archer’s (1994)
Achievement goal theory provides a framework for understanding the importance of goal setting on our achievements, or lack thereof.

Drawing directly from the foundational achievement goal theories of Covington & Omelich (1984), Nichols et al. (1985), Dweck (1986) and others, Archer’s achievement goal theory (1994) has three typologies: mastery-goal oriented, performance-goal oriented, and alienation-goal oriented which align with the previously described labels within achievement goal theory. Outlined in Table 2, Archer’s mastery-goal orientation aligns with the previous labels of success oriented, while Archer’s performance-goal orientation correlates to failure-avoidant and the work-avoidant orientation may also be known as failure-accepting.

Table 2. Goal orientation and labels in related theory

<table>
<thead>
<tr>
<th>Achievement Goal Theory (Archer, 1994)</th>
<th>Alternate Title in Related Research</th>
</tr>
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<tbody>
<tr>
<td>Goal Orientation #1: Mastery-Goal Oriented</td>
<td>Success Oriented (Covington &amp; Omelich, 1985)</td>
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<tr>
<td></td>
<td>Task Mastery Goal Orientation (Nicholls et al., 1985)</td>
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<td></td>
<td>Learning Focused/Learning Oriented (Dweck, 1986)</td>
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<tr>
<td>Goal Orientation #2: Performance-Goal Oriented</td>
<td>Failure Avoidant (Covington &amp; Beery, 1976)</td>
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<tr>
<td></td>
<td>Ego/ Social Goal Orientation (Nicholls et al., 1985)</td>
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<tr>
<td></td>
<td>Ability Focused (Ames, 1984)</td>
</tr>
<tr>
<td>Goal Orientation #3: Academic Alienation Oriented</td>
<td>Failure Accepting (Covington &amp; Omelich, 1985)</td>
</tr>
<tr>
<td></td>
<td>Learned Helplessness (Covington &amp; Omelich, 1985)</td>
</tr>
<tr>
<td></td>
<td>Work Avoidant Goal Orientation (Nicholls et al., 1985)</td>
</tr>
</tbody>
</table>

Based on the available literature, Archer’s goal orientations (mastery, performance, academic alienation) hold the same conceptions of success and effort outlined in previous research on success oriented, failure avoidant, and failure accepting students. Although there are no discernable differences between students who display a mastery-goal orientation (Archer, 1994) versus a success orientation (Covington & Omelich, 1984), Archer’s labels encourage a shift in thought requiring inclusion of goal attainment in our understanding of student
motivation. To this end, Archer’s research (1994) supports that goals are a useful way of conceptualizing the motivations of the university student.

**The Influence of Goal Orientation on Academic Performance and Resilience**

Meece et al (1988) stated that a student’s goal orientation is an “important determinant of behavioral, cognitive, and affective patterns in achievement situations” (p.514). Multiple research studies have confirmed a relationship between motivation, or achievement goals, and academic performance and resilience (Elliot, McGregor, Gable, 1999; Harackiewicz, Barron, Carter, Lehto, Elliot, 1997; Van Etten, Pressley, McInerney, Liem, 2008; Pintrich & De Groot, 1990; Yusuf, 2011). Research by Elliot & Dweck (1988) showed that mastery-goal oriented students tend to persist longer, are more likely to effectively use learning strategies to understand material, and exhibit a more positive outlook towards the task at hand. Performance-goal oriented students are motivated, but by a different catalyst: fear of failure. These students tend to be anxious that they are not “good enough” and are adversely affected by setbacks, seeing them as a confirmation of their inability (Covington & Omelich, 1991; Martin, 2002). Many performance-goal oriented students lack the resilience to persist through challenges, instead opting to quit or even sabotage their chances of success so they have an excuse if they do not do well (Covington & Omelich, 1991; Martin, 2002). For these students, intentional poor performance is better than putting forth full effort and possibility lacking ability (Covington, 1992). Students exhibiting the third goal orientation, alienation-goal oriented, lack both motivation and resilience (Martin & Marsh, 2003). These students tend to be disengaged from their studies and will cease to try at all, with detrimental implications to academic performance (Martin, 2002; Martin & Marsh, 2003).
Research has shown that students pursue different achievement goals depending on multiple factors including, but not limited to, the demands of the situation, their individual needs, or their self-efficacy (Meece et al., 1988; Zimmerman, Bandura, Martinez-Pons, 1992).

Self-Efficacy. Bandura (1997) defined self-efficacy as a personal judgement of one’s capabilities in attaining designated goals. Self-efficacy relates to an individual’s perception of their future performance capabilities, rather than their physical or psychological characteristics (Bandura, 1997). Multiple studies support the validity of self-efficacy as a predictor of motivation, achievement, and persistence (Chemers, Hu, & Garcia, 2001; Marsh, 1990; Salomon, 1984; Shell, Murphy & Bruning, 1989; Zimmerman, 2000; Zimmerman, Bandura, & Martinez-Pons, 1992). Students high in self-efficacy are able to identify alternative courses of action when faced with challenges and exhibit high levels of effort and persistence within the classroom (Bandura, 1997). On the other hand, students low in self-efficacy are more likely to believe situations are more challenging than they actually are dwell on their deficiencies (Bandura, 1997). Therefore, self-belief, or self-efficacy, is central to theories of motivation and resilience, particularly in the argument that high perceived ability results in a greater desire to perform, higher expenditure of effort, increased valuing of tasks, and an intrinsic belief in the ability to surmount challenges (Archer, 1994; Martin, 2002).

In relationship to goal orientation, a strong perceived ability (self-efficacy) has been argued to have a greater effect on performance-goal oriented students, rather than mastery-goal oriented students. As stated by Archer (1994), “When the goal is to demonstrate competence to others (or to hide incompetence), assessments of one’s relative ability is important.”
Goal Orientation and Lifelong Learning

Changes to the landscape of healthcare, such as the impact of technological advancements and the diversification of our population, require that today’s physician be well versed in social determinants of health and display an affinity for critical thinking and lifelong learning (AAMC, 2011; Pershing & Fuchs, 2013). These realizations have prompted a change to the current medical school curriculum and also to current medical school admissions practices. For example, to ensure students display the appropriate competencies and skills, the Association of American Medical Colleges (AAMC) released a new version of the Medical College Admissions Test (MCAT) in 2015 to evaluate newly required skills. One of the changes was the inclusion of the Critical Analysis and Reasoning Skills section, meant to emphasize the need for critical thinking life-long learners (Kaplan et al., 2012; Kroopnick, 2013; Schwartzstein et al., 2013). In an open letter to MCAT students by the President and CEO of the AAMC, Darrell Kirch (2012) explained the need for the changes by saying,

No longer is it humanly possible to memorize every fact relevant to the practice of medicine. What is more important for physicians of the future is an ability to think critically and to have the necessary reasoning skills to know where to seek answers and how to solve problems in the clinical environment (n.p.)

Motivation, as it relates to goal orientation, has been shown to influence self-regulated learning (Dweck, 1986; Garavalia, Scheuer, & Carroll, 2002; Garcia, McCann, Turner, & Roska, 1998; Garcia & Pintrich, 1994; Kim & Jang, 2015; Perrot, Deloney, Hastings, Savell, & Savidge, 2001). Dweck (1986) argued that “motivational processes have been shown to affect how well students deploy their existing skills and knowledge, how well they acquire new skills and knowledge, and how well they transfer these new skills and knowledge to new situations”
Archer (1994) specifically identified mastery-goal oriented students as exhibiting the skills, such as metacognitive learning strategies, required for life-long. Psychological theories surrounding the motivation to learn state that in order to succeed academically students must commit to a goal (intention) and have the willingness to invest effort towards the goal’s completion (volition) (Archer, 1994; Garcia et al., 1998; Perrot et al., 2001). Mastery-goal oriented students have identified themselves as having both the determination and volition to meet the goal, whereas performance-goal oriented students may lose commitment if they feel the goal is unattainable or if the effort required to obtain the goal will negatively represent their abilities to their teachers or peers. Alternatively, alienation-goal oriented students have no intention or willingness to make or meet an academic goal.

When faced with such demanding requirements, research suggests that pre-medical (and medical) students may begin to employ less effective, surface approaches to learning (Ward, 2011). Whereas deep learning approaches are correlated with academic success, surface learning approaches, such as rote memorization, are generally associated with poor learning outcomes (Marton & Säljö, 1976). Superficial learning strategies, such as rote memorization tactics are most often observed in students with a performance-goal orientation, as the emphasis is merely on displaying competence versus obtaining it (Meece et al., 1988). Alternatively, mastery-goal oriented students are more resilient in pursuit of learning and therefore more likely to continue to employ deep learning tactics. Within medical students specifically, research by Papinczak, Young, Groves, and Haynes (2008) found a significant link between high self-efficacy (typically displayed in students with a mastery-goal orientation) and deep learning approaches in first year medical students.
Studies by Covington & Beery (1976) and Covington & Omelich (1979, 1981) found that students experience greater shame when placed under high effort study conditions. Since performance-goal oriented students are driven by the need to display their aptitude, and will actively avoid humiliation, these individuals are at high risk in academically challenging situations. With the high academic rigor required of pre-medical students and within medical school, students with a performance-goal orientation, who are motivated by a fear of failure and an uncertainty about their abilities, may be at greater risk of attrition or self-sabotage in an attempt to avoid embarrassment (Martin, 2001).

These research findings suggest that a student’s goal orientation may influence his or her approach to learning and their aptitude for lifelong learning as both a pre-medical student and a medical school student. Specifically, these findings suggest that a mastery-goal oriented student, who has higher levels of self-efficacy and resilience, may be more likely to exhibit superior performance within a challenging pre-medical program or medical school. Additionally, these studies support the notion that students with a performance-goal orientation or alienation-goal oriented may require additional support to ensure sufficient academic performance.

Summary

This chapter provides a comprehensive overview of the existing literature that shapes this study. By outlining the current pre-medical experience and admissions practices to medical school in the United States, readers can better understand the magnitude of the pre-medical journey and consequences of student actions during this time. Pre-medical undergraduate students are subject to intense scrutiny and must find ways to succeed academically should they wish to matriculate to medical school. Although there is extensive research on motivation and goal orientation of medical students, research on the influence of these factors on the academic
resilience of pre-medical students is virtually nonexistent. Furthermore, today’s healthcare providers must exhibit skills of active, independent and self-directed learning, all of which require high levels of motivation. The information provided in the literature review clearly outlines the need to look at motivational factors to better understand the relationship of goal orientation on both the pre-medical experience and future success in medical school and clinical practice.

Chapter Three outlines the study’s research design, participants, and methods for data collection and analysis. Chapter Three also describes the research instrument, the Modified Archers Health Professions Motivation Survey (MAHPMS).
CHAPTER THREE

METHODS

Introduction

Research from the literature review suggests a connection between levels of motivation and resilience on academic achievement (Dweck, 1986; Martin, 2000; Martin et al., 2001). Archer’s (1994) theory of goal orientation provides a framework to connect a student’s predisposition for mastery, performance, or alienation-goal oriented with motivation. However, minimal research currently exists on these relationships within the subsets of pre-medical students. With undergraduate grade point average (GPA) maintaining critical importance in the medical school admissions review process, opportunities to better understand the academic achievement of pre-medical students should be further explored. This study contributes to the lack of research in this field by analyzing the relationship between goal orientation and academic achievement in pre-medical students at an institution in central Florida.

The following chapter reviews the study’s research design, participants, variables and the survey instrument. This chapter also discusses the ways that the data were collected and analyzed to address the posed research questions:

1. What is the relationship between goal orientation and academic performance for freshman pre-medical students?
2. What is the relationship between goal orientation and academic performance for sophomore pre-medical students?
3. What is the relationship between goal orientation and academic performance for junior pre-medical students?

4. What is the relationship between goal orientation and academic performance for senior pre-medical students?

5. What are the differences in goal orientation based on a student’s academic classification?

6. What are the differences in goal orientation between demographic categories?

Research Design

The research design was a non-experimental, cross-sectional, relationship study designed to evaluate the relationship between a participant’s individual goal orientation and academic achievement. Academic performance is a broad construct that, for the purposes of this study, is operationally defined by cumulative, undergraduate GPA. As part of this quasi-experiment, participants were asked to complete the Modified Archers Health Professions Motivation Survey (MAHPMS) which measures preference for individual goal orientation across the following subcategories: mastery-goal oriented, performance-goal oriented, or alienation-goal oriented. Individual subcategory scores were analyzed for each participant, and the highest mean subcategory score served as their preferred goal orientation. Preference scores for their preferred goal orientation were analyzed in relationship to the participant’s GPA from the fall 2019 semester using correlation analytics and t-tests tests. Furthermore, Chi Square tests were used to determine the differences between goal orientation subscale scores and academic classification as well as between goal orientation subscale scores subcategory scores and demographic categories.
Population and Sample

This study utilized data from the MAHPMS, in addition to institutional data obtained from Florida Southern College (FSC), to evaluate the relationship between the academic performance, as indicated by GPA, and goal orientation of self-identified pre-medical students. FSC is a four-year, private not-for-profit institution consisting of 2,615 undergraduate students, 139 full-time faculty, and 148 part-time faculty with a 15 to one faculty to student ratio (NCES, 2019). Ninety percent of the undergraduate students are full-time and 91% are 24 years of age or younger (NCES, 2019). Sixty-five percent of the undergraduate students are female and the largest ethnicity is white: 75% (NCES, 2019). After Caucasian, the next highest ethnicity of undergraduate students is Hispanic/Latino at 10% followed by Black or African American at five percent (NCES, 2019). All other races and ethnicities when combined constitute the remaining 10% (NCES, 2019). Sixty percent of students attending FSC are Florida residents, while the remaining 40% of students originate from nearly every state in the U.S. and forty eight countries (“About Florida Southern College”, 2019).

Located in Central Florida, specifically in Lakeland, Florida in Polk County, FSC is the oldest private college in Florida and hosts the largest single site collection of Frank Lloyd Wright Architecture in the world (“About Florida Southern College”, 2019). In the 2018-2019 academic year, undergraduate tuition and fees to attend FSC cost $36,348 per year with 93% of the undergraduate student body receiving some form of financial aid, such as grants, scholarships, or student loans (NCES, 2019).

Of the more than 7,000 undergraduate applications received each year, FSC admits approximately 51% (“Undergraduate Admissions”, 2019). The Office of Admissions reports the first year student profile as having an average SAT score between 1130 to 1260, an average ACT
score from 23 to 29, and an average pre-college GPA of 3.70 (“Undergraduate Admissions”, 2019). As of 2019, FSC undergraduates could choose from over 70 academic programs (“Undergraduate Admissions”, 2019). For students who began their studies in fall 2016, retention rates for first-time undergraduate students were at 80% leading into fall 2017 (NCES, 2019). Additionally, the six-year graduation rate for the 2017 cohort was reported at 63% (NCES, 2019). When broken down by gender 59% of males and 66% of females graduate within 6-years (NCES, 2019).

As of spring 2019, 351 undergraduate students at FSC self-identified as pursuing a health profession program post-graduation, with 163 of these students specifically pursuing medical school. Once a semester, the Health Professions & STEM Career Development Center at FSC asks all science majors and known pre-health students to update their career interests. However, not all students continually update this information as requested. To ensure a full and accurate sample, any current FSC student, aged 18 or older, who indicated an interest in a health profession program was asked to complete the voluntary MAHPMS survey. The researcher oversaw the survey distribution via email link through Qualtrics during the fall 2019 semester. Participants were given the option to remain anonymous by not providing identifiable information. Only those individuals who voluntarily provided their name and identification number were included in the research sample.

The study sample was further delimited to only those students who confirmed an interested in pursuing medical school, as indicated on the respective survey question. The convenience sample was further delimited to students who were taking a full-time course load in fall 2019 (considered twelve or more credits) with at least seven of those credits coming from biology, chemistry, physics, or math courses. Any student who withdrew during the fall 2019
semester, did not fully complete the survey, or was not enrolled in a full-time course load and in a minimum of seven credits of biology, chemistry, physics, or math courses during fall 2019 was removed from the sample.

Respondents were categorized by the classifications of freshman, sophomore, junior, and senior. Freshmen consist of any student who has completed fewer than 30 credits at the start of the fall 2019 semester. A respondent who has completed 30 to 59 credits was considered a sophomore, 60 to 89 credits was considered a junior, and any individual with 90 or more credits at the start of the fall 2019 semester was considered a senior. The Office of Institutional Research was responsible for verifying identifying course load and course classifications requirements, identifying undergraduate cumulative GPA, and assigning freshman, sophomore, junior, and senior classification before returning the survey results, with all relevant data, to the researcher.

Variables

Multiple variables will be examined in the study including:

1. Academic performance- this dependent variable was evaluated via each student’s cumulative, undergraduate GPA at the end of the fall 2019 semester. This GPA consists of all courses completed during the fall 2019 semester and will be reported on a traditional 4.0 scale. These students must also have completed a minimum of 12 credits in the fall 2019 semester of which at least seven credits must be biology, chemistry, physics, or math coursework.

2. Goal orientation predisposition- refers to the predisposition for either a performance-goal orientation, mastery-goal orientation, or alienation-goal orientation as dictated by an individual’s highest mean subscale score reported on the MAHPMS survey. A
student’s goal orientation predisposition serves as both an independent and dependent variable for differing research questions.

3. Classification- refers to a student’s year in school at the start of the fall 2019 semester and is based on completed credits. Freshman have completed fewer than 30 credits, sophomores have completed between 30 and 59 credits, juniors have completed between 60 and 89 credits, and seniors have completed 90 credits or more.

4. Pre-medical aspiration- this control variable refers to the fact that all only students who self-identify as pursuing medical school after obtaining a bachelor’s degree were included in the study.

For the first four research questions, the two independent variables are: goal orientation predisposition (either performance-goal oriented, mastery-goal oriented, or alienation-goal oriented) as identified by the highest mean subcategory score on the Modified Archers Health Professions Motivation Survey (MAHPMS) and the student’s classification (freshman, sophomore, junior, or senior). The dependent variable for these four research questions is the individual academic performance (as indicated by cumulative undergraduate GPA) of each student at the culmination of the fall 2019 semester. Research Question Five will compare the nominal variables of student classification and goal orientation while Research Question Six will compare the categorical variables from the demographic questions with categories of goal orientations. The control variable for all questions include that all participants self-identify as pre-medical and all attend the same undergraduate institution.

**Instrument**

This study used an existing survey, the Modified Archers Health Professions Motivation Survey (MAHPMS) (Perrot, Deloney, & Hastings, 2013). The MAHPMS was modified from an
original instrument designed by Jennifer Archer (1994) for use with health profession students (Perrot et al., 2013). The MAHPMS is a 68 items survey, of which 40 of the 41 questions related to goal orientation will be used. The instrument creators provided permissions for reasonable changes to be made to the instrument (Perrot et al., 2013). As such, one question originally pertaining to alienation-goal orientation was not included per the recommendation of Perrot et al. (2013) who felt that the question may be too vague and thus may be too closely related to the performance-goal orientation. Additionally, based on the specific scope of this research study, the 27 questions not related to goal orientation—including the sections on learning strategies (15 items), preference for easy or hard tasks (two items), and causal attribution for success or failure (ten items)—were not utilized in this study. Demographic data including gender, age, undergraduate major, healthcare interests, and racial or ethnic identification were also collected.

The survey questions featured four item stems: when did you feel most successful? how satisfied did you feel during the following? how much do you agree with these statements? and when have you felt greatly satisfied or positive about yourself? Respondents self-reported answers on a likert-type scale of 1 to 5 (1= least favored response, 5= most favored). Examples of individual questions include: “how satisfied did you feel when learned something new?” , “when you felt greatly satisfied or positive about yourself, was it because you received recognition or prestige?”

Each of the 40 goal orientation questions used in this study aligns with one of the three goal orientations: performance-goal oriented (15 questions), mastery-goal oriented (16 questions), and alienation-goal oriented (nine questions). Thus, each respondent had a mean subcategory score for their responses to the performance-goal oriented questions, the mastery-
goal oriented questions, and the alienation-goal oriented questions by combining all responses for each subscale and dividing by the number of items.

**Instrument Administration**

Directly prior to distributing the instrument, the Health Professions & STEM Career Development Center cultivated a list of all current FSC students who self-identified as pursuing a health profession graduate program, also known as being pre-health. Each student who identified as pre-health was invited via email from the researcher to complete the survey in fall 2019. The survey was administered online through Qualtrics and included the necessary IRB disclosures. To maintain participant autonomy and confidentiality, all respondents were asked to voluntarily provide identifiable information. The survey remained active for a period of four weeks. After the fall 2019 semester has ended, the researcher reviewed the survey responses and removed those results that did not voluntarily include identifiable information or fit within the sample parameters. Any student who did not indicate that they are pursuing medical school on the survey was excluded from the survey results. Additionally, any student who did not complete a minimum of 12 credit hours with at least seven credit hours of biology, chemistry, physics, or math coursework was also excluded. The subjects in the remaining sample had their undergraduate cumulative GPA, fall 2019 classes, and demographic information attributed to their records for analysis.

**Reliability and Validity of Data Source**

Both Archer’s original instrument and the MAHPMS used a varimax factor analysis to reduce the goal scale items to three factors- mastery, performance, and alienation (Arch 1994; Perrot et al, 2001). The factor analysis from Perrot et al (2001) confirmed Archer’s factor analysis. Cronbach’s alpha for the goal orientation scale in the MAHPMS was $\alpha = 0.8706$
(Perrot et al., 2001). For this study, Cronbach’s alpha was also calculated to test the reliability of the instrument within the current sample, and that was compared with the results of Perrot et al. (2001).

**Data Analysis**

All statistical analyses for this study were performed using SPSS 25 Statistics Premium Campus Edition. Responses for each of the 40 questions were measured using a 5-point Likert-type scale with 1 being the least favored response and 5 being the most favored response. Each of the questions aligns with exactly one of the three goal orientations: performance, mastery, alienation. All scores within each subcategory were totaled and averaged to determine a mean goal orientation subcategory score for statistical analysis purposes. Thus, each participant had three mean scores across three subcategories. The subcategory score with the highest mean score, either performance-goal orientation, mastery-goal orientation, or alienation-goal oriented, was considered the individual’s goal orientation preference. In the case where a respondent had two subcategory scores that tied for the highest mean score, that individual’s responses were removed from analysis.

Descriptive statistical analyses including frequency, means, and standard deviations were calculated for each scale, subscale, and item and for the demographic variables. For each of the six research questions, specific inferential statistical analysis was conducted (Table 3). For Research Questions One through Four, a $t$-test was performed to analyze the relationship between an individual’s preferred goal orientation score and the participant’s GPA within each classification (freshman, sophomore, junior, and senior). For Research Question Five and Research Question Six, Chi Square tests were used to examine differences between goal orientation subcategory scores and academic classification and demographic categories. For this
study, academic classifications included freshman (0-29 completed credits), sophomore (30-59 completed credits), junior (60 to 89 completed credits), and senior (90+ completed credits). Demographic categories included gender, age, racial or ethnic identification, healthcare interest, and primary undergraduate major.

Table 3. Inferential statistics for research questions

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Data Source</th>
<th>Statistical Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is the relationship between goal orientation and academic performance for freshman pre-medical students?</td>
<td>Freshman respondents from the sample</td>
<td>*test</td>
</tr>
<tr>
<td>2. What is the relationship between goal orientation and academic performance for sophomore pre-medical students?</td>
<td>Sophomore respondents from the sample</td>
<td>*test</td>
</tr>
<tr>
<td>3. What is the relationship between goal orientation and academic performance for junior pre-medical students?</td>
<td>Junior respondents from the sample</td>
<td>*test</td>
</tr>
<tr>
<td>4. What is the relationship between goal orientation and academic performance for senior pre-medical students?</td>
<td>Senior respondents from the sample</td>
<td>*test</td>
</tr>
<tr>
<td>5. What are the differences in goal orientation based on a student’s academic classification?</td>
<td>The entire sample</td>
<td>Chi Square</td>
</tr>
<tr>
<td>6. What are the differences in goal orientation between demographic categories?</td>
<td>The entire sample</td>
<td>Chi Square</td>
</tr>
</tbody>
</table>

Summary

At the conclusion of the fall 2019 semester and following a culling process to remove respondents who do not meet sample parameters, the researcher attributed corresponding fall 2019 undergraduate GPA information, course schedules, and demographic data to each respondent record. Using this survey and demographic data, the researcher then analyzed the goal orientations of pre-medical students, as indicated by their predisposition towards an
orientation of either performance, mastery, or alienation, in relationship to their cumulative, undergraduate GPA.
CHAPTER FOUR
PRESENTATION OF FINDINGS

The purpose of this study was to determine the extent of the relationship between pre-medical students’ goal orientation and their academic performance, as measured by their grade point average after each academic year. The study examined whether or not students’ grade point average had a relationship to their motivational predisposition for one of the following: avoidance-goal oriented, performance-goal oriented, or mastery-goal oriented, as designed by their responses to the Modified Archers Health Professions Motivation Survey (MAHPMS).

In order to improve the research validity, a few changes were made to the study methods outlined in Chapter Three. As previously indicated, the study population included all Florida Southern College students, aged 18 or older, who indicated an interest in a health profession program. However, the original research sample was expanded from only pre-medical students to include the results from both pre-veterinary medical students and pre-medical students. As a result, Research Questions One through Four were augmented to include the underlined portion below:

1. What is the relationship between goal orientation and academic performance for freshman pre-medical and pre-veterinary medical students?
2. What is the relationship between goal orientation and academic performance for sophomore pre-medical and pre-veterinary medical students?
3. What is the relationship between goal orientation and academic performance for junior pre-medical and pre-veterinary medical students?
4. What is the relationship between goal orientation and academic performance for senior pre-medical and pre-veterinary medical students?

To the best of the researcher’s knowledge, expanding the sample to include pre-veterinary medical students in addition to pre-medical students did not change the study purpose or significance. Since pre-veterinary medical school students have almost identical academic requirements as pre-medical students, with the exception of the Medical College Admissions Test (MCAT), and as both categories of pre-health students experience extremely similar barriers to admission, the information presented in Chapters One and Two still apply and need not be augmented.

In general, this study found no statistically significant relationship between grade point average and a student’s preferred goal orientation. Additionally, the study found no statistically significant relationship between subscale goal orientation scores and grade point average.

Survey Responses

The original data set included 215 unique survey submissions. Survey participants had the option to voluntarily provide their names and identification numbers. Those students who did not provide this information remain anonymous and were removed from data analysis, as the researcher was unable to connect these student’s survey results to their institutional data, such as GPA. Additionally, students who did not fully complete all survey questions were removed. After removing the incomplete responses and the submissions lacking identifying information, 159 submissions remained.

Sample Population and Demographic Profile

Of the 159 viable submissions, the final data set was delimited to those students who self-identified as pre-medicine or pre-veterinary medicine, totaling 117 responses. These 117 survey
responses were then evaluated to ensure that the students enrolled in a minimum of 12 credit hours, with at least 7 of the 12 credits being science courses, during the fall 2019 semester. Seventeen students did not meet these criteria and thus were eliminated from the final data. Finally, a preference score was unable to be identified for one of the students as her average for each subscale was identical. As outlined in Chapter Three, this individual was also removed from the analysis. The final data set used for this study consisted of 99 responses, of which 67 identified as pre-medicine and 33 identified as pre-veterinary medicine, with one student indicating that she was interested in both medical school and veterinary medical school. Of the 99 students interested in either medical school or veterinary medical school, 30 were freshman, 25 were sophomores, 24 were juniors, and 20 were seniors.

Table 4 presents a distribution of the percentage of pre-medical, pre-veterinary medical, and those who consider themselves to be both pre-medical and pre-veterinary medical by classification.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Pre-Medical</th>
<th>Pre-Vet</th>
<th>Both</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td>21</td>
<td>8</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Sophomore</td>
<td>12</td>
<td>13</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>Junior</td>
<td>17</td>
<td>7</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Senior</td>
<td>16</td>
<td>4</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>32</td>
<td>1</td>
<td>99</td>
</tr>
</tbody>
</table>

Figure 2 summarizes the frequency distribution of the pre-veterinary and pre-medical students, when combined, by classification.
Each respondent answered 40 questions from a Likert-type scale of which 15 questions were related to a performance-goal orientation, 16 questions were related to a mastery-goal orientation, and 9 questions were related to an alienation-goal oriented. To obtain a score for each subscale (performance-goal oriented, mastery-goal oriented, and alienation-goal oriented), the scores from each question within a particular subscale, with a possible range of answers from 1 to 5, were added together then divided by the number of items in that scale. Therefore, each respondent has a mean subscale score for each of the following sub-scales: performance-goal oriented, mastery-goal oriented, and alienation-goal oriented. The sub-scale score with the highest mean score is considered the individual’s goal orientation preference. The individual subscale mean scores ranged from 2.73 to 4.93 for performance-goal oriented, from 3.18 to 4.88 for mastery-goal oriented, and from 1.00 to 4.89 for alienation-goal oriented. The aggregate mean for all 40 questions in the data set was 3.72 and both the median and mode were 3.94. Of
the 99 respondents, 45 had a preference for a performance-goal orientation, 53 had a preference for a mastery-goal orientation, and one (1) had a preference for an alienation-goal orientation as represented in Figure 3.

Reliability and Validity of Data Source

The researcher used 40 of the 41 goal orientation questions from the original MAHPMS survey for this study. Cronbach’s alpha for the original goal orientation scale, as reported by Perrot et al (2001), was $\alpha = 0.8706$. The Cronbach’s alpha for the goal orientation scale for this study is $\alpha = 0.786$ which, although lower than the Perrot et al (2001) study, is still within an acceptable range for research purposes (Johnson & Christensen, 2012). Cronbach’s alpha was also calculated for each sub-scale as follows: $\alpha = 0.812$ for performance-goal oriented questions, $\alpha = 0.765$ for mastery-goal oriented questions, and $\alpha = 0.807$ for alienation-goal oriented questions.

Figure 3- Frequency distribution by goal orientation preference
Analysis of the Research Questions

In the following sections, the findings of this study are broken down by research question and the analysis of each question will be discussed. Six questions were developed for this research, four of which were analyzed using independent t-tests. The final two questions were analyzed using a Chi Square analysis. For each of the statistical tests, findings were only considered significant at \( \alpha = 0.05 \).

Analysis of the Research Question One

Research Question One: What is the relationship between goal orientation and academic performance for freshman pre-medical and pre-veterinary medical students?

To answer Research Question One, a \( t \)-test was used to determine if there was a statistically significant relationship between freshman performance-goal oriented and mastery-goal oriented students’ and their grade point averages. The results revealed that there were no statistically significant differences between goal orientation and grade point average.

Table 5 provides a descriptive analysis for the freshman pre-medical and pre-veterinary students in the study. Although double the number of freshman students identified as mastery-oriented (\( N=20 \)) than performance-goal oriented (\( N=10 \)), both groups have a relatively similar GPA and standard deviation.

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Mean GPA</th>
<th>Std. Deviation</th>
<th>( N )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance-goal oriented</td>
<td>3.08</td>
<td>.640</td>
<td>10</td>
</tr>
<tr>
<td>Mastery-goal oriented</td>
<td>3.01</td>
<td>.674</td>
<td>20</td>
</tr>
<tr>
<td>Alienation-goal oriented</td>
<td>N/A</td>
<td>N/A</td>
<td>0</td>
</tr>
</tbody>
</table>

A \( t \)-test showed no significant relationship between goal orientation and grade point average, \( t(28) = .296, p > .05 \) (\( p = .769 \)). Additionally, a linear regression was used to evaluate
the relationship between grade point average and performance scores which also proved to be statistically not significant. The strength of the relationship between scores on the performance-goal oriented sub-scale and grade point average was very weak, Pearson $r = 0.270$, $R^2 = 0.073$, $p = 0.450$. Although also not statistically significant, the linear regression analysis between scores on the mastery-goal oriented sub-scale and corresponding grade point average indicated a slightly negative correlation. Pearson $r = -0.179$, $R^2 = 0.032$, $p = 0.451$.

**Analysis of the Research Question Two**

Research Question Two: What is the relationship between goal orientation and academic performance for sophomore pre-medical and pre-veterinary medical students?

Unlike the results from research questions one, four, and five, which saw no preference for an alienation-goal orientation among any participants in the respective classifications, one sophomore student reported an alienation-goal orientation preference. Of the 25 sophomore survey respondents, 16 reported a performance-goal orientation, nine reported a mastery-goal orientation, and one reported an alienation-goal orientation, as outlined in Table 6.

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Mean GPA</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance-goal oriented</td>
<td>3.48</td>
<td>.302</td>
<td>15</td>
</tr>
<tr>
<td>Mastery-goal oriented</td>
<td>3.46</td>
<td>.413</td>
<td>9</td>
</tr>
<tr>
<td>Alienation-goal oriented</td>
<td>2.80</td>
<td>N/A</td>
<td>1</td>
</tr>
</tbody>
</table>

In order to ensure consistency in analysis, the one participant with an alienation-goal orientation was excluded from the inferential statistics. As our $p > .05$, the $t$-test was not statistically significant, $t(22) = .164$, $p = .871$. Although not statistically significant, a linear regression analysis identified a slight correlation between both performance-goal oriented
subscale scores and grade point average (Pearson $r = 0.204$, $R^2 = 0.042$, $p = 0.233$) and mastery-goal oriented subscale scores and grade point average (Pearson $r = .227$, $R^2 = 0.052$, $p = 0.278$).

**Analysis of the Research Question Three**

Research Question Three: What is the relationship between goal orientation and academic performance for junior pre-medical and pre-veterinary medical students?

Like with research question one, no students classified as juniors indicated a preference for alienation-goal oriented and thus a $t$-test was used to evaluate the relationship between goal orientation and grade point average. The descriptive statistics in Table 7 show highly homogenous mean data between the goal orientation preferences of junior pre-medical and pre-veterinary medical students.

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Mean GPA</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance-goal oriented</td>
<td>3.62</td>
<td>.232</td>
<td>12</td>
</tr>
<tr>
<td>Mastery-goal oriented</td>
<td>3.63</td>
<td>.283</td>
<td>12</td>
</tr>
<tr>
<td>Alienation-goal oriented</td>
<td>N/A</td>
<td>N/A</td>
<td>0</td>
</tr>
</tbody>
</table>

The $t$-test for research question three did not reach statistical significance, $t(22) = -.112$, $p > .05$ ($p = .912$). In evaluating the relationship between subscale scores and GPA, the linear regression test also proved not statistically significant. A noticeable correlation was present between performance-goal oriented subscale scores and grade point average, Pearson $r = 0.4740$, $R^2 = 0.224$, $p = 0.120$, however, this was not true for mastery-goal oriented subscale scores and GPA, Pearson $r = -0.068$, $R^2 = 0.005$, $p = 0.833$.

**Analysis of the Research Question Four**

Research Question Four: What is the relationship between goal orientation and academic performance for senior pre-medical and pre-veterinary medical students?
The descriptive statistics including mean GPA and standard deviation for the goal orientation preferences of seniors are outlined in Table 8.

<table>
<thead>
<tr>
<th>Table 8. Senior Descriptive Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
</tr>
<tr>
<td>Performance-goal oriented</td>
</tr>
<tr>
<td>Mastery-goal oriented</td>
</tr>
<tr>
<td>Alienation-goal oriented</td>
</tr>
</tbody>
</table>

The t-test was not statistically significant for research question four, t(18)= .568, p > .05 (p = .577). Linear regression analysis produced a weak relationship between subscale scores and grade point average for both performance-goal oriented subscale scores, Pearson $r = 0.268$, $R^2 = 0.072$, $p = 0.521$, and mastery-goal oriented subscale scores, Pearson $r = 0.242$, $R^2 = 0.059$, $p = 0.448$. When all classifications (freshman, sophomore, junior, and senior) are combined, the linear regression for preference goal orientations in relationship to GPA was still not statistically significant, as outlined in Table 9.

<table>
<thead>
<tr>
<th>Table 9. Linear Regression for Performance &amp; Mastery Preference Goal Orientations (Combined Classifications)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
</tr>
<tr>
<td>Performance-goal oriented</td>
</tr>
<tr>
<td>Mastery-goal oriented</td>
</tr>
</tbody>
</table>

Analysis of the Research Question Five

Research Questions Five: What are the differences in goal orientation based on a student’s academic classification?

A Chi Square test was utilized to determine if a relations exists between a participant’s preference goal orientation (performance-goal oriented, mastery-goal oriented, or alienation-goal oriented) and their academic classification. Table 10 presents a three by four contingency table showing the quantity and percentages of these variables. Only one individual in the entire
sample had an alienation-goal orientation preference, constituting only 4% of the population.

The remaining 98 participants were almost evenly split between a performance and a mastery-goal oriented preference, with slightly more students scoring higher in the mastery-goal oriented range.

<table>
<thead>
<tr>
<th></th>
<th>Performance</th>
<th>Mastery</th>
<th>Alienation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td>10 (33%)</td>
<td>20 (66%)</td>
<td>0 (0%)</td>
<td>30</td>
</tr>
<tr>
<td>Sophomore</td>
<td>15 (60%)</td>
<td>9 (36%)</td>
<td>1 (4%)</td>
<td>25</td>
</tr>
<tr>
<td>Junior</td>
<td>12 (50%)</td>
<td>12 (50%)</td>
<td>0 (0%)</td>
<td>24</td>
</tr>
<tr>
<td>Senior</td>
<td>8 (40%)</td>
<td>12 (60%)</td>
<td>0 (0%)</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>45 (45.5%)</td>
<td>53 (54.5%)</td>
<td>1 (4%)</td>
<td>99 (100%)</td>
</tr>
</tbody>
</table>

Figure 4 presents a numerical representation of the student’s preferred goal orientation by year which depicts a homogeneity between performance and goal orientation preference among most classifications.

This homogeneity between performance and mastery-goal orientation preference was also present in the average mean subscale scores as represented in Figure 5. Each subscale within the
MAHPMS had a possible mean subscale score of 0.00 to 5.00, based on the average responses from the Likert-type survey. Freshmen with a preference for performance orientation averaged a 3.08 subscale score while freshmen with a mastery orientation preference averaged 3.01. Sophomore average subscale scores were 4.44 for those with a performance-goal oriented preference and 4.29 for those with a mastery-goal orientation preference. Juniors had almost identical subscale scores between performance and mastery orientations averaging 4.37 and 4.36, respectively. Seniors began to show a nominal deviation between subscale averages with performance-goal oriented students averaging 4.58 on the subscale and mastery-goal oriented students averaging 4.37 on the subscale. Among the performance and mastery-goal oriented subscales, averages between sophomore, junior, and senior students remained relatively consistent with the averages ranging from 4.29 to 4.58, out of 5.00.

![Goal Orientation Preference: Subscale Averages](image)

**Figure 5- Goal orientation preference: Subscale averages**

However, as $p > .05$, the Chi Square test is not significant and thus we cannot conclude that a relationship exists, $X^2 (6, N = 99) = 7.95, p = .242$.  

67
Analysis of the Research Question Six

Research Questions Six: What are the differences in goal orientations between demographic categories?

The study sample included a range of gender identities, ages, ethnic groups, and academic majors. An overwhelming majority of the participants were female, 77.78%, followed by males at 18.18%. The mean age for the students participating in the study was 19.12 years with participant ages ranging from 18 to 22 years of age. A frequency distribution of ages is represented in Figure 6. All ethnic group options were represented in the study sample. White students represented the majority of the student sample (68.68%), followed by Hispanic students (12.12%), Asian or Pacific Islander students (10.01%), Black students (5.05%), Native American students (2.02%) and Other (2.02%). The two individuals who indicated Other wrote in their racial or ethnic identity as: “Arab” and “Oppressed,” respectively. Over 90% of the responses came from natural science majors with biology being the highest frequency for undergraduate major (71.07%). The next highest represented major was biochemistry & molecular biology (12.12%) followed by marine biology (6.06%).

![FREQUENCY DISTRIBUTION- PARTICIPANT AGE](image)

*Figure 6- Frequency distribution by participant age*
When further delineated in performance-goal oriented, mastery-goal oriented, and alienation-goal oriented, the demographic variables tended to stay rather uniform between performance-goal oriented and mastery-goal oriented, as represented in Table 11.

<table>
<thead>
<tr>
<th>Table 11. Demographic Proportions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Male 18.18</td>
</tr>
<tr>
<td>Female 77.78</td>
</tr>
<tr>
<td>Transgender 1.01</td>
</tr>
<tr>
<td>Prefer Not to Say 2.02</td>
</tr>
<tr>
<td>Other 1.01</td>
</tr>
<tr>
<td>% Total (N = 99)</td>
</tr>
<tr>
<td>% Performance-Goal Oriented</td>
</tr>
<tr>
<td>% Mastery-Goal Oriented</td>
</tr>
<tr>
<td>% Alienation-Goal Oriented</td>
</tr>
<tr>
<td>Proportion of Total Population</td>
</tr>
<tr>
<td>(PO preference = 45 persons)</td>
</tr>
<tr>
<td>(MO preference = 53 persons)</td>
</tr>
<tr>
<td>(AO = 1 person)</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Male 18.18</td>
</tr>
<tr>
<td>Female 77.78</td>
</tr>
<tr>
<td>Transgender 1.01</td>
</tr>
<tr>
<td>Prefer Not to Say 2.02</td>
</tr>
<tr>
<td>Other 1.01</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>18 32.32</td>
</tr>
<tr>
<td>19 36.36</td>
</tr>
<tr>
<td>20 20.20</td>
</tr>
<tr>
<td>21 9.09</td>
</tr>
<tr>
<td>22 2.02</td>
</tr>
<tr>
<td>Ethnicity</td>
</tr>
<tr>
<td>Hispanic 12.12</td>
</tr>
<tr>
<td>White 68.68</td>
</tr>
<tr>
<td>Black 5.05</td>
</tr>
<tr>
<td>Asian or Pacific Islander 10.01</td>
</tr>
<tr>
<td>Native American 2.02</td>
</tr>
<tr>
<td>Other 2.02</td>
</tr>
<tr>
<td>Majors</td>
</tr>
<tr>
<td>Biochemistry &amp; Molecular Bio</td>
</tr>
<tr>
<td>Biology 71.71</td>
</tr>
<tr>
<td>Business 2.02</td>
</tr>
<tr>
<td>Chemistry 2.02</td>
</tr>
<tr>
<td>Marine Biology 6.06</td>
</tr>
<tr>
<td>Psychology 2.02</td>
</tr>
<tr>
<td>Other 4.04</td>
</tr>
</tbody>
</table>
A Chi Square test of independence was performed to examine the relationship between goal orientation and each of the following demographic variables: gender, age, ethnicity, academic major. The Chi Squared tests performed to determine if a relationship exists between a student’s goal orientation and gender was not statistically significant, $X^2 (8, N = 99) = 4.65$, $p = .795$. Additionally, the Chi Square test examining age in relationship to goal orientation was not significant, $X^2 (8, N = 99) = 10.044$, $p = .262$. However, the relationship between goal orientation and ethnicity was significant, $X^2 (10, N = 99) = 27.60$, $p < .05$. Finally, the relationship between academic major and goal orientation was also significant, $X^2 (12, N = 99) = 35.96$, $p < .005$.

**Summary**

Chapter Four provided an analysis of the results using statistical techniques consistent with the research questions. The six research questions were analyzed using self-reported data gathered from the Modified Archers Health Professions Motivation Survey (MAHPMS), as well as institutional data including cumulative fall 2019 GPA and class schedule information. Chapter Five will present a summary of the results, discuss the study limitations, review implications for practice, and make recommendations for future research.
CHAPTER FIVE
CONCLUSION AND RECOMMENDATIONS

Summary of Findings

The goal of this study was to determine if a relationship exists between students’ preferred goal orientations and their academic performance based on grade point average (GPA). This research utilized Archer’s achievement goal theory (1994), which affirms that university students have a strong preference for one of three possible goal orientations: mastery-goal oriented, performance-goal oriented, or alienation-goal oriented. Goal orientation has been shown to positively impact academic achievement in college students (Amrai, Motlagh, Zalani, & Parhon, 2011; Garcia & Pintrich, 1994), but little research has been conducted on the pre-medical and pre-veterinary medical cohorts, specifically. As grade point average remains a significant factor in the medical and veterinary medical admissions review process (AAMC, 2018d; Dunleavy, Sondheimer, Castillo-Page, & Bletzinger, 2011; Elam, Stratton, Scott, Wilson, & Leiber, 2002; Kreiter & Kreiter, 2007; Monroe, Quinn, Samuelson, Dunleavy & Dowd, 2013), acceptance becomes increasingly more difficult for students who are unable to obtain high academic marks. This research attempted to further explore the relationship between Archer’s goal orientations (1994) and their relationship to grade point average, in order to better understand the implications for pre-medical and pre-veterinary students. Better understanding these relationships provides insight for higher education administrators to provide necessary interventions to students to improve their academic profile or explore alternative career pathways.
The study was conducted with pre-medical and pre-veterinary medical students at Florida Southern College who responded to the Modified Archers Health Professions Motivation Survey (MAHPMS) during the fall 2019 semester. The responses to the MAHPMS combined with institutional data were analyzed to address the six proposed research questions. Chapter Five will explore the findings of each research question and summarize the implications for practice and recommendations for future research.

**Findings Regarding Goal Orientation and Academic Performance**

The first four research questions focused on identifying whether a relationship exists between the preferred goal orientations of freshman, sophomore, junior, and senior pre-medical and pre-veterinary medical students and their grade point averages. These research questions were as follows:

1. What is the relationship between goal orientation and academic performance for freshman pre-medical and pre-veterinary medical students?
2. What is the relationship between goal orientation and academic performance for sophomore pre-medical and pre-veterinary medical students?
3. What is the relationship between goal orientation and academic performance for junior pre-medical and pre-veterinary medical students?
4. What is the relationship between goal orientation and academic performance for senior pre-medical and pre-veterinary medical students?

A t-test was conducted to analyze the relationship between performance-goal oriented, mastery-goal oriented, and alienation-goal oriented (if applicable) students and their mean grade point average. Descriptive statistics and a separate t-test were run for the freshman, junior, and senior classifications. For freshmen, the mean GPA for performance-goal oriented students
(μ=3.08) was evaluated against the mean GPA for mastery-goal oriented students (μ=3.01). Sophomores had a mean performance-goal oriented GPA of μ=3.48 and a mean mastery-goal oriented GPA of μ=3.46. The mean GPA for performance-goal oriented students (μ=3.62) was almost identical to the mean GPA for mastery-goal oriented students (μ=3.63) in juniors. The mean GPA for seniors showed the most noticeable difference between performance-goal oriented students (μ=3.66) and mastery-goal oriented students (μ=3.57). Overall, the descriptive statistics show a fairly uniform grade point averages among the cohorts, with mean GPAs between subscales ranging from μ=3.01 to μ=3.67. A t-test for freshman, sophomores, juniors, and seniors produced a p > .05, thus I failed to reject the null hypothesis that a student’s goal orientation preference has a relationship to their GPA. Additionally, the linear regression analysis for each goal orientation and GPA within each classification, even though not statistically significant, still produced a very weak or negative correlation.

Only one student, out of the sample of 99, aligned with an alienation-goal orientation. Although there are limited statistical analyses that can be run on an N=1, it is worth noting that this student had the lowest grade point average of any other student in the sophomore cohort. Although not statistically significant, this finding aligns with prior research on goal orientation and motivation within college students that have found alienation-goal orientation students to have lower GPAs, likely due to avoidant techniques (Elliot, McGregor, Gable, 1999; Harackiewicz, Barron, Carter, Lehto, Elliot, 1997; Van Etten, Pressley, McInerney, Liem, 2008).

Although not statistically significant, the mean GPAs for performance-goal oriented students tended to be higher than the mean GPAs for mastery-goal oriented students, with the exception of sophomores, indicating that performance-goal oriented students may be more driven to obtain academic results. This hypothesis aligns with the literature on performance-goal
oriented and mastery-goal oriented students, which states that performance-goal oriented students are driven to outwardly achieve while mastery-goal oriented students are less interested in the visual representation of their achievement and more interested in the intrinsic value of mastering material (Archer, 1994). Additional research is needed to evaluate if this trend is statistically significant within a larger sample size and if larger variations in grade point averages exist when encompassing a larger population.

**Findings Regarding Goal Orientation and Classification**

What are the differences in goal orientation based on a student’s academic classification?

To answer this question, students were grouped into their preferred goal orientation based on which subscale had the highest mean score. Due to the small sample size, the results showed no statistically significant relationship at the p<.05 level between academic classification and goal orientation \(X^2 (6, N = 99) = 7.95, p = .242\). Both the performance-goal oriented and mastery-goal oriented preference had relatively similar numbers, with 45.5% of the entire sample reporting a preference for performance-goal orientation and 54.5% aligning with a mastery-goal orientation. Only one person, 4% of the entire sample, reported an alienation-goal orientation. Within classifications, goal-orientations were also relatively similar, with the widest difference recognized within the freshman cohort with 33% reporting a performance-goal orientation and 66% reporting a mastery-goal orientation. The sophomore cohort included the only alienation-goal oriented student with the distribution at 60% performance-goal oriented, 36% mastery-goal oriented, and 4% alienation-goal oriented. Juniors had an even split of 50% performance-goal oriented and 50% mastery-goal oriented and seniors were reported as 40% performance-goal oriented and 60% mastery-goal oriented.
Although not statistically significant, a few inferences may be drawn from these results. During freshman year, two times as many students were mastery-goal oriented compared to performance-goal oriented, an interesting result that negates the current research. Traditionally, the attrition rate from pre-medical and pre-veterinary medical freshman to sophomore year is fairly high, a trend analyzed by Barr, Gonzalez, & Wanat (2008) in their recent research study. Their study identified the onset of rigorous courses, specifically chemistry course work, as a leading factor in the decline in pre-health interest (Barr, Gonzalez, & Wanat, 2008). Based on this research, one might hypothesize that pre-medical and pre-veterinary medical students would report higher levels of performance-goal orientations, rather than mastery-goal orientations, further supporting the notion that performance-goal oriented students would rather avoid challenging tasks than risk receiving a poor academic grade (Ames & Archer, 1988; Elliott & Dweck, 1988). One explanation for why freshmen reported a preference for mastery-goal orientation could be related to theories of self-efficacy. In their study on perceived goal attainability, Lockwood and Kunda (1997) found that first year students were more likely than fourth year students to believe in their own academic competence. This proved especially true after students were presented with role models to whom they aspired, with freshmen reporting stronger self-belief in their abilities to match the achievements of their role models than their upperclassman peers (Lockwood & Kunda, 1997). Incoming freshman pursuing medical school and veterinary medical school have already outwardly adopted a rigorous academic goal. It is highly likely that these students were strong academic performers throughout high school, and they have been encouraged by educators, family, and friends to “dream big.” Thus, with likely few academic challenges under their belt, they are easily able to envision their continued academic success. This self-efficacy may have prompted the freshman participants to view their
academic abilities and study habits in a more positive light, resulting in survey responses that favored mastery-goal orientation. The survey results did shift to show that a majority of sophomores aligned with a performance-goal orientation. Based on the research of Barr, Gonzalez, & Wanat (2008), this may be explained by the emergence of organic chemistry in sophomore year, traditionally recognized as one of the most rigorous science courses. It is possible that we are seeing an increase in preference for a performance-goal orientation based on the increased rigor, leading students to focus on performance, rather than mastery, out of necessity. Finally, more seniors aligned with a mastery-goal orientation than performance-goal orientation which may be due to maturity or the simple fact that the performance-goal oriented students may have not retained through this late stage of the pre-health journey. However, due to the small sample size, further studies into the goal orientations of pre-medical and pre-veterinary medical students based on classification will help to address many of the unanswered questions above.

**Findings Regarding Goal Orientation and Demographic Categories**

What are the differences in goal orientations between demographic categories?

To answer this question, demographic frequencies were calculated in relationship to goal orientation preference. At the p<.05 significance level, the researcher was unable to reject the null hypothesis regarding if a relationship exists between a student’s goal orientation and gender \(X^2 (8, N = 99) = 4.65, p = .795\) and was also unable to reject the null hypothesis regarding goal orientation and age \(X^2 (8, N = 99) = 10.044, p = .262\). However, this research concludes that a relationship exists between both goal orientation and ethnicity \(X^2 (10, N = 99) = 27.60, p < .05\) and goal orientation and academic major \(X^2 (12, N = 99) = 35.96, p < .005\).
No discernable trends between goal orientation and gender are visible when evaluating demographic frequencies. Distributions between performance-goal orientation and mastery-goal orientation are close to even or all gender categories. However, a majority of the sample is female, which may be reflective of the trends of women representing a larger proportion of the students enrolled in medical school or veterinary medical school (Association of American Medical Colleges, 2018a; Association of American Veterinary Medical Colleges, 2017). This may also be representative of trends in survey completion, which find that women are more likely to complete surveys than their male counterparts (Smith, 2008).

The majority of students completing the survey were between the ages of 18 and 20, which is representative of a traditional undergraduate cohort. Additionally, the majority of the respondents were white (68.68%), with the remaining ethnicities each representing a small portion of the remaining population: Hispanic (12.12%), Asian or Pacific Islander (10.01%), Black (5.05%), Native American (2.02%), and Other (2.02%). Although additional research is needed to more fully understand the relationship between specific demographic variables and goal orientation, observations by the researcher illuminate a few noticeable trends. Of the five respondents who identified as Black, none reported a performance-goal orientation and a substantial majority, four, aligned with a mastery-goal orientation. Additionally, the one alienation-goal oriented individual from the study identified as Black. Research by Barr, Gonzalez, & Wanat (2008) found that underrepresented minority racial and ethnic groups (URMs), such as African Americans, Latinos, and Native Americans, suffer from higher rates of attrition within pre-medical programs, which may help to explain why the one student who identified with an alienation-goal orientation was Black. Barr, Gonzalez, & Wanat (2008) found that underrepresented groups may disproportionately suffer from a lack of early collegiate support.
in which they are unable to build the necessary resiliency skills to retain in a rigorous pre-health program. The fact that the remaining four Black respondents all identified as mastery-goal oriented, rather than performance-goal oriented, may indicate that these students are URMs who have already identified the support systems and internal resilience necessary to be successful.

The second statistically significant finding was that of academic majors and goal orientation. Within the sample, biology majors represented the majority of the respondents (71.71%) followed by biochemistry & molecular biology majors (12.12%). Of the majors represented, there was a fairly uniform split between the performance-goal orientation and mastery-goal orientation with a slight exception in the biochemistry & molecular biology majors and psychology majors. Although additional research is needed to fully explore these variations, one possible explanation may be due to the perceived rigor of particular majors. For example, the two psychology majors in the study both identified as performance-goal oriented, with neither reporting a preference for a mastery-goal orientation or an alienation-goal orientation.

Although applicants to medical and veterinary medical school can major in any discipline, the natural science majors tend to encompass a greater number of challenging life science coursework which a psychology degree tends to focus more on the social sciences. For some students, the social sciences may be perceived as less challenging and thus, allow for a less difficult overall course plan. Therefore, a psychology major may be selected by a pre-medical or pre-veterinary medical student in an attempt to more easily show academic competence as reflected in a high overall GPA, which aligns with the research on performance-goal oriented students. On the other hand, the biochemistry & molecular biology major is known to require additional upper-level biochemistry courses, which have a reputation as being some of the most challenging courses in an undergraduate major. Therefore, many students who prefer
coursework in the natural sciences will select the biochemistry & molecular biology major over the biology major for the explicit purpose of wanting the challenge of additional science coursework. Should future research support this inference, that research would help explain why two times as many biochemistry & molecular biology majors align with a mastery-goal orientation rather than a performance-goal orientation.

Overall, the distribution of ages, ethnicities, and majors in this study are reflective of the current population of students at Florida Southern College.

**Limitations of the Study**

Prior to undertaking the study, seven limitations were outlined in Chapter One. All six limitations still apply to the expanded study population, now inclusive of pre-veterinary medical and pre-medical students, and were updated to reflect this change. As the study progressed, additional limitations were realized. For example, number two was expanded to encompass additional limitations pursuant to course rigor, and two additional limitations emerged, listed as number eight and nine below.

1. This sample only represented pre-medical and pre-veterinary medical students at one small, private undergraduate institution in the southeast United States and may not represent the entire pre-medical or pre-veterinary medical population nationwide.

2. Although efforts were taken to control for course rigor, pre-medical and pre-veterinary medical students do not abide by one set curriculum. Therefore, students in the sample had varying class schedules with various degrees of difficulty that likely impacted their grade point average. Furthermore, by limiting the sample to only those students who enrolled in seven credits of biology, chemistry, physics, and/or math coursework, students in non-traditional majors where these courses are not as prevalent, such as
Psychology or Business, were largely removed from the sample. It may be possible that pre-health students in these non-traditional majors have a rigorous academic profile when evaluating multiple, combined semesters, but were removed from the study as they may not consistently take a minimum of seven natural science courses each semester.

3. External factors can have a large influence on a student’s grade point average. For example, pre-medical or pre-veterinary medical students who work more than 20 hours a week may find it difficult to invest the necessary time to succeed in their academic courses. External influences were not controlled or assessed in this study.

4. The timeframe of the study may have presented a limitation for some subsections of the larger population. For students in their first year of college, academic performance problems may simply not yet be evident.

5. Attrition rates within the pre-medical and pre-veterinary medical cohorts result in skewed sample sizes. There was a slightly higher proportion of freshman pre-medical and pre-veterinary medical students than there were senior pre-medical and pre-veterinary medical students. These variations in sample sizes may have impacted the statistical analyses when evaluating the relationship between classifications of pre-medical and pre-veterinary medical students.

6. Many students pursuing graduate and professional school are highly competitive, and thus may have exhibited response bias when responding to questions. Competitive participants may have attempted to showcase themselves in a strong light leading them to respond with the answer they believe to be ‘best’, rather than what is most accurate. Furthermore, the study participants likely have an existing relationships with the researcher, who serves as the chief pre-health advisor at their institution. Although the
USF Institutional Review Board (IRB) determined there to be no more or less harm to the participants by having the researcher personally distribute and evaluate the survey responses, pre-health students at Florida Southern College are largely dependent on the assistance of the researcher, who provides them with ongoing advice and support throughout their pre-health journey. Therefore, the respondents who voluntarily provided their identifiable information may have felt conscious or unconscious pressure to respond to survey questions in a more positive manner in order to impress the researcher.

7. Labeling participants by a singular goal orientation preference is a simplification of the data, and thus does not account for part of the variance. Many participants had similar performance and mastery subscale score averages, but were simply categorized by their highest subscale score.

8. Classifications of freshman, sophomore, junior, and senior, based on the cumulative number of collegiate credit hours earned, may have caused students with multiple credit hours earned during high school through accelerated programs, such as dual enrollment programs or Accelerated Placement (AP), to report as a higher classification. This may have been especially true for first year students who, although just starting their collegiate journey, have taken multiple AP exams during high school and thus may be categorized as a sophomore classification.

Implications from the Findings

This study was designed with the intent of discovering information that could be used by academic advisors, faculty, career counselors, and administrators to improve their interactions with pre-medical and pre-veterinary medical students. Gaining acceptance to medical school and veterinary medical school remains highly competitive, with the majority of applicants proving to
be unsuccessful each year. As the majority of college students pursue higher education for the main purpose of securing a better job (Eagan et al., 2016), sufficient strides must be made to ensure that we better understand the needs of these competitive cohorts. Although much of the analysis did not reach levels of statistical significance, this research adds to the limited body of research on the pre-medical and pre-veterinary medical populations.

The findings from this study suggest a lack of variation between the goal orientations of pre-medical and pre-veterinary medical students. Furthermore, no notable strength of relationship was recognized between students exhibiting a performance-goal orientation and their grade point average versus those in a mastery-goal orientation and their grade point averages.

Florida Southern College has steadily increased its medical school and veterinary medical school acceptance rates since 2016, from 11% in 2016 to 43.75% in 2019. Florida Southern College created the Health Professions & STEM Career Development Center, with the specific charge of providing pre-health advising to FSC undergraduates and alumni in 2016. It is possible that the rise in acceptance rates is related to the establishment of services (application reviews, mock interviews, personal statement coaching, etc.) provided to pre-health students, regardless of their goal orientation preference or grade point average. This finding aligns with research by Locke and Bryan (1969) that show that when people are provided feedback on their performance, their performance improves. Similarly, research shows that individuals must have the proper knowledge on how to attain their goal(s) in order to be successful (Locke, 2000). By creating an office dedicated to providing knowledge and feedback on ways to be a successful pre-health student, assuming students utilize this resource, an increase in acceptance rates is likely. However, a recommendation may be made to evaluate the programming from within this office to ensure effectiveness.
Related to goal orientation is the construct of goal importance and self-efficacy, the belief that they can attain the goal. There is a general sense that the increase in interest in undergraduate pursuit of medical school and veterinary medical school is largely fueled by parental involvement out of desire for future financial stability. Although parental influence may be a strong motivator, goal attainment may be inhibited due to a lack of personal goal commitment (Seijts & Latham, 2001). People with high self-efficacy are significantly more likely to develop strategies to obtain their goals (Locke & Latham, 2002). Thus, administrators should make efforts to evaluate student commitment while encouraging self-efficacy within pre-medical and pre-veterinary medical students. A student’s self-efficacy can be improved through persuasive, positive communication and consistent summary feedback (Locke & Latham, 2002). In relationship to control theory, feedback allows individuals to recognize when they are below target and increase their efforts, or try a new strategy, if necessary (Locke & Latham, 2002). Additionally, research shows that when feedback is provided in a positive fashion, particularly as an inspiring message expressing confidence in their abilities by authority figures and mentors, students are able to raise their self-efficacy levels and feelings of self-worth to enhance goal commitment (Bandura, 1997).

Research on medical school students highlights the need for academic skill development, faculty support, and a commitment to personal wellness (Rosenthal, 2012). As there is limited research on the pre-medical and pre-veterinary medical cohort, Rosenthal’s (2012) research on the incoming professional school students provides a window into some of the issues plaguing academic performance that likely began during their undergraduate career. Many students report feeling academically underprepared for the rigor of professional school (Rosenthal, 2012). Administrators should work with pre-medical and pre-veterinary medical students to develop
strong self-directed study habits and strategies. Stress continues to be a reoccurring theme among students in undergraduate degrees and professional degrees, as well as in practice. Yet students who exercised, had stable sleep patterns, and participated in social activities, had higher academic performance in professional school (Rosenthal, 2012). Strides should be taken to encourage pre-medical and pre-veterinary medical students to foster appropriate academic skills and personal wellness rituals prior to matriculating to professional school.

This research shows that pre-medical and pre-veterinary medical students may not have significant variations in goal orientation preference, due to the closeness in subscale score means. Thus, it appears that variation in grade point averages are tied to factors beyond goal orientation, possibly with the exception of alienation-goal orientation. Therefore, researchers may need to identify other factors, other than goal orientation, to evaluate in relationship to academic success in pre-medical and pre-veterinary medical students. As previous studies have highlighted the benefit of high-touch practices, such as positive feedback, building self-directed academic strategies, and one-on-one support, it is recommended that institutions incorporate these tactics into their undergraduate academic programs in an effort to positively influence student motivation and resilience and ultimately increase grade point average of pre-medical and pre-veterinary medical cohorts.

**Recommendations for Future Research**

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

1. It is unknown whether the small sample size influenced the lack of statistical significance or if a replicated study would still result in a failure to reject the null hypothesis for most
research questions. The study should be further evaluated with a larger sample size to evaluate the influence, if any, of the sample size on the observed results. One way to increase the sample size would be to incorporate responses from students at other colleges, as the institution studied only had access to a relatively small pre-medical and pre-veterinary medical population. Alternatively, over a period of a few years, the study could be replicated each fall semester with additional cohorts of pre-medical and pre-veterinary medical students to increase the N for each classification, freshman, sophomore, junior, and senior.

2. Of particular interest to the researcher is the implications that may be recognized over time. For example, it would be very interesting to analyze if a student’s goal orientation preference changed over time throughout their pre-medical or pre-veterinary medical journey. If so, what might influence this change? As new studies begin to emerge regarding the importance of maturity and emotional intelligence within pre-health students, it may be worth researching to see what caused a shift in goal orientation preference and, if applicable, if the shift had any relationship to maturity or emotional intelligence. Possibly most importantly, a multi-year study following students from freshman year through their application cycle, in order to evaluate the relationship of goal orientation on acceptance rates, would be of great significance to the body of literature.

3. As outlined in the Chapter Four, the results from the MAHPMS show that pre-medical and pre-veterinary medical students are almost evenly split between a preference for performance orientation and mastery orientation. Furthermore, when analyzing the mean subscale scores among classifications, and within the larger sample, the scores remain fairly consistent. This research study utilized Archer’s goal orientation theory (1994) as a
framework which attests that all students align predominantly with one of the three goal orientations. However, the data showed highly homogenous mean scores between mastery and performance subscales. This collected data suggest that additional research into a combination category between performance orientation and mastery orientation may be advisable. Creating this new category would allow for expanded research into the relationship between this combined performance/mastery-goal oriented category and academic performance.

4. Lin. et al. (2013) found that the adverse mental health effects of a rigorous pre-medical education may extend well beyond the undergraduate years. As research surrounding goal orientation suggest strong connections to motivation and resilience, future research studies should be developed to analyze the relationship between an individual’s pre-medical or pre-veterinary medical goal orientation and to levels of burnout in the clinical years or as a practicing Physician. Determining a possible connection between undergraduate goal orientation and future burnout may allow for additional early intervention programs to be developed to ensure career longevity.

5. The relationship between goal orientation and ethnicity and goal orientation and academic major were the only relationships with a statistical significance within the study. However, additional research studies would be beneficial to further explore this relationship and the contribution of each variable to this finding.

**Concluding Remarks**

This quantitative, relationship study was conducted to improve understanding of the relationship between student goal orientation and academic performance. Using Archer’s achievement goal theory (1994) as the theoretical framework, this study revealed trends in goal
orientation preferences among pre-medical and pre-veterinary medical students, namely that pre-medical and pre-veterinary medical students predominantly align with a mastery-goal orientation or a performance-goal orientation. However, due to a lack of statistical significance, no conclusions can be drawn regarding whether their goal orientation preference has any relationship to their grade point average. Furthermore, this study found a statistically significant relationship between the goal orientation and ethnicity and goal orientation and academic major.

Previous research focused on the goal orientations of students already within professional school or those in the general collegiate population. This research adds to the limited body of literature on pre-health students by studying the infrequently researched pre-medical and pre-veterinary medical undergraduate population.

With interest in medical school and veterinary medical school on the rise, many institutions of higher education are targeting recruitment efforts at pre-health parents and students. However, as institutions come under increasing pressure to provide adequate return on investment to justify tuition price-tags, emphasis on graduate school, professional school, and job placement rates will also increase. By examining the differences in grade point averages held by students with various goal orientation preferences, institutions of higher education can examine whether their current programs are meeting the needs of pre-medical and pre-veterinary medical students with a particular goal orientation preference. Although there are many theories to explain academic success, by continuing to study the characteristics of pre-medical and pre-veterinary medical students, including their motivations and personality traits influencing resilience and academic success, institutions are better adept to provide early intervention program or coaching models to support the aspirations of pre-health students.
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APPENDICES
Appendix A: Search Terms

The following terms were used in various combinations when searching for articles for the literature review:

academic
achievement
achievement goal
goal orientation
grades
grade point average (GPA)
health profession
higher education
learning
medical school
motivation
performance
persistence
pre-health
pre-med/pre-medical
resilience
self-efficacy
self-regulated learning
strategies
success
Appendix B: Modified Archers Health Professions Motivation Survey (MAHPMS)

<table>
<thead>
<tr>
<th>Think back over your last academic year. In general, when did you feel most successful?</th>
<th>Not successful at all</th>
<th>Very successful</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When I showed people I was good at something.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2. When a lecture or tutorial made me think about things.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3. When I did almost no work and got away with it.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4. When I got a higher grade than other students.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5. When I learned something interesting.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6. When I showed people that I was smart.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7. When something I learned made me want to find out more.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8. When I didn't have to work too hard.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9. When I was the only one who could answer the lecturer's question.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10. When all the tasks and assignments were easy.</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In general, how satisfied did you feel when you …</th>
<th>Not satisfied at all</th>
<th>Very satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Learned something new?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12. Did better than other students in the class?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13. Found the work easy?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14. Realized you were getting through the course without having to work hard?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15. Read something interesting?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>16. Worked hard?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>17. Realized you didn't have to prepare for tutorials?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>18. Worked on a challenging task or assignment?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>19. Saw improvement in your work?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20. Got one of the highest grades?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>21. Did well without having to work hard?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>In general, how much do you agree with these statements?</td>
<td>Do not agree at all</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>---------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>22. The more challenging the task, the harder I work.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>23. If someone is evaluating me I tend to expect the worst.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>24. I like to be the best person in my group.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>25. I am usually worried about what impression I make.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>26. I'm always thinking of ways to improve how I do things.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>27. Good grades are important to me.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>28. As long as I pass the course I don't care about the grade I get.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>29. I put in long hours of work just to do a good job.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>30. I feel very upset when I commit some sort of error.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>31. I like to compete against myself.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>32. The opinions that important people have of me cause me little concern.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>33. I get anxious when I don't know how well I'm doing.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>34. I am often afraid that I look ridiculous or make a fool of myself.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>35. As long as you do enough work to pass, it doesn't matter whether or not you learn anything.</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>When you felt greatly satisfied or positive about yourself, was it because you …</th>
<th>Do not agree at all</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>36. Accomplished something that others in your class could not do?</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>37. Understood something for the first time?</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>38. Were involved totally in something that you were doing?</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>39. Received recognition or prestige?</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>40. Enhanced your status in the group?</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

Demographic Information

Gender: ☐ Male ☐ Female ☐ Transgender ☐ Prefer not to say ☐ Other, please specify: _____

Age: ☐ 17 or younger ☐ 18 ☐ 19 ☐ 20 ☐ 21 ☐ 22 ☐ 23 or older

Racial or ethnic identification: ☐ Black ☐ Hispanic ☐ Native American ☐ White
☐ Asian or Pacific Islander ☐ Other, please specify: _______

Current primary undergraduate major: [drop-down list of all majors at FSC]

Healthcare career interests (check all that apply):

☐ Pharmacy ☐ Optometry ☐ Medicine (MD & DO) ☐ Dentistry
☐ Physical Therapy ☐ Occupational Therapy ☐ Veterinary Medicine
☐ Physician Assistant ☐ Other, please specify: ____________