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ACADEMIC BUOYANCY AS AN EXPLANATORY FACTOR

FOR COLLEGE STUDENT ACHIEVEMENT AND RETENTION

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ABSTRACT

Academic buoyancy generally refers to students' ability to respond to everyday challenges in academic settings. Given the transitional issues known to be experienced by students during the first-year of college, a level of buoyancy sufficient to navigate routine obstacles is necessary for academic success. Two studies were conducted to explore the relationships among academic buoyancy, motivation, and academic achievement of first-year college students. Specifically, whether academic buoyancy is a better predictor of academic success, as measured by college GPA, than SAT scores and scores on college administered placement tests was examined. The Motivation and Engagement Scale for University and College students and the Academic Buoyancy Questionnaire were administered to first-year students enrolled in a Freshmen Year Experience course at a college of technology. In Study One (N=120), regression analysis indicated that academic buoyancy was a small but significant predictor of academic achievement (R^2 =.052). In Study One, academic buoyancy was the only significant predictor of achievement among the variables explored, warranting further research on the buoyancy construct in a higher education setting. The findings from Study Two indicated that SATs were the strongest predictor of academic success, accounting for approximately 14% of the variance in students' GPA at the end of the first-semester of college and for approximately 12% of the variance in students' first-year cumulative GPA. Self-sabotage, uncertain control, persistence and failure avoidance were the motivational variables likely to be most predictive of academic success. However, academic buoyancy was also a significant predictor of first semester GPA, but to a smaller degree. When considered altogether, these results advance understanding of the academic buoyancy construct in higher education and extend existing research on college student motivation and academic achievement. Findings from these studies also establish the warrant for additional research on the role of buoyancy in relation to achievement and exploration of intervention strategies targeted at increasing individual student achievement and overall institutional retention rates.

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Chapter 1

INTRODUCTION

First-year college students require a type of resiliency that allows them to respond

appropriately to the routine academic pressures and challenges experienced in college (Martin &

Marsh, 2006; 2008a; 2008b). Navigating completely unknown cultures, adjusting to new levels

of academic rigor, and acclimating to the faster pace of college-level work are all considered

everyday experiences of the academic life at college. Ironically, facing academic challenges like

these proves empowering for some, but debilitating for others (e.g., Tinto, 1988; Yeager &

Dweck, 2012). Students unaccustomed to dealing with such challenges may experience setbacks,

stress, or decreased self- confidence but they need to be able to "bounce back" and keep moving

forward; they need to demonstrate resilience. Martin and Marsh (2006; 20008a; 2008b) propose

a new construct to define a type of everyday resiliency, one they identify as a*cademic buoyancy*.

Defining Academic Buoyancy

Martin (2002; 2012) reports a lack of existing research focused on how students respond

to academic pressures and setbacks. The buoyancy construct is offered as a pathway to a new

area of research to explore these important student behaviors. Buoyancy is generally defined as

an individual's ability to successfully overcome the setbacks and challenges that are typical of

everyday life (Martin & Marsh, 2008a; 2008b). When applied to the context of an educational

setting, it is referred to as a student's academic buoyancy (Martin & Marsh, 2008a). Martin and

Marsh (2006; 2008a; 2008b) describe buoyancy as an adaptive construct associated with positive

adaptive correlates, such as persistence and participation, and negative maladaptive correlates

such as self-handicapping and disengagement. "Students at all points on the academic spectrum

can benefit from adaptive motivation and engagement: underachieving students will need to

improve; strong students will need the confidence to maintain; disruptive students will benefit through greater engagement" (Martin, 2012, p. 21). To date, the existing research on academic buoyancy was conducted in limited studies primarily with high school students and school personnel working in secondary settings (e.g., Martin & Marsh, 2006, 2008b).

The academic buoyancy construct and its link to academic achievement in a higher education setting, as measured by GPA, as well as the role of buoyancy among other cognitive and motivational factors is the focus of the current research. As such, this study explores the following research questions:

1. Does academic buoyancy predict academic achievement as measured by first-semester college GPA?

2. Is academic buoyancy a better predictor of first-semester college GPA than SAT or placement test scores?

3. Does motivation predict academic achievement as measured by first-semester college GPA?

4. Is motivation a better predictor of first-semester GPA than SAT or placement test scores?

5. How do motivational factors, including academic buoyancy, combine to predict first-semester college GPA?

6. Does academic buoyancy predict academic achievement as measured by first-year cumulative college GPA?

7. Is academic buoyancy a better predictor of first-year cumulative college GPA than SAT or placement test scores?

8. Does motivation predict achievement as measured by first-year cumulative college GPA?

9. Is motivation a better predictor of first-year cumulative GPA than SAT or placement test scores?

10. How do motivational factors, including academic buoyancy, combine to predict first-year cumulative college GPA?

Defining Motivation

Murphy and Alexander (2000) conducted a comprehensive exploration of motivation terminology that illustrated the multitude of definitions and their associated theoretical concepts used by motivation researchers. A will to achieve something (Kurtz-Costes & Schneider, 1994) is a sentiment commonly expressed when discussing motivation. Wentzel & Asher's (1995) conceptualization of motivation included a commitment to, interest in, willingness to strive toward, and concern about academic performance (p.755). Other scholars illuminate the source of the motivation as becomes apparent when discussing the extrinsic and intrinsic aspects of motivation (e.g., Harter & Jackson, 1982, Ryan & Deci, 2000). Extrinsic motivation results in behaviors performed for the benefit of a reward or to avoid punishment. Intrinsic motivation is an internal drive to engage in an activity solely for the pleasure derived from doing so without outside incentives (e.g., Ryan & Deci, 2000). Although the source of the motivation is often differentiated by theorists, the essence of a desire to do something followed by active engagement in an activity is usually common to all definitions. For the purpose of this study, the definition of motivation conceptualized by Martin (2002) will provide the foundation for all discussion on motivational theories. Motivation is "students' energy and drive to learn, work effectively, and achieve to their potential", while "engagement is the behavior that follows from this energy and drive" (Martin, 2002, p. 21).

Motivational Theories and Buoyancy

Martin's (2002, 2012) research on the links between motivation and engagement, academic achievement, and academic resilience led to his development of the academic buoyancy construct. Several motivational theories and constructs formed the theoretical basis for the academic buoyancy construct. These foundational theories and constructs include need achievement, self-worth, attribution, control, self-efficacy, expectancy-value, motivation orientation, and self-determination (Martin 2002, 2012). When considered broadly, these derived motivational theories provide an understanding about why and how students do what they do and also provide insights about students' confidence to bounce back after a setback (Martin, 2002, 2012). Martin (2002) notes that as critical as motivation is to academic success, academic progress can be lost if students are not also resilient to the everyday pressures, stress, and setbacks related to their academic settings. Students need to be both motivated and resilient; therefore, they require a high level of buoyancy.

Distinguishing Buoyancy from Resilience

Everyday resiliency defined as academic buoyancy, is not the same as resilience as it is traditionally defined. The classic academic resilience construct is generally applicable to those experiencing major threats (Luthar, 1991; Masten, 2001). It is invoked less frequently by students and only by students experiencing traumatic or severe situations such as chronic learning disabilities, major illness, or the death of a parent during a semester. Therefore, this construct has limited applicability. Although distinct, the theoretical underpinnings of the buoyancy construct stem directly from the resiliency research (Martin, 2006; Martin & Marsh, 2009). Scholars identified both academic buoyancy and academic resiliency as factors that strengthen students' positive connections to academic life and their ability to bounce back when they face either minor setbacks or major academic adversity (Gonzalez & Padilla, 1997;

Margalit, 2004; Martin & Marsh, 2009; Overstreet & Braun, 1999). But, less is known about the buoyancy construct, in general, and especially about how it operates in post-secondary settings.

The Need for Buoyancy in Higher Education

The first year of college is widely known as the period in which students experience the most significant transition in higher education (Barefoot, 2004; Levitz, Noel & Richter, 1999; Tinto, 1988). One contributing factor is the multitude of academic challenges and pressures college students begin to encounter during the first year (Gonzalez & Padilla, 1997; Margalit, 2004; Martin & Marsh, 2008b, 2009; Overstreet & Braun, 1999).

> Tinto (1988) notes that: The stress and sense of loss and bewilderment, if not desolation, that sometimes accompanies the transition to college can pose serious problems for the individual attempting to persist in college. Though most students are able to cope with the problems of adjusting to the social and intellectual life of the college, many find it measurably more difficult. (p. 444)

New college students often do struggle with personal, financial, or social issues; poor institutional fit; or major selection. This, study, however, focuses on students' adjustment to *academic* challenges and pressures and examines the link between students' abilities to respond to academic setbacks and academic achievement.

Statement of the Problem

The overall state of national post-secondary retention rates is a topic of regular discussion and debate on college and university campuses, in political forums, in social media, and around family kitchen tables. This problem has long-lasting, life-changing effects for several audiences. The tremendous negative impact on the student who voluntarily departs cannot always be fully understood but we often characterize the loss as a waste of human talents and resources (Barefoot, 2004; Lotkowski, Robbins & Noeth, 2004).

Poor student retention is costly to the economic future of individuals, families, and institutions, as well as to the greater well-being of society. The institutions from which these students drop out recognize the negative impact. Operating budgets are directly affected for institutions whose financial stability is tuition driven, and low retention rates also attract unwelcome negative attention. As political pressure increases and threatens to link institutional funding to graduation rates, concern simultaneously rises over whether institutions will reconsider providing access to high-risk students in exchange for opportunities to raise retention and graduation rates (Barefoot, 2004; Lotkowski, et al., 2004). A direct threat to the economic viability and the historic democratic traditions of the higher education system could mean limiting pathways for access for some groups (Barefoot, 2004; Lotkowski, et al., 2004).

Research confirms that being retained from the first to the second year of college is a sound indicator of a student's likelihood for obtaining a degree (Levitz et al., 1999). For this reason, campuses have made massive investments in research on college student performance and have allocated resources to improve student success and retention rates (Reason, 2009; Tinto, 1988). Reason (2009) notes that student retention is the leading issue with which higher education administrators must currently contend. Barefoot (2004), claims that, despite all the efforts, post-secondary institutions fall short of effectively meeting the needs of all students. Reason (2009) suggests that to improve student achievement and to positively impact retention rates, expanded research that considers retention from broader perspectives is necessary to seek out more contemporary insights about why students do not persist in college.

Significance of the Study

This study will explore the relationship between academic buoyancy and academic achievement of first-year college students. Understanding the differences in how students

respond to the everyday setbacks and challenges that are typical of the first semester of college is a critical step toward improving retention. Further academic buoyancy holds particular promise as a new motivational construct in this setting because it acknowledges the importance of the role that students have in developing strategies to be successful in college (Clark, 2005). Through examination of academic buoyancy in the college setting, additional information regarding this emerging motivational construct will be garnered. Information from this study will also be important for those interested in higher education retention, an area where buoyancy has not yet been fully explored.

Coupled with other cognitive and motivational variables, including student-reported feedback about academically related stress, pressures, and setbacks and the degree to which bad grades affect confidence, may prove to be significant for practitioners charged with improving student retention rates. A greater understanding of how students respond to first-semester challenges and obstacles may provide direction for the development of orientation programs, first-year experience course content, or new interventions designed to elevate students' buoyancy levels, ultimately leading to positive gains in student achievement and institutional retention rates.

Dissertation Overview

This dissertation contains 6 chapters. Chapter 1 introduces the academic buoyancy construct and its relevance to the broader conversation on both student motivation and student retention, specifically for first-year college students. This chapter outlines the purpose and significance of this study. Chapter 2 provides a theoretical framework of the relevant literature to situate this study. The review includes a scan of seminal retention studies and a discussion of literature focused on traditional retention predictors. The motivational theories grounded in

social cognitive views of learning that complete the theoretical framework are then reviewed, followed by a presentation of the academic buoyancy construct. Chapter 3 presents Study One – the design, participants, measures, procedures and findings. Study One was conducted to explore to warrant broader research on the academic buoyancy construct in a higher education setting. Presented in Chapter 4 are the methods for Study Two which is guided by a much broader set of research questions than was Study One. Chapter 4 includes an overview of the study design, participants, measures, and procedures. Chapter 5 discusses the findings from Study Two. Chapter 6 discusses benefits, limitations, implications, and future directions for research related to Study Two.

Chapter 2

LITERATURE REVIEW

This chapter presents the relevant literature and theoretical framework that situates this study. The literature review begins with a consideration of Vincent Tinto's model of student retention and the factors most widely understood to impact retention. The most commonly used predictors of college student success, namely high school Grade Point Average (GPA) and SATs, and the debate about the exclusive use and legitimacy of these predictors is reviewed next. The second part of this review explores the relevant motivation literature, and includes known and emerging motivational constructs such as resilience and grit. The present study introduces the relatively new academic buoyancy construct. I set out to illustrate the ways in which buoyancy relates to and differs from other motivational constructs, including adaptive coping and hassles. In particular, I describe the motivational theories that form the basis for the buoyancy construct. Finally, the research conducted to validate academic buoyancy as a distinct construct viable for study are reviewed.

Significance of Retention in the First-Year of College

Not since the 1950s when college student retention first began to appear in the literature has understanding the factors that impact students' decisions to drop out of college been such a central focus for U.S. institutions of higher education (Barefoot, 2004). Approximately 25% of students entering four-year institutions drop out of college by the end of the first year. This is also true for 50% of students entering two-year institutions (retrieved from www.higheredinfo.org/). Volumes of research focused specifically on exploring the experiences of first-year students have emerged. It is commonly known that persistence through the first six months of college is a strong indicator of whether or not a student will complete a degree (Tinto,

1988). Nearly seventy years of scholarship in this area have yielded a multitude of retention theories that are used to examine student behaviors and predict student success. However, Barefoot (2004) argues that the cumulative effect on improving college student retention has been relatively insignificant as evinced by the national retention data. Foundational retention theories, such as Vincent Tinto's interactionalist theory, have long guided the development of retention research for higher education. But due to changing student demographics and evolving pressures from sources external to higher education, time honored theories are being reconsidered and the search for new ways to understand factors impacting retention is on.

Theoretical Perspectives on Student Retention

Tinto's (1988) interactionalist theory is considered an archetype against which most other retention theories are compared and contrasted (Barefoot, 2004). The essence of Tinto's theory of student departure is that the stronger a student's academic and social integration, the higher the student's commitment to her institution and the greater the likelihood to remain in college (Cabrera, Nora & Castenada, 1993; Tinto, 1988). Social and academic integration develop over time as students pass through three defined stages: separation, transition, and incorporation. The hallmark of a successful college experience is the effective navigation through the transitions from one stage to another ultimately reaching incorporation (Tinto, 1988). Unsuccessful integrations may result in unsatisfactory experiences, poor grades, or even withdrawal from college.

Throughout a student's journey, a type of congruency between the student and the institution develop. Social integration can be achieved by connecting with other students, getting involved in student organizations, or actively engaging in campus student life. Academic integration is developed through the on-going demonstration of academic competence; evidenced

most notably by an acceptable college GPA. If at any point a student considers dropping out, the strength of the overall commitment to the institution will factor into the final decision.

Tinto's conceptualization for this theory is steeped in the work of social anthropologist Arnold Van Gennep (Barefoot, 2004; Tinto, 1988). Van Gennep derived his theoretical framework from study of membership rites in tribal societies. His theory is predicated upon a belief that throughout one's life cycle, an individual experiences a number of transitions that involve resigning membership in one group for another (Tinto, 1988). Each transition is eased by participation in a meaningful ceremony (Tinto, 1988). *Table 1* illustrates the parallels between Tinto's interactionalist theory and Van Gennep's work on transitions.

Table 1

Parallels between Tinto's Interactionalist Theory and Van Gennep's Theory on
        Membership/Transitions

Stage	Van Gennep Conceptualization	Tinto Parallel to Student Retention
Separation	Individuals establish separation from all groups in preparation for seeking membership in a new group.	Students may achieve separation in varying degrees depending on the strengths of the bonds at home; this may cause isolation, disorientation, depression; an inability to leave former communities may result in drop out.
Transition	Individuals employ strategies to become isolated from a former group while simultaneously acquiring new knowledge and skills to join ranks in the new group.	Similar to the college matriculation process; usually the early stages of the first-semester of college, personal bonds with past communities become shaky while new bonds in the new community have yet to be formed; skills needed to navigate the new culture have yet to be formed.

Incorporation	Ascendancy into adulthood, individuals become full members in the new group signaled by a ceremony/ritual, responsibility to the new group must be demonstrated as well as maturity to interact with both old and new communities.	Signified by an acceptance of the norms of the college and by a demonstration of social and academic competence.

(Table conceptualized by the author based on Tinto, 1988)

Tinto inspired the work of numerous other researchers who expanded perspectives on student departure. Collectively, researchers acknowledge how complex retention is to understand. However, it is generally known that the interaction between academic and non-academic factors, at both the student and institutional level, will impact students' decisions to drop out or persist. Over a multi-decade journey, researchers continue efforts to identify, more specifically, what influences students' decision making. Barefoot (2004) suggests that retention studies themselves can be classified into one of two categories: 1.) those that identify predictors of student dropout and 2.) those that explore the types of institutional environments most closely correlated with high rates of student persistence (Barefoot, 2004). The retention literature can also be analyzed to discern what factors impact students' decision making about continuing enrollment or dropping out. This approach to understanding retention studies provides even more illuminating insights about student behaviors that impact retention.

Academic, social, environmental, financial, and motivational factors all impact retention. Bean (2013) indexed many of the previously identified variables into one of two primary categories: background and institutional variables. The first set of factors are those described as background variables, factors related to an individual student such as previous academic performance (e.g., high school GPA and rank, SAT scores), socioeconomic status, degree of

parental support, self-efficacy, and the students' level of motivation (Bean, 2013; Leppel, 2002). Initially, these factors are considered to be beyond the control of the institution. However, upon enrollment, students can be exposed to interventions purposefully designed by faculty and staff to increase motivation and improve student success.

The second category, referred to as institutional variables, consider the aspects of the institution that may impact student retention. Examples of these types of variables include institutional type, size and location, the degree to which college policies reflect a student centered culture, and the development of resources to assist students, such as orientation programs and tutoring services (Bean, 2013; Cabrera, Nora, & Castaneda, 1992). While institutions have little to no flexibility to change variables such as their physical location, they do have the ability to increase compatibility between students and the institution by intentionally organizing themselves and developing institutional culture, policies, and student services to promote retention. For example, interventions can be developed to positively affect students' feelings of identification with their campus and to increase the quality of interactions with faculty which are strategies known to increase the probability of retaining students (Astin, 1997; Bean, 2013). However, no universal explanation exists to identify which factors, either independently or in combination with one another, are the keys to improving retention. Therefore, understanding more about students who are not retained further illuminates the complexity of retention.

The Paradox of Preparation

Students gain access to college by demonstrating academic competency through the completion of an arduous application process. Interestingly though, Barefoot (2004) notes, "many institutions experience a rate of attrition that is more or less even across all levels of

student academic performance" (p. 12). This suggests that the students at risk of dropping out are not just those who are least academically prepared. We know that students will experience some level of challenge, pressure, or poor performance during college. The nature, frequency, and magnitude of those negative experiences will vary, but whether or not a student drops out depends on the student's response to the situation. Educators would like to think that students are instinctively driven to achieve and prepared to manage the challenges inherent in academic settings; however, recent research points out that effective work habits and internal drive do not necessarily "kick in" when the going gets rough (Martin, 2002, 2012). This leads to the elusive question about why some students seem to be incapable of managing first-year changes and challenges while others persist.

Conventional Predictors of College Student Success

Despite what has been learned about the range of factors that strongly relate to retention, higher education continues to rely heavily on the conventional predictors of academic success in college, namely the SATs, high school grade point averages (HSGPAs), and college placement test scores as key criterion for college acceptance. For over 70 years, there has been a practice among U.S. colleges and universities to use HSGPAs and SATs to predict students' college success (Camara & Echternacht, 2000; Kobrin & Patterson, 2011). Although challenges to this practice have been issued, HSGPAs and SATs remain common predictors of college success and as selection criterion for college acceptance.

The SAT, originally introduced in 1926 as the Scholastic Aptitude Test, is now simply known as the SAT with the letters representing no official name. Through all iterations of its name and design since its creation, the College Board, which holds proprietary rights over the exam, continues to purport that the exam promotes a system of meritocracy by serving as the

common standard against which all students are compared. Students are assessed on general analytic abilities rather than their mastery of specific subject content (Atkinson & Geiser, 2009). The SAT score has grown to represent a correlation with success in college (Atkinson & Geiser, 2009). However, for nearly as long as the exam has existed, debate ensues about the strength of its predictive capability and the degree to which it fulfills its promise to level the playing field for all students (Elliott & Strenta, 1990; Kobrin, Patterson, Shaw, Mattern, & Barbuti, 2008; Geiser & Santelices, 2007).

In the July 2000 edition of *Research Notes*, produced by the College Board's Office of Research and Development, Camara and Echternacht (2000) report that although most colleges make admissions decisions based on a combined review of SAT and high school rank, the SAT has a predictive power of future academic success over and above that which can be explained by high school grades. Ramist, Lewis and McCamley-Jenkins (1993) collected data on 46,379 students from 38 colleges during the 1980s. The major findings, consistent with previously conducted validity studies, included the following: a.) when using both the SAT and high school grades, the corrected validity coefficient is highly significant (about .7); b.) the SAT adds significantly to the prediction of first-year GPA (FYGPA) beyond high school grades (almost .10); c.) when considered independently, high school grades are a slightly better predictor of FYGPA over SATs; and d.) the combination of SATs and high schools grades yields the best prediction of FYGPA (Ramist et al., 1993). Bridgeman, McCamley-Jenkins, and Ervin (2000) confirmed Ramist, Lewis and McCamley-Jenkins' (1993) previous findings through a follow-up study of data collected during the 1990s that included 48,039 students from 28 colleges.

However, research resulting in significantly different findings raises concerns about the utility of SATs as predictors of college success. Crouse and Trusheim (1988), for example,

report that HSGPA is a stronger predictor of FYGPA than SATs, except when HSGPA and

SATs are combined in a single predictive model. They concluded that the added value of the

combined model was not a statistically significant predictor of student success and, therefore, it

is not worth subjecting students to the extensive SAT testing process (Crouse & Trusheim,

1988). In a study of 4,170 new students entering the University of Pennsylvania between 1983

and 1984, Baron and Norman (1992) affirmed Crouse and Trusheim's findings and similarly

concluded that SATs makes only a relatively small, and therefore insignificant, contribution to

predicting FYGPA, over and above HSGPA. Such studies challenge the general population's

long-standing acceptance of the SAT as a predictor of college student success.

More recently, the exam has garnered national negative attention of another kind. The

SAT is under fire by colleges and universities, students and parents for its inability to achieve its

goal of providing a common standard against which all students can be equally be compared.

Research indicates that the exam is biased against minority students and those from lower

socioeconomic backgrounds, thereby limiting the accessibility and opportunities of the students

in these marginalized groups. Studies have identified the disparate effect of the exam on some

students, most notably minorities. For example, SAT and HSGPA are often reported to have

higher correlation with FYGPA at private, small, selective, or liberal arts institutions over large,

public universities (Elliott & Strenta, 1990; Kobrin et al., 2008).

Further, when applicants at the University of California were rank-ordered by SAT

scores, the number of Latino, African American, and American Indian students in the top

applicant pool decreased by half in comparison to the same rank order exercise conducted by

high school grades (Geiser & Santelices, 2007). This illustrates that selection models too heavily

dependent on data from a single input (i.e. academic factors), will be limited in providing a

comprehensive understanding of students. These models do not factor in other variables about a student which are known to have a measurable effect on student retention. Interest in individual motivational factors as more reliable predictors swells as studies are published that raise doubt about the validity of traditional predictors of college success (Oliver, 2012).

Researchers' on-going commitment to delve into the retention problem resulted in an advanced understanding of college students today. That level of understanding leads to new avenues of research that recently prompted different thinking about this decade-old issue. Braxton (2000) called for a reexamination of some of the most time honored retention theories. Specifically, he challenged the core concepts of Tinto's theory. He questioned whether one aspect of the Tinto theory has become more important than the others. He inquired about the generalizability of the theory and whether it remains a contemporary model given the breadth of diversity in today's college student population. Braxton questioned whether the Tinto model takes into consideration the full range of variables needed to understand a contemporary college student. And finally, Braxton (2000) asked whether a successful college experience was still defined by passing through Tinto's three distinct phases of development. Barefoot (2004) echoed Braxton's sentiment about the need for novel ways of thinking about retention.

The foundational importance of past scholarship is to be acknowledged while new research that goes beyond studying retention through models that may no longer be relevant is necessary. A call for an exploration of alternate factors beyond those that have traditionally been studied to seek new insights about how to improve student success has been issued from within the higher education community (Barefoot, 2004). Consideration of non-cognitive traits studied from different research perspectives has provided opportunities to broaden conversations on

college student retention. Most salient to this study has been an increased interest on motivation research and the relationship between motivation and the academic success of college students.

Motivation and Academic Achievement

Martin drew upon existing motivation theories to develop a model related to students' motivation and engagement. These theories specifically considered need achievement and self-worth; attribution and control; self-efficacy and expectancy-value; and motivation orientation and self-determination theories. Through analysis and synthesis among these theories, he identified eleven factors, which are hypothesized to represent the thoughts and behaviors most essential to developing resilient behavior: negative associations with disengagement, failure avoidance, self-sabotage, anxiety, and uncertain control, and positive associations with learning focus, persistence, planning, task management, self-belief, and valuing (Martin, 2012). Collectively, these factors form the underpinnings of Martin's model for motivation and engagement, which is depicted in *Figure 1*. Each factor can be traced to at least one of the foundational motivation theories while some are linked to more than one.

Figure 1
Martin's theoretical perspectives and associated constructs of motivation and engagement

CONSTRUCT

THEORETICAL PERSPECTIVE

- Need achievement and self-worth motivation
- Attribution and control
- Motivation orientation & Self-determination
- Self-efficacy and expectancy-value

- Disengagement
- Failure avoidance
- Self-sabotage
- Anxiety
- Uncertain control
- Learning focus
- Persistence
- Planning
- Task management
- Self-belief
- Valuing
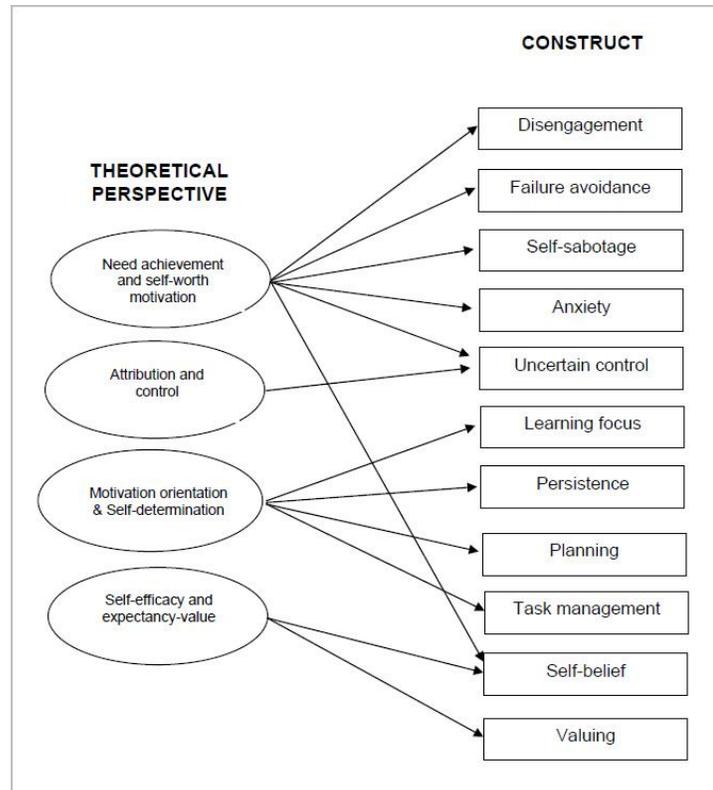
(Martin, 2012, p. 27)

Need achievement and self-worth motivation. Attitudes toward achievement and feelings of self-worth impact students' behavior choices. Students will select behaviors that result in either academic success or disengagement and failure. Need achievement theory categorizes students as being either motivated to approach success or to avoid failure (Atkinson & Geiser, 2009; Covington, 1997: Martin, Marsh & Debus, 2001). Self-worth theory assumes that students recognize the value others place on perceptions of competency and doing well. Therefore, students set goals and engage in behaviors to achieve those goals (Covington, 2000). These types of behavior result in the preservation of self-worth (Covington, 2000). Within these theoretical perspectives, students can be classified into one of three typologies: the success-oriented student, the failure-avoidant student, or the failure-accepting student (Martin, 2002; 2012; Martin et al., 2001).

Success-oriented students engage in behaviors that are more likely to promote success in academic settings; they are characterized as bright, hard-working and optimistic (Covington & Omelich, 1991; Martin et al., 2001). Success-oriented students are most likely to be motivated to respond in adaptive ways to the academic setbacks and challenges they encounter (Martin et al., 2001). They display high levels of self-belief and control.

Failure-avoidant students derive their motivation from a desire to avoid failure more than from a desire to succeed (Martin, et al., 2001). Self-doubt plagues these students (Covington & Omerlich, 1991) as does a pervasive feeling of anxiety (Martin, 2002). Failure-avoiding students engage in behaviors prior to an event to try to control the impact of the failure and to influence the expected implications to the greatest extent that they can (Martin et al., 2001). For example, a student may not study for an exam so that the failing grade can be attributed to lack of studying rather than inability. The excuse serves as a means to preserve the self-worth of the student. Students often attempt to distance themselves from failure, and in doing so, bring it on (Martin et al., 2001) in ways that may have been unnecessary to begin with, thus contributing to lower self-doubt but increased anxiety. As many of these students have the capability to succeed in the first place, this is a form of self-sabotage, or self-handicapping (e.g. not studying for tests) Martin (2002). Anxiety, failure-avoidance, self-sabotage, and disengagement are four constructs added to the model to provide a greater understanding about how failure-avoidant students are motivated.

As is failure-avoidance, failure-acceptance is also a defensive approach. Failure-accepting students generally give up altogether when they recognize the likely outcome of failure (Abramson, Seligman, & Teasdale, 1978; Covington & Omelich, 1991; Martin 2002). For them, disengagement from the academic setting is the means of self-preservation (Abramson, et al.,

1978; Covington, 1997; Martin et al., 2001). Failure-accepting students lack not only resiliency, but also motivation (Martin, 2002). For failure-accepting students, self-sabotage and disengagement are constructs important to a model of motivation and engagement.

Attribution theory and control. "Attribution theorists investigate the perception of causality, or the judgment of why a particular incident occurred" (Weiner, 1972, p. 203). Attribution theory is predicated on the premise that the way an individual interprets the cause of a past event is likely to determine future behaviors (Weiner, 2010). The attribution process has been shown to be relevant in classroom settings and a determinant of academic achievement (Stupinsky, Perry, Hall & Guay, 2012; Weiner, 1972). Students generally perceive outcomes to be associated with one of three causes: need for control (refers to feeling unsure about what to do); locus assignment (refers to internal or external causes – did the teacher cause my failure or my own lack of studying); or state of stability (refers to whether a cause is invariant or variant, that is, subject to change in the future or not) (Stipek & Weisz, 1981; Weiner, 1972). Control is critical to Martin's model because of its role in determining how students respond to setbacks, pressures, or fear of failure (Martin, 2002).

Control generally refers to the level of influence students' believe they have on their academic success (Martin, 2002; Martin and Marsh, 2003; Perry, Hladkyj, Pekrun, Clifton, & Chipperfield, 2005; Weiner, 2010). Studies exploring various aspects of academic life have demonstrated control as a powerful tool in motivating students. Perry and colleagues (2005) found that college students with greater levels of academic control achieved higher GPAs over a three year period and also withdrew from fewer college courses. Similarly, Stupinsky and colleagues (2012) also determined that college students with greater perceived control performed better academically, as determined by grades in a specific introductory psychology course. A

higher level of perceived control is also a positive predictor of critical thinking (Stupinksy, et al., 2008) and effective study habits. Students high in control are those most "energized to perform particular tasks (i.e., are motivated);" thus control is the associated construct from this theoretical framework included in the model (Martin, 2002). Students low in perceived control are expected to also lack resilience and the ability to positively respond to academic setbacks.

Self-efficacy and expectancy-value theory. Self-efficacy relates to students' belief in their own capability to complete a task and the outcome of that self-belief has on their motivation to engage in that task in the future (Bandura, 1977, 1997; Pajares, 1996). Students high in self-efficacy are more likely to select challenging tasks, perform with higher levels of persistence and effort, and seek new courses of action when they encounter failure or setbacks (Bandura, 1997; Martin, 2002; Martin & Dowson, 2009; Pajares, 1996). Highly efficacious students are both more motivated and more resilient in comparison to students with low self-efficacy. Low efficacy affects students in negative ways, sometimes to a greater extent than would reasonably be warranted by a particular situation. For example, students with low self-efficacy perceive situations to be more difficult than they really are; therefore, they choose less challenging tasks or dwell on areas of underperformance (Bandura, 1986, 1987; Martin 2002; Martin & Dowson, 2009; Pajares, 1996).

Expectancy-value theory considers the interaction among a student's self-belief, expectation for a successful outcome, and valuing of the academic task (Martin, 2002; Martin & Dowson, 2009; Wigfield & Eccles, 2000). Martin (2002) asserts that the interplay between students' valuing of a specific task and their expected outcome for that task predicts their level of motivation and engagement in an activity. The greater the perceived utility of what is being

learned, the higher the level of student engagement and overall academic achievement on the task (Martin 2001).

Valuing and persistence in the face of academic setbacks are, therefore, relevant to motivation and everyday resiliency in that they allow for a separation of students who give up before completing tasks and those who carry on to fight through challenge to reach a goal (Martin, 2002). From these theoretical perspectives, the relevancy of self-belief, valuing, and persistence to motivation and engagement are reasonable, as is the basis for their inclusion in the model.

Motivation orientation and self-determination theory. Motivation orientation refers to the aim of a student's focus when completing a task. Orientation is either that of a learning focus, in which students seek satisfaction from mastery of a task set out to be achieved, or performance focus, in which students are primarily concerned with the level of their immediate performance in comparison to others (Duda & Nicholls, 1992; Martin, 2002). Of particular relevance to Martin's (2002) model of motivation and engagement is learning focus, as mastery requires students to maintain high levels of motivation for sustained periods of time. Learning-focused students are not as threatened by failure, which they accept as an unavoidable part of the learning process. Further, learning-focused students do not view failure as a negative commentary on their abilities which is opposite the way performance-oriented students process this feedback. Learning-focused students respond to academic setbacks in proactive, rather than self-defeating ways; they generally meet moments of failure with increased effort (Martin, 2002).

Learning-focus is also related to the final theoretical perspective that shaped Martin's (2002) model on motivation and engagement: self-determination theory. Important aspects of self-determination theory to Martin's model are the intrinsic and extrinsic motivation constructs

(Martin, 2002). Extrinsic motivation refers to those attributes associated with behavior and activity influenced by an outside source, such as rewards, approval, or a grade (Martin, 2002). Intrinsic motivation, instead, refers to those elements that motivate behavior associated with inherent interest in or satisfaction with a task. Intrinsic motivation also includes curiosity, independence, and a desire for challenge. Intrinsic motivational factors like these align with the learning-focus construct and justify its inclusion in Martin's (2002) model of students' motivation and engagement.

Motivation and Engagement Wheel

Martin (2002) expanded the depiction of his model to develop the Motivation and Engagement Wheel (the Wheel), as depicted in *Figure 2*. The Wheel provided a way to more easily synthesize and explain seminal motivational theories to educators who could in turn use it with students. The Wheel corresponds with the Motivation and Engagement Scale (MES) which was developed to assess students' motivation and engagement in the classroom. Teachers use the Wheel to explain student scores on the MES and to initiate discussions with students about ways to improve their academic performance by altering behaviors related to motivation and engagement.

Figure 2
The Motivation and Engagement Wheel
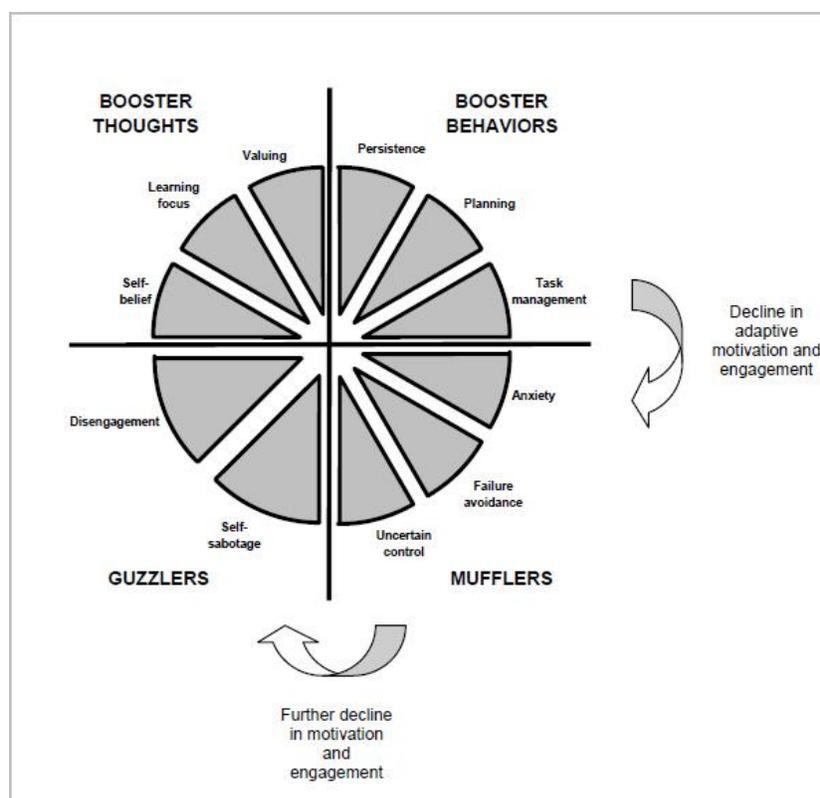
(Martin, 2012, p. 29)

As Martin (2012) describes, the Wheel is partitioned into four sections: booster thoughts and booster behaviors, which are above the horizontal line, and guzzlers and mufflers, which fall below the dividing line. Each of the 11 constructs are classified in one of these four dimensions. Boosters include the adaptive thoughts (valuing, learning focus, and self-belief) and behaviors (persistence, planning, and task management) that reflect increased motivation and engagement. Motivational constructs falling below the horizontal line represent the maladaptive behaviors that students should seek to decrease: disengagement and self-sabotage (the guzzlers) and uncertain control, failure avoidance, and anxiety (the mufflers). Ideally, students will seek to modify those thought processes or behaviors identified as impediments to strong academic performance.

The Wheel provided a mechanism that could easily convey motivational research in a user friendly way in classroom settings. The availability of the Motivation and Engagement Scale (MES) provided teachers with an easily understood instrument that was also simple to

explain to students. The functionality of the MES created opportunities for teachers and students to strategize ways to change student behaviors in adaptive ways (Martin 2002, 2012). Empirical testing of the model supported its ability to predict academic resilience.

Thorough testing of the MES in academic settings with students at all levels, elementary through post-secondary, affirmed its use as a measure of motivation and engagement (Martin 2001, 2003, 2007, 2009; Martin & Marsh 2008a, 2008b). Martin (2009) conducted an extensive study that included Australian students from the elementary, high school, and college settings. Data were collected on 624 elementary aged children from five schools, 21,579 students from 58 high schools, and 420 undergraduate students from two universities. When administered in different academic settings, questions on the MES are adjusted to reflect the appropriate school level of the participants. In the study, the MES-Junior School (JS), MES-High School (HS), and MES-UC were administered to the elementary, high school, and college students, respectively. As Martin (2009) predicted across all three samples, the adaptive dimensions of the MES were strongly and positively correlated, and all maladaptive dimensions were strongly negatively correlated. Martin's (2009) findings were consistent with those from past administrations of the MES and the results further supported the potential use of the MES for use with students at all educational levels. Confirmatory factor analysis has validated the use of the MES in domains beyond academics, to include sports and music (Martin, 2008a). In these settings, the MES continued to demonstrate value as a measure of motivation and engagement and findings were also generally consistent with those from previous administrations.

Findings from studies using the MES consistently indicate that students high on booster thoughts and actions and low on mufflers and guzzlers are more resilient to the pressures and challenges commonplace in academic settings (Martin 2001, 2003, 2007, 2009; Martin & Marsh

2008a, 2008b) as demonstrated by outcome measures such as achieving higher grades. The validation of the Motivation and Engagement Wheel and corresponding Scale(s) as sound ways to measure students' academic resilience initiated Martin's exploration of the buoyancy construct and development of the Academic Buoyancy Questionnaire.

Classic Resilience: An Overview

Generally, scholars describe what Martin and Marsh refer to as classic resilience as a phenomena characterized by positive outcomes despite severe threats to one's developmental processes (Luthar, 1991; Margalit, 2004; Masten, 2002; Rutter, 1987; Werner, 1989). Resiliency studies generally examine life experiences of narrowly defined, high-risk populations (e.g., Garmezy, Masten, and Tellegen, 1984; Luthar, 1991; Masten, 2002; Rutter, 1987; Werner, 1989). Most resiliency research has been conducted with individuals facing major adversity, such as children living with daily exposure to violence in a community or at home, individuals living in poverty, or families living with the responsibility to care for someone with a mental disorder. Encounters with any type of traumatic life event demand a high level of resiliency. To be labeled resilient, the individual must experience a major threat to a developmental process, and, in response, must make some adaptation in behavior that produces a positive outcome (Masten, 2002).

Researchers typically used two primary approaches to study these phenomena: the variable-focused approach and the person-focused approach. The variable-focused approach explores connections between the degree of a risk, outcomes, and environmental factors to seek ways to reduce or eliminate adversity (Masten, 2002). Garmezy, Masten and Tellegen's (1984) research with children led to the development of a compensatory model formulated on the variable-focused approach. Specifically, they suggested that a presenting risk can be offset or

eliminated if compensated for by sufficient positive assets in a person's life (Garmezy, et al., 1984). For example, they have demonstrated that effective parenting can be used to mediate adverse risks in a child's environment that can serve for protection of the child and the development of the child.

The person-focused approach compares individuals or groups from the same high risk sample, one experiencing adaptive outcomes and the other maladaptive ones, to determine the roots of resiliency (Masten, 2002). A classic example demonstrating the person-focused approach is the longitudinal Kauai Study, begun in 1955. A Hawaiian born cohort was followed for about 30 years beginning at infancy. Study participants were required to demonstrate at least four high risk factors such as perinatal stress, poverty, disruption of the family unit, and low maternal education (Masten, 2001; Werner, 1993). From within the participating cohort, a group labeled as "resilient" emerged and served as the comparison against which all other participants' behaviors were compared. The resilient children were reported to be more likely to seek out new experiences, get along well with others in school, achieve higher grades, and have more positive self-concepts than their less resilient peers (Masten, 2001; Werner, 1993). Additionally, Werner notes that that the longitudinal aspect of this particular study created the opportunity to develop perspectives on the long-term effects of childhood adversity in adulthood.

The connection between resilience and academic performance has been an area of focus within the resiliency research. For example, Gonzalez and Padilla (1997) explored achievement among Mexican American high school students in relation to resilience. Finding that resilient students were more likely to report higher grades than their non-resilient peers, Gonzalez and Padilla then employed a regression analysis of GPA, which suggested that a sense of belonging

in school was a significant predictor of academic resilience for these students over all other variables.

In another study with African American children living in poverty, Overstreet and Braun (1999) examined the relationship between exposure to community violence and academic functioning in children living in urban areas where daily violence occurred. Two family compensatory factors associated with resilience, a solid family unit and a strong emphasis on religion, were also explored. They found that exposure to community violence was weakly related to academic functioning. However, the children who perceived an expectation for high academic achievement and whose family displayed a strong focus on religion, demonstrated lower-than-expected levels of academic achievement. When the exposure to violence was decreased, this same group of students then demonstrated the highest levels of academic success. In other words, for this group, exposure to violence increased the risk for lower academic functioning (Overstreet & Braun, 1999).

Margalit (2004) conducted a selective review of literature exploring resiliency among students with learning disabilities (LD) to specifically consider the protective factors that might predict resilient functioning. Lower levels of resilience among LD students demonstrating negative self-views resulted in poorer academic performance. He identified gaps in the research and opportunities to further enhance the academic experiences of LD students. These included developing new methods to study LD students, the creation of interventions to bolster LD students' feelings of attachment and self-belief, and continued research to more fully understand the role of constructs like effort within the LD student community (Margalit, 2004).

Academic settings are places where students face a variety of forms of adversity that require some type of resiliency. Martin and Marsh argue that there is a different type of

resiliency that students invoke which depends on the magnitude of the trauma being experienced. They would suggest, for example, that the type of resiliency needed differs for the quadriplegic student who must learn how to navigate the physical layout of all academic buildings and classrooms in addition to course materials and the new college student who received the first F grade ever on an assignment. Both students must respond appropriately to their respective challenges and keep moving forward. Martin and Marsh agree that there is much to learn about resiliency from students dealing with more traumatic situations. But, they argue for the need to identify how resiliency operates in less oppressive contexts among the majority of students not considered at-risk by inclusion in a demographic or sociological group. They call for a construct that captures the everyday type of resiliency needed by students to bounce back from the setbacks and challenges common in the academic lives of college students. In the academic arena, there is a need to understand what traits distinguish the more successful from the less successful students.

Grit: A Noncognitive Predictor of Success

> Duckworth, Peterson, Matthews, and Kelly (2007) describe grit as: Working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress. The gritty individual approaches achievement as a marathon; his or her advantage is stamina. Whereas disappointment or boredom signals to others that it is time to change trajectory and cut losses, the gritty individual stays the course. (p. 1087)

In a New York Times article, Tough (2011) raised a question that propelled grit into mainstream conversations about student success - *"What if the Secret to Success is Failure?"* The widespread distribution of this article drew national attention to the idea of grit, which was subsequently latched onto within education (Tough, 2011). In his piece, Tough introduced the

intersecting story of two high school principals from distinctly different types of schools. Dominic Randolph, the headmaster of the prestigious Riverdale Country School in the Bronx, NY, and David Levin, the co-founder of the KIPP network of charter schools and superintendent of the KIPP schools in New York City. In their respective school environments, both administrators recognized that students generally seemed to lack skills critical to academic success - self-control, dedication to hard work, ability to accept constructive feedback/low grades, and, especially, grit.

For example, Levin reported that while 80% of the first cohort to graduate from KIPP enrolled in college, more students dropped out before the end of their first college semester than he expected (Tough, 2011). Levin also observed that the

> students who persisted in college were not necessarily the ones who had excelled
> academically at KIPP; they were the ones with the exceptional character
> strengths, like optimism, and persistence, and social intelligence. They were the
> ones able to recover from a bad grade and resolve to do better next time; to
> bounce back from a fight with their parents, to resist the urge to go out to the
> movies and stay home and study instead; to persuade professors to give them
> extra help after class (Tough, 2011, p. 41).

The successful KIPP students were the ones who demonstrated effective navigation of setbacks and failures and the ability to muster motivation to persist in the face of encountered adversities. The question nagging Levin and Randolph was simply *what did the successful students possess that those students who dropped out didn't have*?

The answer to their question may lie, in part, with grit. Grit research stems from the interest of Duckworth, and others (2007) who sought to understand why some individuals of

equal intelligence accomplish more than others. Duckworth and colleagues generally define grit as maintained perseverance and passion to accomplish long-term goals (Duckworth, et al., 2007, p. 1087). This definition marked the inaugural appearance of the term grit in research literature, and legitimatized the viability of the construct as a focus for further research (U.S. DOE, 2013).

In *Promoting Grit, Tenacity, and Perseverance: Critical Factors for Success in the 21st Century,* a draft report released by the U.S. Department of Education (U.S. DOE, 2013), clearly defining "grit" did not appear as easy a task as acknowledging the need for students to possess it. Those authoring the DOE Report recognized what Reschly and Christenson (2012) describe as the 'Jingle/Jangle' problem with term differentiation and definition.

Throughout the literature, grit is consistently likened to different terms, many of which are synonymous with grit itself. Grit is most commonly aligned with concepts including academic tenacity, agency, academic perseverance, and persistence. Further, various meanings of each of these terms were also employed. Among the definitions of grit offered, however, are some common themes and points of differentiation. Two sentiments common across all definitions include the exertion of effort necessary to achieve one's goals and the tendency to keep going when failure, adversity, obstacles and setbacks are encountered (DOE, 2013). One point of differentiation among the definitions relates to the length of time required to maintain a commitment and complete a goal. To Duckworth and colleagues (2007), grit describes strenuously working towards a major goal over years. Alternately, persistence, a term likened to grit, does not invoke the same notion of a long-term commitment and may refer to the continuation of either a short- or long-term goal (DOE, 2013). For the purpose of the DOE Report, the authors integrated key concepts from multiple definitions to describe grit as "perseverance to accomplish long-term or higher-order goals in the face of challenges and

setbacks, engaging the student's psychological resources, such as their academic mindsets, effortful control and strategies and tactics" (DOE, 2013, p. 15). However, the Report also included a call for the educational community to create a shared vernacular for the commonly referred to concept.

The DOE Report cited grit, tenacity, and perseverance as the three requisite skills needed to achieve academic success in today's educational environment (DOE, 2013). As noted above, concepts like tenacity and perseverance are often used to define grit. Characteristics of a gritty individual include positive academic mindset, a high level of effortful control, and well developed strategies and tactics; these constitute the psychological resources needed to support one's sustained perseverance toward a goal (DOE, 2013). An overview of the way in which students manifest the use of these resources in academic settings is depicted in *Table 2*. Effective employment of these resources, that is demonstrating grit, is linked to greater academic success.

Table 2
Psychological Resources that Constitute Grit

Psychological resources that constitute grit	Explanation of psychological resources	Examples of gritty behaviors
Academic mindsets	refers to the way in which students view themselves as learners, their learning environments and, themselves in their learning environments	beliefs attitudes, dispositions, values and ways of perceiving oneself
Effortful control	refers to students' ability to marshal willpower and regulate attention during tasks in the face of distractions	self-discipline, self-control, managing emotions, delay of gratification
Strategies and tactics	refers to students' ability to deal with setbacks and	defining tasks, planning, monitoring, changing course

challenges		of action

(Table conceptualized by author with support from U.S. DOE Report, 2013, p. viii)

Absence of grit, decisions like giving up on a task and dropping out of college become likely choices. For the purpose of evaluating grit in various settings, the Grit Scale (Grit-S) which measures trait-level perseverance and passion for long-term goal completion was developed and validated (Duckworth, et al. 2007; Duckworth & Quinn, 2009). Early findings reported that students high on the grit scale earned higher college GPAs even though they earned lower SAT scores. Individuals demonstrating high levels of grit also earned higher levels of educational degrees and changed jobs less often than those with low grit levels.

Conversations about the role of grit and its relevance to student success are taking place in higher education discussion forums. Despite lacking a broad accepted understanding of what constitutes grit, to which students and in what contexts it applies, how to assess it in students in everyday settings, and how to help students develop it, the higher education community has latched on to grit as a novel way to think about boosting retention. The consideration of grit does expand the conversation on predicting academic success beyond one that has primarily been focused on intellectual ability (Duckworth, et al., 2007; Duckworth & Quinn, 2008; U.S. DOE, draft, 2013). Academic buoyancy, however, is a construct applicable to higher education settings for the masses of students encountering everyday academic challenges and problems that often lead to drop out. There is a relationship between buoyancy, achievement, and retention relevant to higher education and that is worthy of examination.

Academic Buoyancy: An Introduction

Martin (2002) first explored a model of motivation and engagement that formed the basis for an academic resilience concept, namely *buoyancy*. Academic buoyancy is described as the everyday resilience that students call upon to respond to the academic obstacles encountered in

the course of a typical day. Martin initially used the terms academic resilience and academic buoyancy interchangeably. Since 2008, academic buoyancy has most often been used to refer to students' ability to bounce back from setbacks, challenges, and obstacles encountered in everyday life in the academic setting. In addition to known motivation and engagement variables, Martin argues that academic buoyancy is equally important to academic success.

Classic Resilience: Correlations and Distinctions from Academic Buoyancy

While fundamentally distinct from the classic resilience construct, the research on buoyancy stems directly from the resiliency research (Martin & Marsh, 2006). Previous studies provide a greater understanding of the difference between academic buoyancy and resiliency and the situations to which each applies in an academic context (Martin & Marsh, 2008 a, b; 2009). As *Table 3* conveys, the resilience construct is applicable to only those students who experience extreme adversity, such as a learning or physical disability or a personal tragedy (death of a parent mid-semester). Conversely, the academic buoyancy construct takes into account the routine challenges and obstacles faced by higher numbers of students with greater frequency – sometimes on a daily basis - in educational settings (Martin & Marsh, 2008a, 2000b; 2009).

Table 3
Differences between academic resilience and academic buoyancy

Academic Resilience is more relevant to:	Academic Buoyancy is more relevant to:
chronic underachievement	more typical experience of isolated poor grades and patches of poor performance
overwhelming feelings of anxiety that are incapacitating	typical stress levels and daily pressures
debilitation in the face of chronic failure or anxiety	threats to confidence as a result of a poor grade.

clinical types of affect such as anxiety and depression	low level stress and confidence
truancy and total disaffection from school	dips in motivation and engagement
comprehensive and consistent alienation or opposition to teachers	dealing with negative feedback on schoolwork

(Martin & Marsh, 2008a, 2008b; 2009)

Martin and Marsh's research (2008) indicates that buoyancy is likely to be a condition of, but is not equal to, resiliency. In practical terms, students need to be able to first navigate daily challenges (buoyancy) if they are expected to be able to manage more serious situations (resilience) (Martin & Marsh, 2008a, 2008b, 2009). During their college journey, most students are presented with an academic challenge or setback that requires the ability to bounce back and forge ahead; but fewer college students are likely to experience a form of extreme adversity as those addressed by the resiliency research. This is not to say that a high level of buoyancy may not also suggest a high level of resiliency, but the two characteristics are not interchangeable. The constructs are also not hierarchical; rather, they are two related, yet distinct, concepts that each may play a role in students' academic achievement.

Academic Buoyancy: Set in Positive Psychology

The academic buoyancy construct is set within a positive psychology context (Martin & Marsh, 2008a; 2009). Positive psychology fosters the development of positive qualities, for example, well-being, optimism, happiness, and determination, at both the individual level and within groups (Seligman & Csikszentmihalyi, 2000). Positive psychologists hypothesize that individuals have the capacity to flourish and achieve psychological growth through interactions that provide opportunities to address aspects of their lives that are not yet adaptive (Frederickson,

2001; Martin & Marsh, 2008a). This is the basis for the "broaden and build theory" (Fredrickson, 2001; Fredrickson & Joiner, 2002; Martin & Marsh, 2008a). According to this theory:

> certain discrete positive emotions – including joy, interest, contentment, pride, and love – although phenomenologically distinct, all share the ability to broaden people's momentary thought-action repertoires and build their enduring personal resources, ranging from physical and intellectual resources to social and psychological resources (Fredrickson, 2001, p. 219).

In a study of 138 undergraduate students in an introductory psychology course, Fredrickson and Joiner (2002) demonstrated that using incremental processes, positive emotions associated with broadened thinking can initiate upward spirals that move students toward emotional well-being while increasing their arsenal of coping skills for future encounters with adversities (Fredrickson & Joiner, 2002).

Martin and Marsh (2009) drew parallels between these theoretical foundations and those underlying their buoyancy construct. Most notably, the on-going, proactive, and frontline essential elements of buoyancy are those they find most in alignment with positive psychology (Martin & Marsh, 2008a, 2009). This offers an even broader theoretical lens through which to consider academic buoyancy. It moves the discussion beyond just predicting student performance to designing and applying interventions that will change student behaviors. Students can learn how to build on their strengths and improve their "outcomes" each time they engage in buoyant behaviors. The expectant result is more positive, productive patterns of behavior for future events, thereby increasing the likelihood of persistence in college.

Academic Buoyancy: Different from Adaptive Coping

Putwain, Connors, Symes, Douglas-Osborn, (2012) explored whether the buoyancy construct was merely adaptive coping presented under another identity. Previous research on coping explored individuals' cognitive and behavioral attempts to manage stressful life situations (Kohn & O'Brien 1997; Martin & Marsh, 2008a; Putwain, et al., 2012). Further examination of the coping construct illustrated nuances between problem-focused coping, an individual's effort to address the problem or stressor, and emotion-focused coping, an individual's effort to address the emotions of the stressful situation. In a study of 298 British students in their final two years of compulsory schooling, Putwain and colleagues (2012) explored whether academic buoyancy explained any variance in test anxiety above that explained by coping. A hierarchical regression analysis showed that academic buoyancy explained a significant proportion of variance in test anxiety above that accounted for by coping (Putwain et al., 2012). These findings suggest buoyancy's difference from the adaptive coping construct.

Academic Buoyancy: Different from Hassle Research

Another area of research related to coping examines everyday hassles. Researchers who target hassle as a construct focus primarily on stress and frustration that results from encounters with everyday hassles (Kohn, 1996; Martin & Marsh, 2008a). Both buoyancy and hassles deal with the stresses faced by students. However, hassle research focuses primarily on the existence and extent of the frustration, whereas buoyancy targets the manner in which the student responds to the frustration (Kohn, 1996; Martin & Marsh, 2008a). Of theoretical importance, buoyancy rests in positive psychology because of its positive, proactive orientation, which is not a feature of the hassle research.

Validating and Predicting Academic Buoyancy

The significance of an everyday resilience largely remained under-recognized through research. Even Martin and Marsh's early work on this type of resiliency drew almost solely from the classic resilience construct. This was problematic in that it meant trying to help the greater mass of students manage everyday setbacks by using a body of research based on a population of students experiencing more extreme issues (Martin & Marsh, 2006). The first study to specifically explore students' everyday resilience using a newly introduced measure designed for this purpose, the Academic Buoyancy Questionnaire, examined psychological and engagement dimensions supporting academic resilience (Martin & Marsh, 2006). The first iteration of the Academic Buoyancy Questionnaire was administered in a study with 402 Australian high school students. The initial buoyancy scale included six questions (Cronbach's $\alpha = .89$) and was administered with the student MES and items that measured enjoyment of school (n=4), class participation (n=4), and general self-esteem (n=4). Several key findings were reported from this study. The internal reliability of the items on the Academic Buoyancy Questionnaire were demonstrated. Five predictors of academic resilience were identified and yielded the 5-C model and a starting point for additional research to explore the link between motivation and resilience. Confidence (self-efficacy), coordination (planning), control, composure (low anxiety), and commitment (persistence) comprised the Cs on the model. Finally, the study also demonstrated academic resilience as a more significant predictor of enjoyment of school, class participation, and general self-esteem than the motivation and engagement factors underpinning academic resilience (Martin & Marsh, 2006).

In a follow up study that continued to explore the best predictors of buoyancy, the 5-C model was further refined. Again, classic resilience literature provided the theoretical framework and the commonly used variable-focused approach to study resilience was adopted for use in this

study. This approach guided researchers through a method that considered the links between individual variables and outcomes with the intent being to create specific interventions that will assist students (Martin & Marsh 2008a; Masten, 2001). Psychological factors, previously identified as salient determinants of students' ability to navigate academic adversities (Borman & Rachuba, 2001) and, therefore, deemed most relevant for the study of buoyancy included self-efficacy, control, teacher-student relationships, academic engagement, and anxiety (Finn & Rock, 1997; Martin & Marsh, 2008a). Anxiety was also included based on its known ability to significantly impact student performance in negative ways (Hancock, Nichols, Jones, Mayring & Glaeser-Zikuda, 2000).

Participants in the study were students in years 8 and 10 from five Australian high schools (N=598). At two different points during the school year, students were asked to rate themselves on their perceived level of academic buoyancy. At Time 1, anxiety (negatively), self-efficacy, and academic engagement significantly predicted Time 1 academic buoyancy. Anxiety (negatively), self-efficacy, academic engagement, and teacher-student relationships explained the variance in Time 2 academic buoyancy, above that explained by academic buoyancy at Time 1 (Martin & Marsh, 2008a). A supplemental finding was that of all the predictors, anxiety accounted for the bulk of the variance in academic buoyancy (Martin & Marsh, 2008a).

A notable aspect of the buoyancy research is the consideration of the differences between the sexes. Martin & Marsh consistently cited higher buoyancy levels for male students (2006; 2008a; 2008b). The motivational factors determined to impact buoyancy also differed for men and women and also differed across studies. The implications of this are most relevant for the practitioners developing targeted interventions designed to raise students' buoyancy levels and academic achievement.

These findings advanced the understanding of academic buoyancy in several significant ways. Consistency between the findings from this study were generally consistent with the previous buoyancy research thereby warranting the need for continued research. The identification of the factors that constitute academic buoyancy was useful to researchers and practitioners interested in this link between buoyancy and student achievement. Because most of the variance in academic buoyancy was recognized at the student level, it became clear that interventions could be initiated to promote the development of more buoyant behaviors (Martin & Marsh, 2008a). Educating students about the maladaptive behaviors that impede their success and teaching them strategies to replace those maladaptive behaviors with more adaptive ones could result in more positive management of academic setbacks. Notably, this study also confirmed Martin and Marsh's distinction of academic buoyancy from the traditional resilience construct. They also established the relevance of the academic buoyancy construct to students' at all academic levels (Martin & Marsh, 2008a, 2008b). Hence, a critical research gap that did not account for a type of resiliency needed by students dealing with everyday academic challenges was filled. Buoyancy was established as a distinct, adaptive construct with potential for practical application in performance based settings, including first-year college students.

Conclusion

Academic buoyancy, then, is a construct worthy of further research in the higher education context. Although some students willingly leave college for what might be considered personal or even positive reasons, student dropout is primarily caused by negative contributing factors. Ensuring that students do not withdraw or are not suspended because of an inability to manage the routine academic challenges that are known to be inherent in the college culture could positively impact the academic achievement of students, and by extension, contribute to

retention efforts. Students' inability to navigate tasks like having to ask faculty for help or interpreting a bad grade as a message that they don't belong in college can result in increased anxiety, disengagement, and ultimately withdrawal. This study will move us toward a more comprehensive understanding of the role that buoyancy might play in college student achievement, and will provide new considerations for programs that result in student retention.

Chapter 3

STUDY ONE

The purpose of Study One was to conduct an initial exploration of the academic buoyancy construct in relation to the academic achievement of first-year college students. Presented first in this chapter is an overview of the institution where the study was conducted. A description of the measures, including the Motivation and Engagement Scale for Universities and College (MES-UC), the Academic Buoyancy Questionnaire, the Study One population, and descriptive institutional data are presented. Finally, the procedures used to conduct Study One and to analyze all collected data conclude the chapter.

Institution-Specific Data: An Overview of the Study Site

Study One was conducted at a public, northeast, regional, state-related technical college. The college began as a technical institute primarily serving veterans, and then evolved into a community college, and then evolved again into the college of applied technology it is today. This undergraduate institution offers more than 100 baccalaureate and associate degrees. All academic programs focus on applied technology.

The college operates on a practice of open admission. Verification of receipt of a high school diploma or an official GED transcript is the primary admission requirement. While SAT scores are not a standard admission requirement, they are required for any student seeking to directly enter into a baccalaureate degree program and for other specially designated programs. For some programs, mostly in the field of health sciences, students must compete for seats through a highly selective admissions process beyond what is required of the college's general admissions process. All applicants are expected to complete the college's placement testing process, unless SAT or ACT scores demonstrate a level of proficiency warranting exemption.

The fall 2012 total college student enrollment was 5,671. Just slightly more students were enrolled in associate degree programs than in baccalaureate programs, although the enrollments were nearly split evenly. Enrollment in certificate programs accounted for less than 2% of the total student body. Approximately 84% of the students were enrolled in courses at the full-time level. Nearly 90% of the students self-identified as white and almost 90% of the student body permanently resided in the state in which the college is located. Just over 60% of the students were male and approximately 61% of the fall 2012 incoming class was under the age of 20.

As might be expected for an institution with a policy of open admission, a significant percentage of entering students routinely demonstrate a need for developmental coursework in at least one discipline: math, reading, or English. In fall 2012, approximately 56% of the entering new students demonstrated a need for developmental coursework. The first- to second-year retention rate of the cohort entering in fall 2012 was 70% for baccalaureate students and 62% for associate degree students.

The college offers students the full collegiate experience. Approximately 30% of all students live on-campus for a traditional residential living experience. Greek life, student government, leadership programs, diversity events, and social programs – all comparable to those found at most any college or university - are offered as part of this college's student experience. Intramural activities and college recognized athletics are also options for students. During the fall 2012 semester, the college began exploring the process to seek membership in the National Collegiate Athletic Association (NCAA) at the Division III level. Students consistently report that their primary rationale for selecting this particular college is because of its known reputation with employers and the longstanding tradition of positive placement for graduates.

Because of several longstanding relationships with key administrators at the college, permission was granted to the researcher to pursue this research. All aspects of the study design and related communications for Study One were approved by the Institutional Review Board at the institution where the study was conducted and the Pennsylvania State University Office of Research Protections (IRB #41150)

In fall 2012, Study One was approved and conducted to complete a narrow exploration of the role of academic buoyancy as a potential explanatory factor of first-semester college student GPA and to establish the viability of a larger follow up study to represent this dissertation. A review of literature suggested that the buoyancy construct demonstrated potential utility and validity through a limited number of studies, but none were conducted in a post-secondary setting with first-year students. Furthermore, no discussions of buoyancy as a predictor of academic success could be identified across all literature reviewed. To begin to understand more about this construct, two research questions were posed for Study One.

(1.) 1a.How is academic buoyancy diplayed by first-year students in a post-secondary setting? 1b.How does bouyancy in this population compare to how it is displayed in previously studied populations?

(2.) How does academic buoyancy account for variance in students' first-semester college GPA, above that which can be explained by traditional predictors, specifically, scores on institutionally administered college placement tests in math, reading, and English?

Instrument Descriptions

Consistent with previous studies exploring buoyancy, the University-College Motivation and Engagement Scale (MES-UC) and the Academic Buoyancy Questionnaire were selected for

administration. These instruments have published psychometric support, have been used in

numerous published manuscripts, and have been administered worldwide in academic settings.

Motivation and Engagement Scale (MES-UC). The MES-UC, a 44-item, seven-point

Likert scale instrument, measures post-secondary students' motivation and engagement. Students

rate themselves on a scale of 1 (Strongly Disagree) to 7 (Strongly Agree) on each item. Items are

organized into eleven scales, further grouped into four dimensions: adaptive cognitive

dimensions (booster thoughts), adaptive behavioral dimensions (booster behaviors),

impeding/maladaptive cognitive dimensions (mufflers), and maladaptive behavioral dimensions

(guzzlers). Each of the eleven scales comprises four questions (Martin, 2012). The scales that

comprise each of the four MES-UC dimensions and a corresponding sample question are

presented in *Table 4*. The MES-UC is an instrument that is protected by copy write and is

published by the Lifelong Achievement Group. The instrument was purchased for use in Study

One (www.lifelongachievement.com).

Table 4

Composition of MES-UC and corresponding sample question

MES-UC Dimensions	MES-UC Scales	Sample Question for each Dimension
Booster Thoughts	Self-belief Valuing Learning Focus	"If I try hard, I believe I can do my university/college work well."
Booster Behaviors	Planning Task (study) management Persistence	"Before I start an assignment, I plan out how I am going to do it."
Mufflers	Anxiety Failure avoidance Uncertain control	"When exams and assignments are coming up, I worry a lot."

| Guzzlers | Self-sabotage Disengagement | "I sometimes don't study very hard before exams so I have an excuse if I don't do so well." |

(Table conceptualized by author based on Martin, 2012; Martin & Marsh, 2006)

Academic Buoyancy Scale. The Buoyancy Scale contains four, seven-point Likert scale items and is designed to measure everyday resilience. Each of these items can be modified slightly to fit the context in which they are being administered (e.g., the work place or an academic setting) (Martin & Marsh, 2008b). Participants rate each item 1 (*strongly disagree*) through 7 (*strongly agree*). Strong reliability estimates are consistently reported for the scale (e.g. Martin and Marsh, 2008b).

The Academic Buoyancy items included: I'm good at dealing with setbacks (e.g., bad mark, negative feedback on my work); I don't let study stress get on top of me; I think I'm good at dealing with schoolwork pressures; I don't let a bad mark affect my confidence (Martin & Marsh, 2008, p. 173).

Study One Population

The pool of students identified for inclusion in Study One included all those enrolled in a required one-credit First Year Experience (FYE) course (n=1,459) during the fall 2012 semester. The FYE course objectives are designed to aid students' acclimation to the academic and social aspects of college life, including both in and out of classroom experiences. Discussions related to critical thinking, study skills, and academic support are primary components of the class. Successful completion of FYE is one of the college's graduation requirements. In limited cases, students may be exempted from the course and fulfill the graduation requirement through alternate credit. Students with more than 15 transfer credits and documented life experiences that

demonstrates competency for the course objectives are the most common to be exempted from FYE. During the fall 2012 semester, 45 faculty members taught 65 sections of FYE; all followed a common curriculum.

There were 120 students who voluntarily elected to participate in Study One. In this sample, 67 students were female and 53 were males. Approximately 85% of the students self-identified as White (n=102). Nearly 62% of the participating students submitting SATs scores upon entrance to the college. Likewise, just about 62% of the students in Study One required developmental level coursework upon as indicated by their college placement test. Sixty students required developmental coursework in a single area (math, reading or English), just seven students required developmental courses in two disciplines and ten students demonstrated a need for remediation in all three areas. In the overall Study One population, 43 students had no required developmental coursework.

Study Invitations

Students in FYE were sent an electronic invitation via the college email system asking for their participation in the Study One. The introductory email outlined the purpose of the study, instructions for completing the survey, and a link to both a statement of informed consent and the actual instruments. No incentive program to provide any form of external motivation was offered to participate in Study One.

Survey Administration

The MES-UC and Academic Buoyancy Questionnaire were administered electronically to all students enrolled in FYE. Although two separate measures, they were issued together so students were presented with a survey that contained 48 questions. The electronic administration of the MES-UC and Academic Buoyancy Questionnaire was powered by Qualtrics. Qualtrics is a

web-based survey software tool regularly used by the college's Assessment, Research and Planning office to gather data from the campus community. Qualtrics is also commonly used by educational institutions for this type of information gathering.

Students were given approximately two weeks to respond to the survey. Three reminders were sent between the date the introductory email was sent and the date the survey closed. Once a student completed the survey, they no longer received email reminders. Survey responses were sent directly to the Assessment, Research and Planning Office at the college.

Data Collection

The executive director of the Assessment, Research and Planning Office was responsible for compiling all student survey data and selected institutional data, including race; sex; age; and college placement test results in math, reading and English; and first-semester GPA as verified at the end of the fall 2012 semester. Collecting these institutional data required running queries from the college's main database; all queries were conducted by the executive director. The executive director randomly generated ID codes so that students' personally identifiable information could not be linked back to an individual student's data by the researcher. When all data were collected, the information was converted into an excel file. That excel file was emailed to the researcher for analysis. The data analysis for Study One was conducted using IBM® SPSS® Statistics Version 20.

College Placement Tests

Writing. The college's English placement test is administered to determine students' readiness for college-level writing. Students are given 30 minutes to respond to one of two prompts developed by the college's English faculty. Responses are evaluated on the quality of the organization, idea development, sentence structure, grammar and use of vocabulary. Two

English faculty read every student's essay. If there is not a consensus about a student's placement between the two faculty, a third evaluation of the essay is conducted by yet another faculty member. If an essay is scored at a lowscore level, indicating that the student's writing skills are evaluated as generally comparable to eighth grade proficiency, the student's college acceptance is temporarily rescinded by Admissions. Lowscoring on a placement test requires students to seek remediation. A re-test to demonstrate a minimum level of proficiency in the deficient area is then required to reactivate a students' acceptance. A successfully completed English placement test results in a student being scheduled for either a developmental English course (ENL 001) or the first level college course, English 111.

    Reading Comprehension. The college's reading placement test assesses students' ability to read and comprehend complex information. The test is designed to determine students' readiness for the type and amount of reading that will be expected in college. The college administers the commercially owned Nelson Denny, a test first developed in 1929, to gauge students' reading levels. The reading test is divided into two parts: vocabulary and comprehension. The vocabulary portion of the test consists of 80 questions to which students must respond in 15 minutes. During the second part of the test, students have 20 minutes to read 7 short passages and to respond to 38 questions (Brown, Fishco & Hanna, 2007). Students who test at or below a 4.9 reading level, generally comparable to a fifth grade reading proficiency, will be lowscored and their college acceptance will be temporarily rescinded by Admissions. Lowscoring students must seek remediation and re-test to demonstrate a minimum level of proficiency in the deficient area. A successfully completed reading placement test results in a student being scheduled for one of the developmental reading courses (RDG 001 or RDG 111) or demonstrating proficiency in this area thus eliminating the need for a required reading courses.

The Nelson Denny continues to be used in both research and practice (e.g. Brown, Bennett & Hanna, 1985; Peverly, Vekaria, Reddington, Sumowski, Johnson & Ramsay, 2013). Reviews of the Nelson Denny suggest that reliability of the instrument has been demonstrated through testing and retesting: for the comprehension sub-test, reliability ranges from .75-.82; for the reading sub-test, the reliability range dips to .62-.82 (Ysseldyke in Brown, et al., 1985). Ysseldyke acknowledges the reliability of the items, but questions the evidence provided to support the validity of the use of the instrument. Specifically, he notes that the sample population was not representative of all students participating in higher education, most notably in relation to type and size of institution and race. Murray-Ward (in Brown, Fishco & Hanna, 1998) questions the content validity of the test items citing the arbitrary and vague test selection process. Murray-Brown suggests that no empirical data exists to confirm the diagnostic functioning of the questions. Considering that the Nelson Denny format has remained relatively unchanged since 1929, Murray-Brown (1998) suggests that the format of the questions is outdated and unable to ascertain individual students' reading ability. Despite criticism, the Nelson Denny remains a widely used tool to test students' reading abilities and to place them into entry level college courses.

Math. The college's math placement test series, intentionally developed by the college's math faculty to directly align with the math curriculum, is designed to place students in the highest level math course possible. Two math faculty are required to reach consensus on each student's math placement. A third faculty is asked to review when agreement on a placement cannot be concluded.

There are three levels of the math exam. The exams are designed to test students' mathematical knowledge of concepts, computation, and application. The first exam assesses

students' proficiency with pre-algebra and elementary algebra concepts. Students are given 45 minutes to respond to 58 questions. The second of the three math exams tests students' knowledge of intermediate algebra. During this section, students are presented 26 questions to which they must respond in 30 minutes. The third part of the exam determines students' readiness for calculus. A functions and graphs exam containing 37 questions that must be answered in 45 minutes is administered to gauge proficiency. All students begin the math testing process by completing the pre-algebra and elementary algebra unless an SAT math score of 550 or an ACT score of 23 is submitted. Students who submit those SAT or ACT scores take only the functions and graphs exam.

For a comprehensive review of students' readiness for college level math courses, math faculty also evaluate each students' high school transcript and student provided feedback on a faculty developed math survey. The high school transcript review gives faculty insights about the student's past academic performance in relation to math, including the highest level math course previously taken by the student. This data helps faculty determine if there is alignment between past performance and results from the college administered math exams. An additional piece of data that is factored into placement decisions, although to a lesser extent in comparison to actual performance results, are the student provided responses on a survey that explores anxieties, attitudes, and study skill knowledge about math. This comprehensive review of all data provided through the math testing process results in course placement. Students who test lowscore, meaning placement results indicate that a student is performing math at approximately an eighth grade level or less, are prohibited from enrolling at the college until the deficiencies are remediated. Upon successfully completing the math placement tests, students can be placed into one of three developmental math class (MTH 004, 005, or 006) or any one of numerous college

level math classes. At least one, and in most cases more, college level math course is required for every major at the college.

Data Analyses

Research Question (1). 1a. How is academic buoyancy diplayed by first-year students in a post-secondary setting? 1b. How does bouyancy in this population compare to how it is displayed in previously studied populations?

Table 5 reports descriptive statistics from Study One for each of the individual buoyancy items included on the Academic Buoyancy Questionnaire. The internal consistency reliability estimate reported for the buoyancy scale (.87) from the Study One sample was stronger than previously reported by Martin & Marsh, 2008a (.80). The mean range for the Study One sample was reported as 4.28 to 4.89; the standard deviation range spanned from 1.64 to 194. The skew and kurtosis values suggest a normal distribution for each of the four items. The distributional characteristics of the measure as administered in Study One and those from previously administered buoyancy studies were similar (Martin & Marsh, 2008a).

Table 5

Study One Descriptive item-level and scale-level statistics for Academic Buoyancy Questionnaire (7-point Likert Scale)

	Mean	SD	Skew	Kurtosis
I don't let study stress get on top of me.	4.56	1.74	-.57	-.55
I think I'm good at dealing with school work pressures.	4.28	1.94	-.22	-1.21
I don't let a bad mark affect my confidence.	4.89	1.64	-.93	.05

I'm good at dealing with setbacks at school (e.g., bad mark, negative feedback on my work).	4.59	1.89	-.55	-.84
Buoyancy Scale	18.32	6.14	-6.24	-.26

Table 6 reports the descriptives for the 11 MES-UC scales from the administration of Study One. The mean value for the booster thoughts and booster behaviors which represent the adaptive constructs range from 21.14 (planning) to 25.82 (learning focus). For the maladaptive behaviors, categorized as the guzzlers and mufflers, the mean value ranged from 8.08 (disengagement) to 18.65 (anxiety). Average scores on the adaptive scales were slightly higher in this sample, and average scores on the maladaptive scales were slightly lower (Marsh, 2012). However, overall the structure and reliability of the MES-UC in Study One demonstrated strong similarities with previous findings in related academic settings (Martin & Marsh, 2008a).

Table *6*

Study One Descriptive scale-level statistics, reliability estimates for MES-UC (7-point Likert Scale)

	Mean	SD	Skew	Kurtosis	Reliability (α)
Boosters					
Self-Belief	24.85	3.17	-1.74	5.87	.78
Persistence	23.39	3.59	-.910	1.44	.88
Learning Focus	25.82	2.91	-2.30	8.07	.88
Valuing	25.52	2.74	-2.40	10.78	.79
Task Management	23.63	4.09	-1.25	1.45	.84
Planning	21.14	4.51	-.66	.18	.81
Guzzlers					
Disengagement	8.08	4.78	1.94	4.33	.81
Self-Sabotage	9.81	5.56	1.06	.81	.85
Mufflers					
Uncertain Control	12.87	6.03	.38	-.55	.89
Failure Avoidance	14.13	6.65	.30	-.78	.88
Anxiety	18.65	5.69	-.27	-.61	.81

Notably, despite a relatively small sample size, all internal consistency reliability estimates for scales in Study One were stronger than in previously reported administrations of the instrument (Martin, 2012).

Study One also explored the relations among primary motivational variables. *Table 7* reports the correlations among the primary motivational variables in Study One. The subscales for the Mufflers (uncertain control, failure avoidance, anxiety) and the Guzzlers (disengagement, self-sabotage) were combined as were the subscales for the Booster Thoughts (valuing, learning focus, self-belief) and Booster Behaviors (persistence, planning, task management) to create two predictive constructs.

Table 7

Study One Correlations among primary variables

Measure	Booster	Muffler/Guzzler	GPA
Buoyancy	.39**	-.39**	.29*
Booster		-.33**	.10
Muffler/Guzzler			.08

** Correlation is significant at p<.001; * Correlation is significant at -<.05 level

Research Question (2.) How does academic buoyancy account for variance in students' first-semester college GPA, above that which can be explained by traditional predictors,

specifically, scores on institutionally administered college placement tests in math, reading, and English?

Consideration was next given to whether buoyancy could predict first semester college GPA better than scores on college placement exams. Regression models tested scores on the motivational scales, independently and in combination with the academic buoyancy scale. Scores on the institutionally administered placement tests in reading, math, and English were also examined.

In the first linear regression model, placement scores were used to predict first-semester GPA. This model failed to predict significant variance in GPA ($R^{2=}$ .012). A second model tested the amount of variance accounted for by MES-UC scales. The two subscales also accounted for an insignificant amount of sample variance in first-semester GPA ($R^2=.028$). A final regression model indicated that reported academic buoyancy was a small but significant predictor of first-semester GPA ($R^2 =.052$, p<.012).

Due to sample limitations, additional regression models were not tested in Study One. The results from Study One advanced understanding of the academic buoyancy construct in a higher education academic setting.

Study One Findings

Previous research supports the link between motivational variables and academic achievement (Duckworth, et al., 2007; U.S. DOE Report, 2013; Martin, 2001, Martin & Marsh, 2006, 2008a, 2008b; Wigfield & Eccles; 2000). Findings from Study One lent support for use of both instruments in the population of students at the target institution, despite that the students in Study One did not directly match characteristics with any sample of students in previously reported MES-UC studies. When taken together, the positive indications from Study One

suggested that academic buoyancy is a construct warranting additional study in post-secondary settings uniquely with a first-year student sample. Therefore, Study One set the stage for a more thorough investigation of the role of buoyancy in relation to college student achievement and the motivational factors most likely to improve first semester GPA.

Chapter 4

STUDY TWO METHODS

The purpose of Study Two was to expand the exploration of the academic buoyancy construct in relation to the academic achievement of first-year college students. Study Two was conducted at the same institution as Study One, and many aspects of the methods in Study Two were consistent with those utilized in Study One. The similarities between the Methods of Study One and Study Two are presented below, as are their differences.

The Study Site

Study Two was conducted at the same college as Study One.

Research Questions

Study Two explored a broader set of research questions than those considered in Study One. The research questions for Study Two related to motivation, engagement, and academic achievement, and included:

1. Does academic buoyancy predict academic achievement as measured by first-semester college GPA?

2. Is academic buoyancy a better predictor of first-semester college GPA than SAT or placement test scores?

3. Does motivation predict academic achievement as measured by first-semester college GPA?

4. Is motivation a better predictor of first-semester GPA than SAT or placement test scores?

5. How do motivational factors, including academic buoyancy, combine to predict first-semester college GPA?

6. Does academic buoyancy predict academic achievement as measured by first-year cumulative college GPA?

7. Is academic buoyancy a better predictor of first-year cumulative college GPA than SAT or placement test scores?

8. Does motivation predict achievement as measured by first-year cumulative college GPA?

9. Is motivation a better predictor of first-year cumulative GPA than SAT or placement test scores?

10. How do motivational factors, including academic buoyancy, combine to predict first-year cumulative college GPA?

Based on Martin and Marsh (2006, 2008a, 2008b, 2009), I expected academic buoyancy to be a significant predictor of college GPA for this college student sample, separate from and above and beyond the other known predictors of academic success identified for Study Two.

Instrument Descriptions

Consistent with previous studies exploring buoyancy and Study One, the MES-UC and the Academic Buoyancy Questionnaire were administered in Study Two.

Study Two Population

The fall 2013 total college student enrollment was 5,678. Similar to the snapshot of the new student class that enrolled in fall 2012, again in fall 2013, slightly more new students enrolled directly into associate programs than in baccalaureate programs. But in the total student body, just over 50% were enrolled in baccalaureate programs. The full time enrollment remained consistent at 85% and the proportion of students with in-state permanent residence was 90%. Approximately 60% of the population were male and nearly 90% self-identified as white. Approximately 65% of the fall 2013 incoming class was under the age of 20.

Consistent with previous years, 56% of new students demonstrated a need for developmental coursework in at least one discipline: math, reading, or English. The first- to

second-year retention rate of the cohort entering in fall 2013 was 75% for baccalaureate students and 65% for associate degree students.

All students enrolled in FYE during the fall 2013 semester were selected for participation in Study Two. During this semester, 1,549 students were initially identified to take FYE; 1,496 registered for the course. Fifty three students were exempted from FYE and therefore were not invited to participate in Study Two. In total, 41 faculty members taught 61 sections of FYE during the fall 2013 semester.

Nearly 100% of the students registered for FYE were enrolled full time. Almost 65% of the students were enrolled in associate degree programs at the time they were taking FYE, but nearly 65% had also submitted SAT scores upon admission to the college. The average high school GPA of the FYE cohort was 2.972. There were 677 (45%) students who demonstrated a need for developmental coursework in at least one discipline, 114 (8%) students demonstrated a need in two disciplines, and 162 (10%) students required developmental courses in all three (math, reading and English). Nearly 70% of the fall 2013 FYE cohort were males.

Study Two Participants

Completed surveys were submitted by 390 students enrolled in FYE during the fall 2013 semester. This was a 26% response rate of all students invited to participate in the study. *Table 8* presents relevant demographic information for the study sample compared to the overall population of students enrolled in FYE. A slightly higher number of males (210) responded to the survey than females (180). But females were represented in this study sample (46.2%) at a higher proportion than they are in the overall FYE population (37%). The racial composition of the sample population nearly mirrored the diversity of all students enrolled in FYE. The vast

majority of students self-identified as white both in the sample and the total FYE population (89%).

The level of academic preparation of the students participating in Study Two was generally reflective of their larger first-year cohort, with some minor differences. Because SAT scores are not a requirement for admission, they were not provided by all students. For this sample, SAT scores were submitted by 251 students. Math SAT scores ranged from 230 – 700. The scores submitted for the Verbal SAT ranged from 230 – 660. For the fall 2013 semester, SAT scores were submitted by 998 students taking FYE. Individual students' math and verbal SAT scores were combined to give each student a composite SAT score. The mean of the submitted SAT scores for the study sample was 925.52 (SD = 144.59). A significant number of study participants also demonstrated a need for developmental coursework in math (n=215), reading (n=63) or English (n=230). This is similar to the required developmental coursework rate for the overall first-year class. Over half of the entering students (56.3%) required developmental coursework in one of the three disciplines. Descriptive statistics for the math, reading and English test scores for this sample are provided in *Table 9*. The mean first-semester college GPA of the Study Two sample was 2.876 (SD = .846).

Table 8

Study Two Participant Demographics

Characteristic	Students Participating in Study	Percentage of Students Participating in Study	Total Percentage of Students in First-Year Experience Course
Sex			
Female	180	46.2	37.04

Male	210	53.8	62.96
Race			
Native American	1	.3	.19
Asian	2	.5	.67
Black	9	2.3	3.66
Hawaiian	1	.3	.12
Hispanic	11	2.8	3.03
Multi-racial	8	2.1	1.88
White	350	89.7	89.13
Other	8	2	1.32

Note. N =390 for the sample population. N= 1,496 students enrolled in FYE course during fall 2013.

Three students were excluded from analyses because they did not provide a three part SAT score. It should be noted that the birth years of these three students are 1977, 1986 and 1987 so it is likely that all three completed the exam prior to when it was redesigned and expanded from two to three sections Therefore, reading scores would not have been available for these students, further justifying exclusion of their scores.

Study Invitations

The same process to invite students to participate in Study One was used in Study Two. Introductory emails were issued to students during the tenth week of the semester. The introductory email outlined the purpose of the study, instructions for completing the survey, and a link to both a statement of informed consent and the actual instruments.

Specifically, the tenth week of the semester was identified as the ideal time to administer the survey to first-semester students. Because the Academic Buoyancy Questionnaire is designed to gain insights about responses to college stress and challenges, it made sense to give students an opportunity to experience several weeks of homework, quizzes, tests and classroom interactions during the first half of their semester. Additionally, within the first ten weeks of the semester, mid-term grades, which provide direct feedback on overall academic performance, are issued to students. By the tenth week of the semester, students are likely to have encountered some form of academic challenge and pressure thereby providing references for responding to the survey.

Different from Study One, students were offered an incentive to participate in Study Two as a means to motivate increased participation in the study. An explanation of the incentive was included in the introductory email to students. Students who completed the survey were entered into a drawing for one of the following prizes from the college's book store: decal, mug, hat, or book store gift card in the amount of $10, $20, $50 or $100. Students were informed that their identities would remain anonymous from the researcher and would not be associated with their personal data in any way.

The data linking student names with the random codes was only accessible by the executive director. Individual names were accessed to award the prizes offered to incentivize students to participate. At the close of the survey, the executive director randomly generated a list of winning codes and matched those to student names. Only the names of the students selected to win a prize were provided to the researcher. The selected students were emailed through their college email account to inform them about their prize as well as the methods for claiming those rewards.

Institutional Data

The same archival data that was collected for Study One from the institution's

Assessment, Planning and Research Office for each student who submitted a completed MES-

UC and Academic Buoyancy Questionnaire was collected for Study Two. However, students'

high school GPAs and SAT scores, if submitted by the student, were also collected for Study

Two.

Survey Administration

The same processes to administer the surveys were followed in Study Two as were

followed in Study One.

Data Collection

The same processes to collect data were used in Study Two as were used in Study One.

Chapter 5

STUDY TWO RESULTS

This quantitative study (N=390) explored the relations among academic buoyancy, motivation, and academic achievement of first-year college students. More specifically, the purpose of Study Two was to investigate whether academic buoyancy was a more effective predictor of student success, as measured by first-semester college GPA and first-year cumulative college GPA, than SAT scores or scores on college administered placement tests. The individual roles and relationships among motivational factors and academic buoyancy were also examined.

In this chapter, I will discuss the findings from Study Two as they relate to the research questions that guided the execution of this study. Those questions were:

1. Does academic buoyancy predict academic achievement as measured by first-semester college GPA?

2. Is academic buoyancy a better predictor of first-semester college GPA than SAT or placement test scores?

3. Does motivation predict academic achievement as measured by first-semester college GPA?

4. Is motivation a better predictor of first-semester GPA than SAT or placement test scores?

5. How do motivational factors, including academic buoyancy, combine to predict first-semester college GPA?

6. Does academic buoyancy predict academic achievement as measured by first-year cumulative college GPA?

7. Is academic buoyancy a better predictor of first-year cumulative college GPA than SAT or placement test scores?

8. Does motivation predict achievement as measured by first-year cumulative college GPA?

9. Is motivation a better predictor of first-year cumulative GPA than SAT or placement test scores?

10. How do motivational factors, including academic buoyancy, combine to predict first-year cumulative college GPA?

Academic Achievement and the Buoyancy Scale

The buoyancy scale has primarily been administered in K-12 and workplace settings. Internal consistency reliability estimates reported from previous studies were .80 for high school students; .80 for the workplace (Martin & Marsh, 2008b). As was previously discussed, there was always an intent to be able to adapt the buoyancy measure to other performance contexts (Martin & Marsh, 2008b). Item and scale level statistics were first considered. *Table 9* reports the descriptive statistics from the administration of the academic buoyancy measure in Study Two.

Table 9

Study Two Descriptive item-level and scale-level statistics for Academic Buoyancy Questionnaire

	Mean	**SD**	**Skew**	**Kurtosis**
I don't let study stress get on top of me	4.40	1.77	-.26	-1.01
I think I'm good at dealing with school work	4.82	1.62	-.60	-.37

pressures

I don't let a bad mark affect my confidence	4.75	1.67	-.51	-.65
I'm good at dealing with setbacks at school (e.g., bad mark, negative feedback on my work)	4.81	1.61	-.68	-.28
Buoyancy Scale	18.78	5.65	-.424	-.459

In the Study Two sample, the internal consistency reliability estimate (.87) was stronger

than previously reported by Martin and Marsh (2008a). A large proportion of the students

participating in Study Two responded in agreement with the buoyancy items, as indicated by the

mean values. The mean range from a Martin and Marsh study with 3,450 high school juniors

(Martin & Marsh, 2008b) study was reported as 4.40 to 4.82; in Study Two, similar values of

4.59 to 4.79 were reported. The standard deviations ranged from 1.45 to 1.69 and 1.61 to 1.77,

respectively. The skew and kurtosis values for each of the buoyancy items in Study Two

approximate a normal distribution. Both independently and as a scale, Study Two results

demonstrated similar item and scale properties in this setting to those reported from the previous

academic contexts in which the academic buoyancy questionnaire was administered (Martin &

Marsh, 2008b). Given these similarities, and findings from Study One, support exists for the

expanded use of the academic buoyancy questionnaire beyond those settings in which it was

previously administered.

Academic Achievement and the MES-UC

Presented in *Table 10* are the descriptive statistics for the MES-UC administered in Study

Two. For the Study Two sample, the mean value for the booster thoughts and behaviors ranged

from 20.87 (planning) to 28.90 (persistence). Questions about planning explored students' habits

related to mapping out how to accomplish an assignment before actually beginning it. The

booster with the highest mean (persistence) related to students' drive to keep reviewing work

until it is understood. As these behaviors are more positively related to achievement, higher

numbered responses to questions about booster thoughts and behaviors are desired.

Means for the maladaptive behaviors, those categorized as mufflers and guzzlers, range

from 8.57 (disengagement) to 17.54 (anxiety). Questions exploring feelings of disengagement

ask students' about their level of interest to be in college. Anxiety related questions attempt to

gauge the degree to which students worry over future assignments and exams. Opposite of

booster thoughts and actions, lower numbered responses to questions about the muffler and

guzzler dimensions are desired as these behaviors and habits are commonly known to disrupt

students' pursuit of success.

Table 10

Study Two Descriptive scale-level statistics, reliability estimates for MES-UC

	Mean	SD	Skew	Kurtosis	Reliability (α)
Self Belief	24.89	2.82	-1.01	1.46	.758
Persistence	28.90	4.13	-.796	1.73	.797
Learning Focus	25.65	2.55	-1.23	1.85	.758

Valuing	25.46	2.66	-1.54	3.27	.741
Task Management	23.19	3.93	-1.14	1.89	.833
Planning	20.87	4.30	-.471	.113	.737
Disengagement	8.57	4.70	1.37	1.71	.806
Self-Sabotage	9.77	5.42	.968	.29	.859
Uncertain Control	12.44	5.93	.504	-6.51	.870
Failure Avoidance	13.12	6.82	.309	-1.02	.873
Anxiety	17.54	6.09	-.319	-.683	.841

Consistent with previous practice with the assessment, the 11 scales comprising the MES-UC were collapsed into 4 dimensions: booster thoughts (self-belief, valuing and learning focus); booster behaviors (planning, task management, and persistence); mufflers (anxiety, failure avoidance, and uncertain control); and guzzlers (self-sabotage and disengagement). The booster thoughts and behaviors include the adaptive constructs measured by the MES-UC, while the mufflers and guzzlers represent the maladaptive ones. Motivated and engaged students are expected to have higher booster dimension ratings and lower scores on the muffler and guzzler dimensions.

Martin (2002) discusses his model in terms of maladaptive motivation and behavior and adaptive motivation and behavior, which are represented by the booster thoughts and actions (adaptive) and the mufflers and guzzlers (maladaptive). Therefore, the mufflers and guzzlers were combined as were the two booster dimensions to reduce the model to two predictive constructs. Correlations among scores on these two collapsed dimensions, the academic buoyancy scale, scores on college administered placement tests in reading, math, and English, and SAT scores are reported in *Table 11*.

Table 11

Study Two Correlations among primary variables

Measure	Booster	Muffler/Guzzler	GPA
Buoyancy	.389**	-.461**	.144**
Booster		-.422**	.197**
Muffler/Guzzler			-.317**

**Correlation is significant at p<.001; *Correlation is significant at p<.05 level

Measure	SAT	Eng PT	Math PT	Reading PT	GPA
Buoyancy	.004	-.039	.076	-.002	.144**
SAT		.152*	.685**	-.008	.377**
Eng PT			.063	.126*	-.017
Math PT				-.060	.308**
Reading PT					-.069

**Correlation is significant at p<.001; *Correlation is significant at p<.05 level

As expected, positive significant relationships between buoyancy and other behaviors that might be anticipated to positively correlate with GPA, such as the thoughts and behaviors that comprise the booster dimensions were identified. Additionally, positive relationships existed between buoyancy, SAT scores, scores on all three of the college administered placement tests, and first-semester college student GPA.

Table 12 reports the correlations among the collapsed scales for the MES-UC items; all relationships were significant as indicated. Appropriately, the findings indicated that boosters negatively correlated with the mufflers and guzzlers.

Table 12

Study Two Correlations among muffler, guzzler, and booster collapsed scales from the MES-UC

Measure	Muffler	Guzzler
Booster	-.252**	-.500**
Guzzler	.578**	

**Correlation is significant at p<0.01.

Table 13 reports in greater detail the correlations among the 11 MES-UC scales. The strongest correlations were reported among the variables that comprise each of the four dimensions. Positive relationships were reported for the correlations between all variables comprising the booster dimensions. The same held true for the correlations between the muffler and guzzler dimensions. As expected, the boosters correlated negatively with the mufflers and guzzlers. All relationships were significant at the $p < .05$ level with some limited exceptions. Anxiety was not reported to have significant relationships with learning focus, planning, task management, or persistence. This suggests some anxiety may likely be evident even among strongly motivated students. Additionally, failure avoidance was not reported to have a significant negative relationship with planning. None of the correlation values were high enough to suggest an issue with potential multicolinearity in subsequent regression models.

Table 13

Study Two Correlations among the MES-UC scales

**Correlation is significant at $p<0.01$ level. *Correlation is significant at $p< 0.05$ level.

Measure	Self Belief	Valuing	Learning Focus	Planning	Task Mgmt	Persistence	Anxiety	Fail Avoid	Uncert Control	Self Sabotage	Disengage
Self Belief		.625**	.678**	.429**	.499**	.604**	-.162**	-.200**	-.377**	-.329**	-.401**
Valuing			.701**	.370**	.473**	.597**	-.106*	-.164**	-.272**	-.335**	-.456**
Learning Focus				.387**	.469**	.591*	-.019	.141**	-.274**	-.352**	-.455**
Planning					.617**	.641**	-.067	-.096	-.213**	-.209**	-.345**
Task Management						.699**	-.057	-.138**	-.220**	-.281**	-.397**
Persistence							-.088	-.179**	-.286**	-.389**	-.450**
Anxiety								.422**	.649**	.325**	.259**
Fail Avoid									.465**	.485**	.425**
Uncertain Control										.540**	.499**
Self Sabotage											.605**
Disengagement											

Exploring the Research Questions

To determine the degree to which academic buoyancy accounts for variance in first-year college student GPAs over other known predictors of student success, specifically, college placement test scores in math, reading, and English, SATs, and motivational variables, linear regression models were examined to address each of the research questions for Study Two. The first half of this analysis focuses on the academic achievement of students as defined by first-semester college GPA (research questions 1 – 5). The second half of the analyses then explores research questions 6 – 10 in relation to students' first-year cumulative college GPA.

Academic Achievement of First-Semester Students

Predictive Power of Academic Buoyancy. *RQ #1 Does academic buoyancy predict academic achievement as measured by first-semester college GPA?*

A regression model that included academic buoyancy as the only predictor of success for all students in Study Two indicated that academic buoyancy was a small but significant predictor of first-semester college GPA (R^2 =.021, F(1, 388) = 8.467, p <.05). Further analysis to determine whether academic buoyancy played a different role in the prediction of first-semester college GPA for male and female students was conducted. A regression model indicated buoyancy as a significant predictor of first-semester college GPA for the male students in Study Two accounting for a larger variance of GPA (7%) than had been reported by the model for the total study sample (R^2 =.068, F(1, 208) = 15.101, p <.05). A parallel model run for the females participating in Study Two, however, indicated that academic buoyancy was not a significant predictor of first-semester college GPA.

Predictive Power of Buoyancy Combined with Other Variables. *RQ #2 Is academic buoyancy a better predictor of first-semester college GPA than SAT or placement test scores?*

Academic Buoyancy and Placement Test Scores. Academic buoyancy as a predictor variable was then explored in relation to college administered placement tests in math. First, a regression model including scores from the math college placement tests as the independent variable indicated that math test scores were a significant predictor of first-semester college GPA (R^2 =.100, F(1, 388) = 43.268, p <.05). A second model including math placement test scores and academic buoyancy was then tested. Math was entered first into the model, followed by academic buoyancy. The model was statistically significant, F (2, 387) = 24.670, p <.05) and accounted for approximately 11% of the variance in first-semester college GPA (R^2 =.113, Adjusted R^2 = .108). When buoyancy was added to the model, the Adjusted R^2 was increased by

10.2%. Taking into account both students' academic buoyancy and performance on college

placement math tests accounted for a greater portion of the variance in first-semester college

GPA than the model including solely academic buoyancy, as reported above. It should be noted

that an element of this College's math placement test is a survey of students' anxieties, attitudes

and study skill knowledge about math.

Academic Buoyancy and SAT Scores. The next model explored reported SAT scores as

a significant predictor of first-semester college GPA (R^2 =.141, F(1, 246) = 40.511, p <.05).

Academic buoyancy was then added into the model along with SAT scores. Academic buoyancy

did not contribute to the model and was not a significant predictor of first-semester college GPA.

A set of models then tested for the most significant predictors of first-semester college

GPA, specifically for the group of students who did not provide SAT scores. Notably, academic

buoyancy was indicated as a significant predictor of first-semester college GPA for the students

in Study Two who did not submit SAT scores (R^2 =.048, F(1, 137) = 6.851), p <.05).

Specifically for males who did not submit SAT scores, academic buoyancy was a significant

predictor of first-semester college GPA (R^2 =.088, F(1, 83) = 8.003). Academic buoyancy was

not a significant predictor of first-semester college GPA for females who did not submit SAT

scores.

Exploring the MES-UC with students with no SAT scores. Significant motivational factors

from the MES-UC for the students who did not provide SAT scores upon entering the college

differed from the cohort that did provide SAT scores. For all of the students in the Study Two

sample without SAT scores, persistence and anxiety were identified as the significant predictors

of first-semester college GPA (R^2 = .151 F(2, 136) = 12.137 p <.05). Adding anxiety to this

model accounted for a 23% increase in the Adjusted R^2 (persistence: R^2 =.119, Adjusted R^2 =

.113; persistence and anxiety: R^2 =.151, Adjusted R^2 = .139). The differences between the men and women in this group were then explored. The strongest predictive model for first-semester college GPA for males without SATs included uncertain control and persistence (R^2 = .183 F(2, 82) = 9.182 p <.05). For females, learning focus was the significant first-semester college GPA predictor (R^2 = .161 F(1, 52) = 10.00 p <.05).

Exploring the MES-UC in relation to academic buoyancy with students with no SATs. *W*hen academic buoyancy was added into the model along with the MES-UC motivational scales, buoyancy failed to be a significant predictor of first-semester college GPA. This held true for both the male and female student groups as well. For the male group, uncertain control and persistence, and for the female group, learning focus, remained the significant predictors of students' first-semester college GPA.

Motivational Factors that Predict Achievement. ***RQ #3 Does motivation predict academic achievement as measured by first-semester college GPA?*** The MES-UC scales were tested next. All scales constituting the booster thoughts and booster action dimensions were collapsed into one overall booster dimension, consistent with past buoyancy research studies. Guzzler and muffler dimensions were also added to the model, in a stepwise method. The strongest predictive model of first-semester college GPA included boosters and mufflers, (R^2 =.095, F(2, 387) = 20.300, p <.05). When boosters were added into the model with mufflers, the Adjusted R^2 increased by 42.9% (mufflers: R^2 =.066; Adjusted R^2 = .063; mufflers and boosters: R^2 = .095; Adjusted R^2 = .090) Even when academic buoyancy was added to the model, boosters and mufflers remained the two strongest motivational predictors of first-semester college GPA.

RQ 4 Is motivation a better predictor of first-semester GPA than SAT or placement test scores? Of all the models tested, SAT scores were the strongest predictor of first-semester GPA,

accounting for approximately 14% of the variance in students' GPA at the end of the first-semester of college.

   RQ #5 How do motivational factors, including academic buoyancy, combine to predict first-semester college GPA? To fully understand which motivational factors most likely predict student success in the first semester of college, regression analyses were then run on the 11 MES-UC scales, singularly and in combination with academic buoyancy.

   Exploring the MES-UC. When examining the 11 MES-UC motivational scales, the strongest predictive model of first-semester college GPA included persistence, uncertain control, and failure avoidance ($R^2 =.107$ F(3, 386) = 15.360 $p <.05$). The Adjusted R^2 for the model containing only persistence increased by 40% when uncertain control was added into the model (persistence: $R^2 = .068$, Adjusted $R^2 = .065$; persistence and uncertain control, $R^2 = .096$, Adjusted $R^2 = .091$). When failure avoidance was added as a third variable into the model, the Adjusted R^2 increased again by 9.8 % (persistence, uncertain control, failure avoidance: $R^2 = .107$, Adjusted $R^2 = .100$). As gender differences were explored in relation to these motivational variables, the models changed for the male and female populations within Study Two. For males, uncertain control and persistence were the most significant predictors of first-semester college GPA ($R^2=.130$ F(2, 207) = 15.406 $p <.05$). Whereas for the females, self-sabotage and valuing were the significant predictors of first-semester college GPA ($R^2 = .113$ F(2, 177) = 11.319 $p <.05$).

   Exploring the MES-UC in relation to academic buoyancy. Academic buoyancy was added as an independent variable along with the 11 MES-UC sub-scales to the next model. None of the models changed. For all students in the Study Two sample, the model still reported persistence, uncertain control, and failure avoidance as the most significant predictors of first-

semester college GPA. The strongest models for males and females remained the same as well; academic buoyancy was not included in the predictive model of first-semester college GPA for either group.

Academic Achievement of Students, as Defined by First-Year Cumulative College GPA.

RQ 6 Does academic buoyancy predict academic achievement as measured by first-year cumulative college GPA? The relation among academic buoyancy, motivation and academic achievement was also explored using first-year cumulative college GPA data collected on students who participated in Study Two. Academic buoyancy was found to be a small but significant predictor of first-year cumulative college GPA ($R^2 = .018$ $F(1, 339) = 6.141$ $p <.05$). For the male students from Study Two who were retained through the end of their first year, academic buoyancy was also found to be a significant predictor of first-year cumulative college GPA ($R^2 = .054$ $F(1, 193) = 11.067$ $p <.05$). However, buoyancy was not significant for female students.

RQ 7 Is academic buoyancy a better predictor of first-year cumulative college GPA than SAT or placement test scores?

Academic Buoyancy and Placement Test Scores. Academic buoyancy and college administered placement tests in math were explored as predictors of first-year cumulative college GPA. A model that tested math placement tests scores as the independent variable indicated that math was a significant predictor of first-year cumulative college GPA ($R^2 =.096$, $F(1, 339) = 35.977$, $p <.05$). A second model including math placement test scores and academic buoyancy was then tested. Math was entered first into the model followed by academic buoyancy. Math emerged as the only significant predictor of first-year cumulative GPA

Academic Buoyancy and SAT Scores. SAT scores were reported as a significant predictor of first-year cumulative college GPA (R^2 =.126, F(1, 222) = 32.141, p <.05). Academic buoyancy was then added into the model along with SAT scores but academic buoyancy did not emerge as a significant predictor of first-year cumulative college GPA.

A set of models then tested for the most significant predictors of first-year cumulative college GPA, specifically for the group of students who did not provide SAT scores. Notably, academic buoyancy was indicated as a significant predictor of first-year cumulative college GPA for the students in Study Two who did not submit SAT scores (R^2 =.034, F(1, 112) = 3.991), p <.05). For the males in Study Two who did not submit SAT scores, academic buoyancy predicted approximately 6% of the variance in first-year cumulative college GPA (R^2 =.061, F(1, 71) = 4.598). Academic buoyancy was not a significant predictor of first-year cumulative college GPA for females who did not submit SAT scores.

Exploring the MES-UC with students with no SAT scores. Significant motivational factors from the MES-UC for the students who did not provide SAT scores upon entering the college differed from the cohort that did provide SAT scores. For all of the students in the Study Two sample without SAT scores, self-sabotage, task management, and persistence were identified as the significant predictor of first-year cumulative college GPA (R^2 = .170 F(3, 110) = 7.503 p <.05). The differences between the men and women in this group were then explored. Self-sabotage emerged as the only significant predictor of first-year cumulative college GPA for males without SAT scores (R^2 = .117 F(1, 71) = 9.393 p <.05). For females, self-sabotage was also the only significant first-year cumulative college GPA predictor (R^2 = .139 F(1, 39) = 6.302 p <.05).

Exploring the MES-UC in relation to academic buoyancy with students with no SAT

scores. When academic buoyancy was added into the model along with the MES-UC

motivational factors, self-sabotage, task management, and academic buoyancy emerged as the

significant predictors for first-year cumulative college GPA (R^2 = .179 F(3, 110) = 7.986 p <.05).

The Adjusted R^2 for the model that contained solely self sabotage as a predictor variable

increased by 26% when task management was added as a second variable into the model (self

sabotage: R^2 = .104, Adjusted R^2 = .096; self sabotage and task management: R^2 = .137,

Adjusted R^2 = .121). When academic buoyancy was added as the third variable into the model,

the Adjusted R^2 increased again by 28.9% (self sabotage, task management and academic

buoyancy: R^2 = .179, Adjusted R^2 = .156). For males, self-sabotage, academic buoyancy, and

disengagement were included in the strongest model predicting first-year cumulative college

GPA (R^2 = .215 F(3, 69) = 6.292 p <.05). And for females, self-sabotage emerged as the sole

significant predictor (R^2 = .139 F(1, 39) = 6.302 p <.05).

RQ 8 Does motivation predict achievement as measured by first-year cumulative

college GPA? To determine if motivation is predictive of first-year cumulative college GPA, the

MES-UC scales and academic buoyancy were explored. The booster, guzzler and muffler

dimensions were added into the model in a stepwise method. The guzzlers and mufflers were

reported as significant predictors of first-year cumulative college GPA, (R^2 =.089, F(2, 338) =

16.509, p <.05). When academic buoyancy was added to the model, it failed to report as a

significant predictor of first-year cumulative college GPA. Again, only the mufflers and guzzlers

emerged as significant predictors.

RQ 9 Is motivation a better predictor of first-year cumulative GPA than SAT or placement test scores? Again, SAT scores emerged as the strongest predictors of academic achievement accounting for approximately 12% of the variance in students' first-year cumulative college GPA.

RQ 10 How do motivational factors, including academic buoyancy, combine to predict first-year cumulative college GPA?

Exploring the MES-UC. The best predictive model for the entire study sample included just three of the 11 MES-UC scales: self-sabotage, uncertain control and persistence (R^2 =.114 $F(3, 337) = 14.392$ $p <.05$). For the male students, anxiety, planning, and self-sabotage were the most significant predictors of first-year cumulative college GPA (R^2=.112 $F(3, 191) = 7.994$ $p <.05$). Whereas for the females, self-sabotage was the significant predictors of first-year cumulative college GPA (R^2=.137 $F(1, 144) = 22.804$ $p <.05$).

Exploring the MES-UC in relation to academic buoyancy. Academic buoyancy was added as an independent variable along with the 11 MES-UC scales to the next model. None of the models changed. For all students in the Study Two sample, the model still reported persistence, uncertain control, failure avoidance as the most significant predictors of first-year cumulative college GPA. No changes were reported in the models for either the male or female groups either.

Conclusion

The relevancy of these findings to this setting, specifically, and to higher education more globally, is next discussed in Chapter 6.

Chapter 6

DISCUSSION

Colleges and universities are unique sites where academic challenges and obstacles that can result in diminished academic performance or drop out are encountered by all students (Clark, 2005; Martin & Marsh, 2006, 2008a, 2008b, 2009). The experience of students may be similar; in fact, the challenges may appear to be common to all students. But the way that students respond to the same situation can be quite different. Previous research established the link between academic achievement and motivation (Schmitt, Keeney, Oswald, Pleskac, Billington, Sinha, & Zorzie, 2009; Martin, 2002). But, Martin suggested that a gap in existing motivation research illuminates a missed opportunity to bolster student achievement by failing to focus on the role of student response in these situations.

To effectively navigate the everyday challenges that are known to be inherent in academic settings, students need a type of everyday resiliency known as buoyancy. More specifically, in academic settings where students must be able to successfully overcome the setbacks and challenges that are typical of everyday academic life, they require a sufficient level of academic buoyancy (Martin & Marsh, 2008a; 2008b). Debilitating effects, such as poor academic performance, high levels of stress, and student drop out, result when students demonstrate an inability to appropriately respond and keep moving forward in the face of adversity. Greater insights about what motivates students to do what they do could help improve low institutional retention rates, which have become a topic of national discussion. Furthermore, this type of knowledge about students could provide strategic direction on the design of effective interventions targeted at improving students' academic performance (Clark, 2005; Martin 2002).

The broad purpose of Study Two was to explore the academic buoyancy construct in a higher education setting and to understand its relations among motivation, engagement, and academic achievement. Confirmation of the comparability of distributional properties and internal consistency reliability estimates between the findings of Study Two and past administrations of both the academic buoyancy scale and MES-UC scales supported the application of both instruments in this higher education context. Academic buoyancy was found to be a small but significant predictor of academic achievement, with some noteworthy nuances.

This chapter presents a discussion of the findings for the research questions presented. These discussions are followed by a presentation of the study limitations. The implications for both research and practice are noted and lead to the final suggestions for future directions in research on academic buoyancy and college student achievement.

Findings and Discussion

Buoyancy Scale Validation

Academic settings are known to be environments in which pressure and challenges exist for students (Clark, 2005; Martin and Marsh, 2006, 2008a, 2008b, 2009). A small but growing number of researchers examined the ways in which students respond to challenges and pressures in other academic settings, most notably in secondary classrooms. The findings from previous research supported buoyancy as a construct distinct from other known constructs that could be used to measure students' motivation and engagement in academic settings (Martin & Marsh, 2006; 2008a; 2008b; 2009; Martin et al., 2010).

Although of a different nature from those experienced in high school, post-secondary institutions, including the college that served as the site for Study One and Study Two, present routine academic challenges known to result in setbacks for some students. From the higher

demands for independent work to the increased level of academic rigor, students routinely experience new forms of daily pressures when they enter college. The expectation that one's continued enrollment in college depends on demonstrated academic success creates environments at post-secondary institutions in which academic buoyancy could be critical to a student's success. The findings from both Study One and Study Two lend support for expanding the study of academic buoyancy beyond the K-12 system where it had primarily been researched and into the higher education context.

The data reported in Chapter 5 from Study Two illustrated the similarities between samples from past administrations of the academic buoyancy measure and the student sample in Study Two. Most notably, the internal consistency reliability estimate for the academic buoyancy scale in Study Two was .87; a value stronger than was reported in previous studies by Martin and Marsh (2008b). As independent items and as a scale, the findings on the four buoyancy questions also demonstrated similar properties between the first-year college student sample in Study Two and the findings from other studies with younger aged student populations. The distributional properties of the individual item responses approximate a normal distribution that is comparative to consistent findings from previous buoyancy research. As indicated then by the data, the academic buoyancy construct demonstrated potential for use in the higher education setting with first-year college students where this study was conducted.

Academic Buoyancy and the Prediction of Academic Achievement

A sub-set of the research questions dealt specifically with the role of academic buoyancy and its ability to predict academic achievement, as measured by college student GPA at the end of the first semester and then again at the end of the first-year of college. The specific research questions related to this aspect of academic buoyancy include:

RQ #1: Does academic buoyancy predict academic achievement as measured by first-semester college GPA?

RQ #2: Is academic buoyancy a better predictor of first-semester college GPA than SAT or placement test scores?

RQ #6: Does academic buoyancy predict academic achievement as measured by first-year cumulative college GPA?

RQ # 7: Is academic buoyancy a better predictor of first-year cumulative college GPA than SAT or placement test scores?

The Motivation and Engagement Scale (MES) was based on a cognitive-behavioral model that includes the thought processes and behaviors central to motivation achievement (Martin & Marsh, 2008b). The framework for this model was formed by integrating several seminal motivation theories which included attribution and control; self-efficacy and expectancy-value; and motivation orientation and self-determination. From this integrative perspective on motivation emerged 11 scales that were divided into four dimensions: booster thoughts (valuing, learning focus, and self-belief); booster behaviors (persistence, planning, and task management); mufflers (uncertain control, failure avoidance, and anxiety); and guzzlers (disengagement and self-sabotage). The MES was developed as a 44 item instrument to measure motivation and engagement in unique settings, e.g. K-12 classrooms, the workplace, college classrooms. The MES-UC was specifically designed to assess motivation and engagement of college students, in general. It was not designed to gauge motivation in relation to the content of any specific course or domain (Martin, 2007).

Because the MES-UC did not specifically explore the way in which students respond to stress created by academic challenges, buoyancy was proposed as a factor that underpins the

positive connections students have with school and their ability to bounce back when faced with academic adversity (Martin & Marsh, 2009). Academic buoyancy was positively correlated with the 11 MES scales. Study Two explored whether buoyancy would be a significant predictor of academic achievement above that of placement tests or SAT scores. Few studies were previously conducted to explore buoyancy in the post-secondary setting. Research directly examining the role of academic buoyancy in predicting first-semester and first-year cumulative college students' GPAs in the way it is explored in Study Two was not known to exist prior to this study.

Regression models demonstrated the relationships among the variables examined through Study Two. Results for this study indicated that academic buoyancy was a small, but significant predictor of academic success at both the end of the first semester and the end of the first-year, as defined by GPA (2%).

SAT scores and college administered math placement tests scores emerged as more significant predictors of academic success from Study Two than did academic buoyancy. Of the three college placement tests administered in math, reading, and English, only math emerged as a significant predictor of students student achievement. Scores on math placement tests alone accounted for 10% of the variance in both first-semester and first-year cumulative college GPA. At the end of the first semester, math test scores and academic buoyancy combined to predict 11% of the variance in students' first-semester college GPA. However, by the end of the first year, academic buoyancy no longer contributed significantly to that predictive model with math scores.

SAT scores were reported as the strongest predictor of students' academic achievement. For the students who submitted SAT scores, the scores accounted for 14% of the variance in

students' first-semester college GPA and 13% of the variance in students' first-year cumulative

college GPA. The reported correlation between SATs and first-semester college GPA (.377) was

the strongest from all those reported values.

Prior academic performance, usually demonstrated by performance documented on a

high school transcript, standardized test or college entrance exam, is commonly identified as the

likeliest predictor of academic success in college (Williford, 2009). There is, however, growing

sentiment that SAT scores and/or high school performance alone are not the most useful

predictors available for use (Camara & Echternacht, 2000; Crouse & Trusheim, 1988; Elliott &

Strenta, 1990; Kobrin, et al., 2008; Williford,). For instance, studies exploring noncognitive traits

suggest that a broader set of motivational constructs may assess a more comprehensive set of

explanatory predictors of success than solely those that measure intellect (Duckworth, et al.,

2007; Martin, 2001, Martin & Marsh, 2006, 2008a, 2008b; U.S. DOE Report, 2013). These types

of studies offer new perspectives on understanding students' strengths and potential pitfalls, and

thus, where a student is likely to need to assistance.

The findings from Study Two suggested that, when considered as independent variables,

SATs and placement test scores are more predictive of first-semester and first-year cumulative

college GPA than the academic buoyancy construct under study.

Observations about the Study Two sample provide notable perspective on these findings.

The college operates on an open admission policy. That almost 65% (n=251) of the students who

voluntarily participated in Study Two submitted SAT scores was a higher than expected rate.

SAT scores were not required as part of students' application to the college for admission unless

applying directly to a baccalaureate program. This high proportion of students submitting SAT

scores was considered significant given that only 35% of the total fall 2013 new student class enrolled directly into baccalaureate degree programs.

It could be inferred that students require a level of buoyancy to complete all processes related to the SAT – researching the dates, times, and locations; preparing for the exam, taking it, submitting scores to selected institutions, etc. One explanation could be that the students who self-selected to participate in Study Two do in actuality possess high levels of buoyancy. The effect of buoyancy then in the predictive model may have been diminished in comparison to what could be ascertained by SATs and placement test scores in this highly motivated sample.

Although students appeared to have submitted SAT scores for no reason, it might be that these students had an intent to enroll in a 4-year degree program that just was not yet acted upon. Nearly 50% of the approximate 6,000 total student body at the college in fall 2013 was enrolled in baccalaureate degrees. This means that sometime during students' first two years, a notable number of new students officially change from associate to baccalaureate degree programs. Consciously making the choice to switch from a two-year to a four-year degree is committing to an investment of time, financial resources, and personal sacrifice that requires a considerable level of motivation.

Another indicator suggesting that the students participating in Study Two possess key adaptive thoughts and behaviors that enable them to successfully navigate the pressures and challenges of collegiate life are the fall to spring and fall to fall retention rates of these students. At the end of the fall 2013 semester, 89% of the 390 students in the study sample were retained from the fall to the spring semester. And 75% of the study sample were retained from the first to second year of college. These students outperformed those students who were invited to participate in Study Two, but did not, in regard to both academic achievement and retention. The

study sample collectively earned a 2.835 GPA at the end of the first-semester, and a 2.959

cumulative GPA at the end of the first year. Their peers who were invited but did not participate

in Study Two collectively earned 2.529 first-semester GPA and a 2.798 end of year cumulative

GPA. The non-participating cohort were retained from the fall to spring semester at a 82% rate

and from the first to second year at a 68% rate.

In Study Two, SAT was controlled for as a predictor variable which revealed another

noteworthy finding. For the student cohort that did not submit SAT scores, academic buoyancy

accounted for a slightly higher proportion of the variance (5%) in first-semester college GPA

than the reported variance for the students who did submit SATs. However, by the end of the

first year, buoyancy only accounted for 3.4% of the variance in cumulative GPA, which was less

than the cohort that did submit SAT scores.

The reasons that students did not submit SAT scores were not assessed and it is likely

that they vary among students. These reasons, however, could include factors such as lack of

high school academic preparation, poor college planning, or declaring a major at the college that

does not require them. Although not at this college, SATs are commonly required as part of a

college admission application. A lower level of motivation to seek out information about the

testing process and to endure the tests could be one possible explanation about why students' do

not complete the testing process. Alternately, students could also have appropriately researched

and planned for college and known in advance that SATs were not required for admissions at this

college. Not having the scores to submit could have been purposeful and intentional as a strategy

to save time and financial resources for example.

The significance of academic buoyancy was similar for all students participating in Study

Two, those who submitted SAT scores and those who did not submit SATs, in regards to sex. It

should be noted that there are distinct enrollment patterns in degrees at the college by sex. Females at the college are largely enrolled in health related fields that require a selective admission process. Once in one of the health programs, students are expected to continue to demonstrate strong academic performance to maintain enrollment in their respective programs. Students who seek these programs are often characterized as highly motivated and possessing a mindset for success.

More male students (n=210) participated in Study Two than female students (n=180). Buoyancy was reported as a significant predictor of academic success for male students in both groups at both the end of the first semester and at the end of the first year. For male students who submitted SAT scores, 7% of the variance in their first-semester college GPA was accounted for by GPA; 5.4% in first-year cumulative college GPA. For the male cohort who did not submit SAT scores, academic buoyancy accounted for 8.8% of the variance in first-semester college GPA and 6% in first-year cumulative college GPA. However, academic buoyancy was not a significant predictor of academic success for female students, those with or without SAT scores.

Finally, the regression model that included both math placement test scores and academic buoyancy as predictor variables and accounted for 11.4% of the variance in first-semester GPA should be considered. This model is similar to one reported by Schmitt and colleagues (2009) in a study that explored both noncognitive and cognitive predictors of success for college students. Final semester college GPA was identified as the dependent variable while SAT/ACT scores, high school GPA, institutional data, and noncognitive variables as measured by the Situation Judgment Test were entered as the independent variables. While scores on the standardized tests and high school GPA were reported as the most significant predictors, Scmitt and colleagues

(2009) concluded that noncognitive measures were also useful for practitioners engaged in the work of predicting student success.

Given relative low variances reported for SAT (14%/13%), placement test scores (10%), and academic buoyancy (2%) in Study Two, a similar conclusion can be drawn. For Study Two, academic buoyancy was positively correlated with scores on all three of the college administered placement tests, and first-semester college student GPA. The significance, although relatively low, of the model containing both academic buoyancy and math placement test scores could provide practitioners at the college with a more comprehensive understanding of what impacts students' success. This finding also provided support to explore the specific motivation factors that contribute to students' success as explored through the remaining research questions.

Motivational Factors and the Prediction of Academic Achievement

Study Two also focused on the role of motivational factors on academic achievement. Whether motivational factors predicted academic achievement, the degree to which motivational factors might be a better predictor than other known predictors of success, and which motivational factors, in particular, are more significant to students' success were next explored. These topics were examined in relation to academic achievement, as measured by college student GPA at the end of the first semester and then again at the end of the first year of college. The specific research questions related to motivation include:

RQ #3: Does motivation predict academic achievement as measured by first-semester college GPA?

RQ #4: Is motivation a better predictor of first-semester GPA than SAT or placement test scores?

RQ #5: How do motivational factors, including academic buoyancy, combine to predict first-semester college GPA?

RQ #8: Does motivation predict achievement as measured by first-year cumulative college GPA?

RQ #9: Is motivation a better predictor of first-year cumulative GPA than SAT or placement test scores?

RQ #10: How do motivational factors, including academic buoyancy, combine to predict first-year cumulative college GPA?

The driving interest motivating this study was curiosity about how to more specifically help college students develop strategies to achieve academic success. The variable-focused approach taken to study buoyancy created opportunities for researchers to ascertain the specific motivational factors most likely to influence academic success (Martin & Marsh, 2008a; Masten, 2001). The strength of this approach lies in the ability to connect this understanding to targeted interventions designed to promote increased academic buoyancy.

The findings of Study Two suggested that persistence, uncertain control, failure avoidance, and self-sabotage were the most salient of all measured motivational variables under study warranting further examination of each.

When considered specifically in relation to sex, uncertain control and persistence (in relation to first-semester GPA) and anxiety, planning, and self-sabotage (in relation to first-year cumulative GPA) were also identified as significant predictors for male participants. Self-sabotage and valuing (in relation to first-semester GPA) and self-sabotage (in relation to first-year cumulative GPA) were identified as predictors of achievement for the women in Study Two.

For the cohort of students that did not provide SAT scores, persistence, anxiety, self-sabotage, and task management all emerged as significant predictors of GPA. For the male students specifically, significant predictors of academic achievement included uncertain control

and persistence (in relation to first-semester GPA) and self-sabotage (relating to the first-year cumulative college GPA). For females, it was learning focus (in relation to first-semester GPA) and self-sabotage (relating to first-year cumulative GPA).

Specifically, the study findings suggest that interventions designed to target students' academic buoyancy should revolve around the thoughts and behaviors that can be linked to each of these variables.

Interestingly, of the eleven motivational scales comprising the MES-UC, ten – persistence, planning, task management (booster behaviors), valuing, learning focus (booster thoughts), self-sabotage (guzzler), uncertain control, failure avoidance, disengagement and anxiety (mufflers) - were reported as significant predictors of GPA for students participating in Study Two. In some cases, these motivational variables were predictors of first-semester GPA while others were predictors of firs-year cumulative GPA. Some variables were also only predictors for relative students, for example they only predicted GPA for students who did not submit SAT scores.

Martin (2003, 2012) established correlations for each of these motivational variables with adaptive behaviors. Therefore, efforts should be made to promote the significant booster behaviors with students while simultaneously attempting to diminish the negatively correlated muffler and guzzler behaviors. The established link Martin (2003, 2012) has established between motivation variables and academic success provides a roadmap for intervening with students in need of assistance. Persistence describes the drive that students have to keep working through materials they find to be challenging (e.g. "If I can't understand my schoolwork as first, I keep going over it until I understand it") (Martin 2012, p.37). Planning relates to how students plan and track homework and classwork (e.g. "Before I start an assignment, I plan out how I am going

to do it") (Martin, p. 37). Task Management generally relates to students' time management skills (e.g. "When I study, I usually, try to find a place where I can study well") (Martin, 2012, p. 37). Valuing refers to ways that students think about the importance and relevancy of what they are learning (e.g. "Learning in school is important to me") (Martin, 2012, p. 37). Learning focus explores students' thoughts about how they feel when they recognize that they have acquired new knowledge or developed a new skill (e.g. "I feel very pleased with myself when I really understand what I'm taught at school") (Martin, 2012, p. 37).

The ways in which the maladaptive behaviors that students employ to prevent their own success also was explained (Martin, 2003; Martin, 2012). Self-sabotage refers to the behaviors that students engage in to reduce the chance of success (e.g. "I sometimes don't study very hard before exams so I have an excuse if I don't do well") (Martin, 2012, p. 38). In an academic setting, these could include procrastinating on assignments and not attending class. Anxiety includes both feeling nervous and worrying. Feeling nervous is described as the sick feelings that students sometimes experience when they think about their coursework. Worry then refers to fear students have about not being successful in college (e.g. "When exams and assignments are coming up, I worry a lot") (Martin, 2012, p. 38). Students demonstrate uncertain control when they are unsure about what to do to be successful (e.g. "I'm often unsure about how to do well or how to avoid doing poorly") (Martin, 2012, p. 38). And, failure avoidance is described as the actions students take to avoid failing so that they don't earn poor grades and disappoint others (e.g."Often the main reason I work at university/college is because I don't want to disappoint others") (Martin, 2012, p. 38).

The findings of Study Two make sense in relation to the cohort of students participating this study. Feelings of anxiety are commonly discussed in relation to new students and their

experiences during the first-semester of college. Belzer, D'Zurilla, and Maydeua-Olivares (2002) demonstrated a significant relationship between college students' feelings of anxiety and negative problem orientation, rational problem solving and impulsivity. Anxiety is known to impede college students' functioning in a variety of contexts that range from all types of social settings Kadison and DiGeronimo (2004) to classrooms, especially where math is being taught (Bessant, 1995; Perry, 2004), to study skills workshops (Chapell, Blanding, Silverstein, Takahashi, Newman, Gubi, & McCann, (2005); Culler & Holahan, 1980).

Generally, anxiety is recognized as a nearly unavoidable hallmark of educational systems due to the high stake expectations for success in the academic culture (Martin, 2003). Stupinsky and colleagues (2012) demonstrated the debilitating effect that student perceptions about low levels of control have on academic performance, specifically grades. When students experience such doubt and anxiety, behaviors that are considered self-handicapping, like purposefully not preparing for tests and failing to complete assignments, often ensue. Recognizing when new students begin to exhibit these feelings and behaviors is a key to preventing them from stumbling. Interventions to help students reframe their thinking and behaviors are needed.

Setting students on a course for success often begins at many colleges and universities through communications and programs that convey the importance of college attainment and the standards for academic performance. Admissions materials and orientation programs are examples of ways that many institutions begin to frame students' thinking about the college experience. Helping students then achieve success in the classroom can support students to move their mindsets toward a higher level of being satisfied with their own academic success (learning focus). The broaden and build theory (Seligman & Csikszentmihalyi, 2000) reminds us that even small successes can be motivating and encouraging for continued success. Numerous resources

on every college campus exist to help students achieve success such as faculty, academic advisers, tutoring services, and self-help workshops. Examples of ways that college faculty and staff encourage students to develop behaviors that will increase their level of persistence can also easily be identified. Faculty who promote office-hours, early alert referral systems for students who demonstrate a need but may not ask for it on their own, and workshops designed to intervene with students who demonstrate low mid-term grades are just a few. Finding ways to motivate students to take advantage of the resources made available to them is often one of the most commonly cited frustrations about working with new college students. Seeking ways to understand why students do what they do by exploring how they responded to encountered challenges and setbacks can give both researchers and practitioners some direction in their work.

Study Limitations

The design of this study depended largely on student reported responses. Inherent in that method of collecting data are two noted limitations.

The clearest factor that may have influenced the findings of this study was the response rate. Although 390 students voluntarily participated, one might question the lack of responses from 1,100 students in the cohort eligible for participation. Other common concerns about self-reported data often include consideration of the degree to which the survey items were interpreted appropriately and the truthfulness in the responses provided. Concern about whether students responded in a way to reflect the behaviors they desired in themselves or in a way that accurately depicts how they really think and act is a common limitation for these types of data collection (Krathwohl, 2009).

The timing of the survey could have impacted students' responses in different ways. A decision was made to administer the survey just after mid-term grades were issued at the

College. Students begin a semester with a positive feeling; expectations for grades that may be inconsistent with past academic performance or students' commitment to studying. For example, a student might indicate a belief that the semester will end with a dean's list GPA, but also share that they missed 2 of the first 4 class meetings. By waiting until after students' received midterm grades, a more realistic understanding of their own behaviors was deemed likely. If administered too early in the semester, students may not have enough feedback on college level coursework or campus experience to thoughtfully draw upon when responding to the questions.

Finally, the study was conducted at a single institution which may limit the generalizability of these findings to other new college student populations. The setting for this study was a technical college with an open admission policy. Those features of this College draw attention to the unique aspects of this institution. But the similarities of the characteristics of the student body and the first-year issues they face during their transition to college are parallel in many ways to those of new college students nationwide. The findings of this study lend support for warrant to broaden research on the way academic buoyancy is demonstrated in college settings to further illuminate issues related to generalizability.

Future Directions for Research

This study advanced the understanding of the academic buoyancy construct in relation to college student achievement. In doing so, perspective areas for future research were illuminated. The first relates to the need to continue the validation of buoyancy as a construct that is distinct from others. Although buoyancy was well established in relation to resilience, coping, and hassle research, additional research is needed to explore the possible relationship between buoyancy and grit. Current research does not offer a formal connection between the two adaptive

constructs; however, several key motivational elements appear to be relevant to both: self-belief, persistence, task management, planning, and valuing.

An important aspect of Duckworth's definition of grit is the emphasis placed on the duration of time. If grit is defined as persistence over long periods of time to achieve goals, and academic buoyancy is applicable to everyday obstacles and challenges, one consideration might be that what some are identifying as grit is really a high level of buoyancy in students. Is it grit or something else that explains students' motivation to bounce back from everyday types of obstacles and setbacks? An exploration of whether students' behaviors are more representative of being academically buoyant or gritty is an avenue for research to more fully understand students' motivation and engagement to succeed.

Although buoyancy was found to be less predictive of GPA than SATs and scores on college administered placement tests, the findings from this study were consistent with other research that confirmed that noncognitive traits contribute significantly to the prediction of academic success (Scmitt, et al., 2009). Further exploration of the role of buoyancy, especially in relation to students who demonstrate low academic performance, would be useful. Students placed on academic probation as result of demonstrated poor performance in college often demonstrate maladjustment to college life in ways that contribute to their poor grades. Lack of content mastery could be a contributing factor, but more often than not, lack of commitment to coursework and drive to engage in classes in positive ways are anecdotally perceived to be the more contributing factors. Focused research with this population of students could provide a more concrete understanding about who they are, why they do what they do, and how to assist them.

Future Directions for Practice

Academic buoyancy demonstrated as a somewhat useful predictor of first-year college students' GPA. First-year college students will undoubtedly encounter academic situations that require a level of buoyancy that helps them bounce back and continue moving forward. This study illustrates that an understanding of buoyancy will provide insights about "the specific facets underpinning academic resilience" and guide the development of "more targeted intervention and support to enhance students' ability to deal with setback, challenge and pressure in the academic setting" (Martin & Marsh, 2006, p. 277). Findings from this study provided practitioners at the college information that can be used to develop strategies that reduce anxiety, uncertain control and self-sabotaging behaviors. Simultaneously, those strategies could be aimed at enhancing students' valuing, learning focus, and persistence. Ascertaining information about students' buoyancy could have implications for those who plan orientations, teach FYE courses, coordinate academic advising, and develop any type of academic support services are positive. This could be a useful resource for college and university practitioners seeking to raise college retention rates.

Additionally, understanding that buoyancy is displayed differently by male and female college students could be helpful in designing interventions that meet the needs of different students in more purposeful ways. The finding for this study that males exhibited higher levels of buoyancy is consistent with previous research (Martin & Marsh, 2006; 2008a; 2008b). The specific motivational factors underpinning achievement levels of males and females in this study differed some from those studied in previous administrations (Martin & Marsh, 2006; 2008a; 2008b), a key aspect of buoyancy research is to learn what motivates specific group of students. So, for the males in this sample, uncertain control and persistence were the most significant predictors of buoyancy, while for the female participants it was self-sabotage, valuing, and

learning focus. Such difference can inform the development of specific interventions that target individual and group needs.

Conclusion

The purpose of this study was to explore the relations among academic buoyancy and academic achievement of first-year college students. Through this research, the understanding of the buoyancy construct was advanced. Expansion of its use in higher education with a cohort of new college students contributed to the growing body of literature on buoyancy and also contributed another variable to consider in the college student retention discussion. Insights about how students respond to everyday academic challenges and setbacks that are considered routine in the college environment would be relevant to researchers and practitioners interested in enhancing students' motivation and engagement. Buoyancy was found to be a small, but significant predictor of first-semester and first-year cumulative GPA. These findings add additional perspectives to consider when developing strategies targeted at facets of students' lives that may be impeding desired achievement levels. Increasing student success is an important aspect of improving institutional retention rates. As such, buoyancy offers a way to examine students' motivation and engagement and refocus them on their path to academic success.

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Vita

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