3-15-2019

An Examination of the Use of Reading Fluency Indicators to Predict ACT Sub-Scores of First-Year College Students

Elizabeth Cassady
ecassady@bellarmine.edu

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by

Elizabeth Cassady

A dissertation submitted to the Faculty of

The Annsley Frazier Thornton School of Education

Bellarmine University

In partial fulfillment of the requirements for the degree

Doctor of Philosophy in Education and Social Change

March 2019

Bellarmine University

The Undersigned Faculty Committee Approves the

Dissertation of

Elizabeth M. Cassady

An Examination of the Use of Reading Fluency Indicators to Predict ACT Sub-Scores of First-Year College Students

Dr. David Paige (Chair)

Associate Professor, Annsley Frazier Thornton School of Education, Bellarmine University

Dr. Grant Smith

Assistant Professor, Annsley Frazier Thornton School of Education, Bellarmine University

Dr. Katie Partin

Director, Office of Institutional Effectiveness, University of Louisville

Acknowledgements

I am incredibly grateful for the guidance and support I have felt along the journey of graduate work and the writing of this dissertation. I am blessed to have a supportive family, tight circle of amazing colleagues that have provided me with encouragement, reality checks, and timely distractions over the last four years. To my parents, Don and Carole, thank you for nourishing my confidence, voice, and commitment to lifelong learning. You have both modeled hard work, discipline, and an appreciation for every opportunity to grow for my entire life. My successes are certainly rooted in the foundation you so lovingly provided for us. Thank you to my dear brother Brent, the first Dr. Cassady, for demonstrating resilience and education in your own education and amazing career. To my sweet brother Graeme, thank you for always listening, allowing me to externally process ALL the emotions, and the timely texts with perfect gifs along the way. To Joey- I am so grateful you showed up at the door right when I needed you. Thank you for balancing out my life, reminding me to have fun, and to appreciate life's blessings along the way. You and the girls have enriched my life in immeasurable ways.

A true blessing in life is working hours on end with not just colleagues but true friends. To my dearest partner in crime, Dr. Patrick Englert, thank you for caring for me like a sister. I am fairly certain I would not have made it through a few patches in our nine years of working together without your encouragement. Thank you for always being a supportive and generous listener. I am forever indebted to Dr. Helen Grace Ryan for endless support and guidance along my career. You have helped me grow and have provided transformative leadership in my life. And to Dr. Fred Rhodes- I will never forget our first meeting over ten years ago. Thank you for hiring me for my first job at Bellarmine and allowing me to flourish under your graceful leadership of Student Affairs.

I will never forget my first meeting with you, Dr. David Paige. I had no idea our little exploratory meeting would turn into this dissertation study but am so grateful it did. You have instilled an eagerness for understanding and renewed a commitment to removing barriers to literacy for our students. Thank you for all of the time you have dedicated to this study. I look forward to ongoing collaborations and learning. Thank you to Dr. Grant Smith for all of your advising and support along my doctoral journey. I have so enjoyed your perspective and insightful commentary on the happenings on campus. And to Dr. Katie Partin- thank you so very much for your guidance and insight not just on this project but over the last ten years as a friend. Who would have thought our collaborations in First Year Initiatives would have led us here? You are a wonderful friend and lovely role model. Thank you for your support through all of this.

Abstract

Using Tinto's student departure theory (Tinto, 1975, 1993, 2012) and the simple view of reading (Hoover & Gough, 1990), this study explores the relationship between reading fluency indicators and achievement on the ACT reading sub-test and the ACT composite score. The study utilizes reading samples obtained from first-year college students attending a small, private university in the southeastern United States. A non-random sample of students (n = 95) was recorded while reading a college-level, informational passage measured at the 1470 Lexile level. Results of using hierarchical linear regression revealed that word reading accuracy as measured by reading miscues predicted unique variance in both ACT reading sub-scores and in ACT composite scores. Reading miscues explained 19.2% of the variance in the ACT reading sub-score and 24.0% of the variance in ACT composite scores. Issues of college-student literacy, readiness, and persistence to degree completion are explored. Implications of the study support the need for pre-matriculation indicators of incoming student academic competencies for universities to provide equitable and adequate academic support for all students for persistence to degree completion.

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Chapter 1: Introduction

In a recent article in *The Atlantic*, a startling headline was used to address the state of reading in the United States. The headline read, "Why American Students Haven't Gotten Better at Reading in 20 Years," (Wexler, 2018). The headline targets an issue many in the higher education community are voicing as a critical concern underlying the acute pattern of declining college readiness across the country. Particularly in the areas of reading and math, fewer students are demonstrating readiness as determined by national tests such as the ACT, even though more students are graduating from high school with an interest in attending college (Conley, 2007; Venezia & Jaeger, 2013). A stark disconnect exists between student and parent expectation, what students are learning from kindergarten through high school completion, and the expectations of college and university staff and faculty of student preparedness. The tension is made even sharper by consistent increases year-to-year in college tuition and the pressure placed on retention and career placement outcomes in support of accountability expectations (Seemiller & Grace, 2016). Without a comprehensive review of the preschool to career pipeline, often referred to as "cradle to career", or the P-16 pipeline, the United States will remain stagnant in student learning (Castleman & Page, 2014).

College readiness across the country is a complicated metric. Readiness indicators used by secondary and postsecondary institutions in many states are based on ACT benchmarks (Kentucky Council on Postsecondary Education, 2018). An ACT reading score of 20 or higher is considered college ready in some states, such as the site state for this study, which was lowered from a score of 21 for the 2018- 2019 academic year. Incoming ACT reading sub-scores for the fall 2018 cohort at the institution for this study ranged from 15 to 36. ACT composite sub-scores ranged from 18 to 35 with a mean average of 25.13. In the largest school

district in the state, 80.6% of the senior class graduated from the public school system, yet only 58.8% of that same population was considered college or career ready (55,000 Degrees, 2018). In analyzing reading scores for the state as compared to national normed populations, eighth grade reading scores dropped from 19th in the country to 31st in 2015 (Krauth, 2018). Nationally, National Assessment of Educational Progress reading scores for eighth and 12th grade students have declined between 1992 and 2015, with very little movement between 2013 and 2015. Both ACT (2018) and NAEP reports demonstrate stagnation in reading development across the country. Based on ACT reports, the stagnation of reading levels is consistent with NAEP findings (ACT, 2006, 2014, 2018; Krauth, 2018). In an ACT report on The Condition of College and Career Readiness (2014), only 53% of 10th grade students met the ACT reading benchmark. In 2018, the percentage was 46%, a decline of 13.2%. Without a better understanding of the reading trends at the secondary level, higher education will always combat the issue of readiness with matriculating students.

As Conley (2008) explains, college readiness is a complicated, multi-faceted factor in a student's ability to persist to degree completion. A roadblock in having a full understanding of what incoming students know and can do includes the limited nature of current readiness measures. While most colleges and universities still require either the ACT or SAT for admission, the lack of standardized assessments of concrete content knowledge as well as measures of non-cognitive skills limit the ability of post-secondary institutions to decipher various data needed to inform support services for transition structures that will best fit each incoming cohort. There may be a distinct interaction between college readiness and reading literacy as much is still undiscovered about the literacy skills of underprepared students (Fowler & Boylan, 2010; Perin, 2013). While the role of student ownership and motivation is significant

in student persistence, schools must provide equal access to academic support for the students that enroll at the institution (Braxton, Jones, Hirschy, & Hartley, 2008; Conley & French, 2014; Tinto, 2012). Stronger relationships could also be built between K-12 schools and postsecondary institutions within communities to enhance the students' transitions and build shared matriculation data on students in support of student persistence (ACT, 2014; ACT 2018; Venezia & Jaeger, 2013). The interwoven tensions create an ethical dilemma for postsecondary instutions in admissions politics. As many postsecondary institutions scramble to admit the most diverse pool of scholars from a decreasing population of college-going students (Selingo, 2018), the necessary insrastructure to support all learners continues to pose a barrier to the ultimate capacity for persistence for all students. When students are admitted to a postsecondary institution, the university is ultimately making a commitment to see the student through to degree completion by providing adequate social and academic support along the way. For schools that are unable to build an infrastructure to support all learners, more demand for accountability in admissions policies may emerge, facilitating a need for institutions to reconcile capacity demands with mission-driven student support.

The role of reading fluency in college readiness has been explored recently, and findings demonstrate the need for more analysis in this area of literacy (Rasinski et al., 2016). The authors argue that a better understanding of reading fluency will allow secondary teachers to have benchmarks for readiness in an otherwise fluid landscape of reading measures and lack of clarity on appropriate interventions. While the research around the Lexile framework and the Common Core State Standards (Stenner, 1996) attempts to standardize reading measures across the country, school systems remain at a loss for adequate guidance on supporting struggling readers beyond the elementary grades (Cunningham & Mesmer, 2014; Goldman & Lee, 2014). While

many educators are fully aware of readiness issues and literacy trends, few possess a learned framework to truly provide successful interventions to better prepare struggling readers for college and career.

Problem Statement

There is a gap in the literacy research in the global understanding of reading fluency and college-level students. While there is substantial support for literacy theory in the elementary grades, a gap in the understanding of reading achievement stagnation exists at the secondary level. It is yet to be determined why reading achievement declines between the 10th and 12th grades and how that stagnation may impact entering college student academic performance.

Significance

Although Rasinski et al. (2016) explored the relationship between ACT reading scores and first-year college student fluency, additional research is necessary to more fully understand the interactions between high school reading indicators, academic performance, and how literacy levels impact college student persistence. As the bulk of literacy research is focused on elementary with some exploration of middle grades, more robust research is necessary to understand the dynamics of college-level literacy, why reading indicators decline between 10th and 12th grades, and how colleges and universities can design interventions to academically support students as they progress to degree completion. While many postsecondary institutions do offer remediation or co-curricular academic support for incoming students that test below college-ready, remediation efforts often fail to adequately assist the students. Fewer incoming students that start a degree requiring remediation will actually persist to degree completion as compared to their peers not requiring remediation (Perin, 2013).

Purpose

The purpose of this study is to determine the predictability of first-year student reading fluency based on pre-matriculation ACT reading and composite sub-scores. Through a deeper understanding of student reading ability tied to ACT sub-scores, student success professionals may provide stronger academic supports for incoming students as they become better informed of intervention and remediation strategies that can assist first-time college students. Accumaticity, a metric used to describe the number of miscues subtracted from words read in a passage, contributes to the prosodic fluency of a reader (Paige & Smith, 2018). By analyzing a reader's fluency, depths of knowledge and perceived capacity for success may be determined for pre-college processes such as course placement and provision of academic supports. As many postsecondary institutions still use standardized tests, such as the ACT and SAT, for admissions criteria, the predictability of student capacity and relevance of the pre-matriculation scores should be continuously assessed for efficacy and validity.

Research Questions

The guiding research questions for this study include:

1. What is the relationship between indicators of fluent reading and ACT attainment levels?
2. Do reading fluency indicators predict the ACT composite and reading sub-score?

Based on the guiding research questions for this study, the hypothesis is that students with ACT reading and composite scores at the college-ready level or below will have some difficulties in reading fluency as compared to peers above the college-ready level on the ACT reading and composite benchmarks. More specifically, it is hypothesized that students who are not considered college-ready by state standards will have clear gaps in ability that could limit comprehension of academic reading at the college level. It is additionally hypothesized that

students with higher ACT attainment levels will be more fluent readers than peers with lower ACT attainment levels.

Conceptual Framework

This study requires two frameworks to explain the intersection of literacy and reading ability with readiness measures and ultimately student persistence. The guiding framework that will be used to explain first-year student reading fluency will be the simple view of reading (Hoover & Gough, 1990). College student persistence trends will be explored through the lens of Tinto's student departure theory (1975, 1993, 2012). Both conceptual frameworks are discussed in detail in chapter two of this dissertation.

Limitations

Based on the sample size and site characteristics, this study may not be widely generalized to all first-year entering college students. The timing of the data collection is also a limitation, as data collection occurs in the latter part of the fall semester; the ebb and flow of the typical academic year may impact the number of participants attending to e-mail requests for participation. Additionally, participation is voluntary and answers to pre-surveys are self-reported. In terms of background characteristics, race will not be included in the analysis, although there is reason to consider it based on ACT and NAEP data that show reading attainment differences by race. However, the small sample size makes consideration of race problematic in the interest of preserving participant anonymity.

Definition of Terms

The following definitions are relevant to this study:

1. *Accumaticity:* A metric in which reading miscues are subtracted from the number of words read within one minute to reflect the correct number of words read (Paige & Smith, 2018).
2. *Automaticity:* the ability to perform a complex skill with little conscious mental effort (Samuels & Flor, 1997).
3. *College readiness:* "The level of preparation a student needs in order to enroll and succeed, without remediation, in a credit-bearing general education course at a postsecondary institution that offers a baccalaureate degree or transfer to a baccalaureate program" (Conley, 2008, p. 4).
4. *Fluency:* the ability of a reader to group words in meaningful ways, recognizing grammatical units, and the ability to read effortlessly and with expression (LaBerge & Samuels, 1974).
5. *Persistence:* "Continued enrollment of students as they work toward completing a credential" (Kentucky Council on Postsecondary Education, 2011)
6. *Prosody:* The pitch, duration, loudness, and smoothness of oral reading (Benjamin & Schwanenflugel, 2010)
7. *Text complexity:* features of a narrative that may be evaluated, measured, or analyzed for the textual elements such as syntax, words, and sentence length (Cunningham & Mesmer, 2014)

Summary

This study will explore the linear relationship between reading fluency, college readiness, and persistence to degree completion. Focusing on reading fluency indicators of reading rate, word identification accuracy, and prosody, the relationship between first-year college student

reading fluency and ACT reading and composite scores will be explored. The need for this study is rooted in the gaps of understanding of college-level literacy concerns and the inadqequate remediation interventions currently utilized at the postsecondary level. The study will use two theoretical models to inform the analysis and discussion: the simple view of reading and Tinto's college student departure model. More discussion of the scholarly literature in the domains of literacy, college readiness, and predictors for degree completion will be explored in chapter two of this dissertation.

Chapter 2: Literature Review

Introduction

This literature review synthesizes the intersecting fields relevant in this study: literacy, college student readiness, and college student persistence to degree completion. College student readiness is informed by performance on standardized tests, specifically the ACT. As such, the literature review will cover relevant frameworks for college student persistence and seminal theories on reading fluency and comprehension. While the literature is rooted in foundational theory for each component of this study, recent dialogue from the last 10 to 20 years of scholarly research on issues in higher education is represented. A clear gap exists in the research in the field of reading fluency for students in secondary and postsecondary grades. Hence, the majority of the research discussed will address early learning in reading and disconnects in what is understood about the development of fluency and text comprehension beyond the secondary grades. This further supports the need for the current study as many teachers of secondary students as well as higher education professionals have little training in strategies to better support reading skill development of secondary and post-secondary students.

This chapter will ultimately provide a discussion of seminal research and relevant current discourse on each subtopic, a discussion of the frameworks selected as informed by what is understood about literacy and college student success to date, and a look toward an understanding that may be gleaned from this study.

College Readiness

A serious issue in the United States is the lack of broad understanding of literacy concerns. Although more students are graduating from high schools and are offered access to higher education, fewer of these students are technically college ready. David Conley (2007) of

the Educational Policy Improvement Center defines college readiness as the preparation a student needs to be successful in a given credit-bearing course at a postsecondary institution without requiring remediation. The Kentucky Council on Postsecondary Education (CPE) defines college readiness based on the criteria that entering first-time students should have graduated from high school, completed pre-college curriculum, and have taken the ACT assessment (Kentucky Council on Postsecondary Education, 2018). Although most formal readiness definitions include benchmarks met through placement or standardized tests, much of the literature supports additional consideration for non-cognitive skills and the role of mindset and academic commitment in a thorough discussion of readiness (Braxton, Jones, Hirschy, & Hartley, 2008; Conley, 2007; Conley, 2008; Conley & French, 2014; Roderick, Nagaoka, & Coca, 2009).

Students that graduate from secondary schools who are not college-ready are often advised to take remedial courses pre-matriculation or as a co-curricular course offered by a two- or four-year postsecondary institution. While the exact numbers vary slightly, many researchers have found that only one third of United States high school graduates are truly prepared for college-level work (Bettinger, Boatman, & Long, 2013). This proportion is often skewed downward for African-American and Latino students as gaps in minority achievement have been stagnant for decades. These gaps in achievement have direct effects on all Americans in terms of taxes, lower economic development in communities, and ongoing strains on federal financial aid (Bettinger, Boatman, & Long, 2013). Remediation requirements have emerged as a substantial barrier for students who graduate from American high schools without adequate preparation in core content areas and specifically in reading and math.

Stewart, Lim, and Kim (2015) studied the relationship between pre-matriculation factors, such as high school GPA, ACT scores, family characteristics, and demographics, with college persistence and completion of assigned remedial courses. For the purposes of the study, Stewart, Lim, and Kim (2015) defined remedial education as courses that supplemented basic knowledge in math, reading, and writing. Based on a longitudinal accumulation of data analyzed using multiple regressions, the researchers found significant differences based on financial status, ethnicity, and remedial status. In other words, students from various minority backgrounds, students needing remediation, and students with high financial need were less likely to persist. Additionally, high school GPA and first-semester college GPA had a significant role in effect size in the regression for persistence (26%). The researchers obtained a sample size of 3,213 first-year students continuously enrolled from fall 2006 through fall 2008 at a large research institution. Based on the ex post facto analysis of the cohorts, the researchers found that of the students qualifying for remedial education pre-matriculation, 60.5% persisted through five semesters and 39.5% persisted for four semesters or fewer, while 73.2% of nonremedial students persisted for five semesters or more and 26.8% persisted for fewer than five semesters. Overall, this study demonstrates a need for further analysis of the role of readiness and the probability of students qualifying for remedial education to persist to degree completion. Additionally, the impact of high school GPA and first-semester college GPA is consistent with similar studies on relevant predictors of college-student persistence through the first year (Barnett & Reddy, 2017; Venezia & Jaeger, 2013).

Placement in remediation has a profound impact on college student persistence and is directly informed by accepted readiness measures for each postsecondary institution (Barnett & Reddy, 2017; Venezia & Jaeger, 2013). Additionally, the delivery style of remedial courses may

have a compounding impact on student persistence. Conley (2007) and Venezia and Jaeger (2013) support the widely accepted argument in the research on college student readiness and success that many students in need of remediation feel a palpable isolation and may experience imposter feelings as they matriculate to a postsecondary institution. Strategies that students may have used to compensate for any learning challenges in high school, such as in reading fluency and comprehension, may not work for the student with college-level text. Students are also asked to demonstrate content knowledge and critical thinking differently in the college setting (Venezia & Jaegar, 2013). Some students' remedial needs may be inadequately measured resulting in higher attrition from both remedial courses and the institution once the students matriculate (Barnett & Reddy, 2017).

Many students who start remedial courses do not complete the intended college degree (Adams, Gearhart, Miller, & Roberts, 2009). There is some support in the literature for this phenomenon that would imply commitment and ability consistent with the students' high school performance (Bahr, 2012). Others may also argue that the failure of some students to persist through remedial coursework is related to the length of time and financial commitment required to work through remedial courses prior to enrolling in credit bearing course work (Adams et al., 2009; Barnett & Reddy, 2017; Venezia & Jaeger, 2013). Students that are not college ready at the time of high school graduation in reading and math are not prepared for the levels of success necessary to persist to degree completion. While there is much agreement in readiness research that students' levels of readiness should be determined using multiple factors (Bettinger, Boatman, & Long, 2013; Conley, 2007; Fowler & Boylan, 2010; Roderick, Nagaoka, & Coca, 2009), gaps in foundational content knowledge may lead to even larger persistence and adjustment issues for the student. The impact on students' confidence if struggling in college-

level work, compounded with potential lack of agency and resources for obtaining academic support, may also contribute to barriers in course completion (Barnett & Reddy, 2017). Additionally, gaps in reading and math contribute to larger academic issues in all courses such as STEM courses, writing, and in the synthesis of information .

Summary

Of the numerous issues contributing to college readiness, gaps in reading literacy are fundamental to the ongoing issues of students' ability to persist. Although multiple components of student ability should be considered in measures of readiness, the majority of post-secondary schools continue to use student performance on standardized tests, such as the ACT and SAT, to determine readiness levels of incoming students. The strategy to support students who are admitted but are not considered college-ready pre-matriculation is enrollment in remedial courses that are either offered in the summer prior to matriculation or as a co-curricular option. Many students who begin college enrolled in remedial courses will not persist to degree completion.

Standardized Measures of Readiness

ACT

Measures of readiness are largely comprised of standardized testing or placement exams. Standardized exams, such as the ACT and the SAT, are used to determine high school graduates' levels of academic readiness in many states. Some states, such as the location of the site in this study, utilize ACT benchmarks in place of content exams given at the high school level to determine eligibility for graduation (Scott- Clayton, 2012).

Beginning in 1959 at the University of Iowa, the ACT was designed to measure academic achievement and skill knowledge taught in schools (ACT, 2018). The ACT provides student test-

takers with a score in the following areas: English, math, science, reading, and a composite score of all content areas. Over 1.4 million students take the ACT on average each year (Atkinson & Geiser, 2009). The reading section of the assessment focuses on student ability to make meaning of given texts and infer conclusions, make comparisons, and generalize content more broadly (ACT, 2006). The ACT was designed to allow for better measurement of reasoning skills than the primary exam to that point on the market: the SAT. As such, the ACT was meant to be informed by, and more closely aligned with, actual high school curricula (Atkinson & Geiser, 2009). However, with each state responsible for determining curricula for each school system, the ACT has been challenged to standardize content across the country. Although the ACT was revised in 1989 to better reflect high school curriculum, and even with the addition of a writing section in 2005, both the ACT and SAT struggle to capture an authentic representation of what students actually learn and know at the point of high school graduation (Atkinson & Geiser, 2009). Ultimately, the ACT may be used as a yardstick to measure progress over time of a nationally representative sample of student learning. A critical area of concern as reported by ACT in recent decades is in the area of reading.

Based on ACT reading scores in 2005, only 51% of students in the United States were meeting the benchmark for college-level reading (ACT, 2006). The benchmark for most states has been set at a reading score of 21 (Adams, 2010). A further concern is that while only 51% of eighth and 10th graders in 2005 were on track for college-readiness, a decline in reading ability actually occurs by the 12th grade (Adams, 2010; ACT, 2006). Reading readiness levels on the ACT hit a peak high in 1999 with 55% of students meeting the benchmark. However, the percent of students meeting the benchmark decreased to the 2005 level and have remained stagnant ever since (ACT, 2006).

While early reading has continued to improve over time, there is limited understanding of exactly what is happening in the high school years that may be contributing to this decline in literacy rates across the country (Adams, 2010). The debate largely focuses on classroom instruction in high schools, teacher training in literacy, lack of comprehensive national reading standards, inconsistent accountability to national legislation, and declining complexity of textbooks (ACT, 2006, Adams, 2010; Atkinson & Geiser, 2009). Based on the outcomes of the Reading Between the Lines report (ACT, 2006), various recommendations were suggested by ACT: strengthen teacher preparation for teaching reading, provide targeted interventions for students who are behind in reading skills, revise and standardize state and national expectations of reading curriculum, and strengthen the degree of text complexity included in reading curriculum (ACT, 2006).

In 2014, ACT released an updated report with trends in all areas of content measured for benchmarks of college and career readiness. The report is comprised of the results of approximately 57% of the nations' graduating class in 2014. Reading has continued to decline since 2005 with only 44% of the nation's high school graduates meeting the college-ready benchmark in reading. The report, released again in 2018, shows a very slight improvement in reading readiness with 46% of the nations' graduates reaching the benchmark. The 2018 results are representative of 55% of the high school graduates with an increase in the number of test-takers between 2014 and 2018 (a 4% increase in students taking the test). Once again, ACT provided various recommendations to strengthen college-readiness across the country. In addition to reiterating the need for clear standards and a focus on teaching and learning, an increase in rigor and complexity in curriculum, a recommendation to strengthen the communication and data-driven policy shifts for the pre-school through college completion

pipeline were included. With the rise of the Common Core, the emphasis on standardizing complexity of curriculum seems to be taking hold of the national policy agenda (Venezia & Jaeger, 2013).

National Assessment of Educational Progress

Another clear measure of the concern regarding reading performance, particularly as students progress through the grades in the pre-school to college pipeline, exists within the results of the National Assessment of Educational Progress (NAEP). Since the inception of the exam in 1969, the NAEP has been considered the largest measure of student learning and knowledge in the country (NAEP, 2015). Testing students at schools selected to be representative of the country, the assessments are given at the fourth, eighth, and 12th grades. The most recent NAEP results in reading align with ACT findings. The average 12th grade reading scores have decreased over time since 1992 (the first year the reading assessment was administered). Additionally, the lower performing students in the 10th to 25th percentiles in reading actually scored even lower between 2013 and 2015 while the higher performing students in the 75th to 90th percentiles actually scored slightly higher in 2015 than in 2013. Students in the median percentiles demonstrated no significant shifts. Overall, 12th-grade students scored an average of 287 out of 500 on the NAEP assessment (N = 18,700 students). This means that only 37% of the students taking the assessment were at or above the level of proficient on the assessment.

Readiness and the ACT

There is wide debate over the efficacy of using ACT, and other standardized indicators of achievement or competency, for readiness and placement measures of high school graduates. While the ACT attempts to measure content knowledge in the various domains assessed, the fact

remains that the ACT is unable to measure the specific content knowledge taught in each state as the United States does not offer a standardized curriculum (Adams, 2010; Atkinson & Geiser, 2009; Conley, 2007). Multiple measures of placement are currently more widely recommended take into account a more holistic representation of each individual student's capacity for persistence and academic success (Conley, 2007; Maruyama, 2012; Scott-Clayton, 2012; Smith, 2018).

One of the most concerning issues within the debate about utilization of ACT as a predictive measure of student readiness is the unfailing disparity in performance based on demographics. African-American students and Latinx students consistently score significantly lower on ACT benchmarks across the country (ACT 2006, 2014, 2018). For example, in the 2018 college and career readiness report from ACT, only 20% of African-American students and 33% of Hispanic students met the reading benchmarks as compared to 56% of White students. In 2014, 17% of African-American students met the benchmark, 29% of Hispanic students and 54% of White students met the benchmark. While the numbers increased slightly for African-American and Hispanic students between 2014 and 2018, the increase is not representative of the intentional efforts made in schools and by ACT to decrease the disparity between racial groups (ACT, 2014, 2018).

There is very strong support in the literature for the primary predictive validity of high school grade point average (GPA) as well as first-semester college GPA for readiness and subsequent persistence in post-secondary education (Koretz & Langi, 2017; Maruyama, 2012; Scott-Clayton, 2012). While some have argued that high school GPA and ACT composite scores have often been conflated in the literature for effect size on first-year academic performance, both Maruyama (2012) and Westrick, Le, Robbins, Radunzel, and Schmidt (2015) found that

GPA and ACT composite scores have a significant and independent effect on first-year academic performance. While students with higher high-school GPAs and ACT composite scores may do better academically in the first-year, assuming the scores will predict whether the student is able to persist neglects the consideration of various factors that could also contribute to the academic trajectory of the student (Conley, 2007). For the purposes of this study, the ACT variables are utilized as the site institution uses the ACT in pre-matriculation predictive modeling for projecting student persistence. Also, and most importantly, the ACT is used as the college-readiness benchmark in the state in which the site institution is located. As 70% of the students who enroll at the site university are from the state, the ACT scores are highly relevant to the readiness discussion for the student participants in the study.

Literacy

National measures of reading indicate that literacy levels for incoming college students are not only worse than previous decades but that they may actually be declining over time (NAEP, 2015). Of additional concern is the limited research on this age group that can allow for authentic inferences and interventions to be designed to begin improving the literacy rates. A study by Mellard, Fall, and Woods (2010) used a path analysis of 174 adults who participated in adult basic education in the state of Kansas. The measured variables included components of reading ability rooted in theoretical frameworks supported by existing research and literature. The researchers ultimately concluded that adult literacy rates were found to be largely misunderstood by the literacy community as most theoretical models and interventions are based on primary grade levels of reading instruction. Studies such as this, coupled with ACT, NAEP, and first-year college performance contribute to the acceptance that ongoing insights are needed to better understand the issues at hand in terms of college-age and adult literacy.

Comprehension

Global Knowledge

Hirsch (2003) supports the simple view of reading (Hoover & Gough, 1990), which is explained in greater detail in the theoretical framework section of this chapter, but contributes the theory that students must read a significant amount to support decoding and also to increase global knowledge. Hirsch posited that the simple view, while credible for explaining early learning in reading at the elementary grades, results in a "fourth-grade slump" in reading comprehension. Once students learn how to adequately decode text, struggles with more difficult reading are not wholly explained by the simple view. Hirsch argues that students must acquire more expansive word knowledge in order to directly impact fluency and comprehension beyond simply decoding. The more words a student knows and can automatically identify, the less mental capacity is needed for comprehension. After practicing decoding for several years through validated instructional methods rooted in the simple view, Hirsch argues that domain knowledge goes beyond simply acquiring the vocabulary that promotes the automatic recall of words and meaning. Students must develop domain, or global, knowledge that provides context and background information that students can use to select the correct meaning and intent for words in a text to support comprehension. Depth of understanding a topic and breadth of content knowledge is outlined by Hirsch as the foundational layers to comprehension.

Verbal Efficiency Theory

Another seminal concept building on the simple view of reading is the verbal efficiency theory (Perfetti, 1988). In the verbal efficiency theory, comprehension engages local processes and text modeling (Perfetti, 1988). Readers process the encoding of words through semantics and phonemic awareness. Readers then apply a schematic using prior knowledge and word

meaning to develop an inferential comprehension of the text. The components of this theory would be supported by both the simple view of reading (Hoover & Gough, 1990) and the role of domain knowledge (Hirsch, 2003) as multiple layers of knowledge, both semantic and word meaning, must be engaged in comprehension. Individual differences in reading emerge from gaps in skills in many areas of the reading process. Perfetti (1988) argues that comprehension and reading ability are directly impacted by the global knowledge of an individual. A reader can develop an adequate schema, for example, to infer meaning but without the correct knowledge of a subject, the schema, and resulting inference of meaning, may be completely wrong resulting in insufficient comprehension of text.

The verbal efficiency theory supports the argument that differences in reading comprehension are the result of differences in efficiency of text propositions, largely impacted by working memory, attention, and resource allocation (Perfetti, 1998). In cases in which text is comprehended inaccurately, schemata misalignment, based on lack of knowledge or the local processes required to automatically decode the text, is often the culprit. King and Just (1991) supported the verbal efficiency theory in a study focused on individual working memory. King and Just found- through two experimental studies- that syntactic processes for comprehension are impacted by an individuals' working memory in analyzing particular sentence structures. More complicated sentence lengths and structures engage greater memory capacity. Individuals who have to work harder to process a more complicated sentence engage more working memory and comprehension is therefore negatively impacted when a reader must work harder to decode a sentence.

Working Memory

Baddeley (1992) provides some insights into the relationship between working memory, decoding of words, and reading comprehension. Based on Baddeley's research, he suggests that working memory is a system that temporarily stores information for complex cognitive tasks. The capacity of working memory thereby impacts student performance on neurological tasks such as reading, comprehension, and reasoning through a process connected to the phonological loop. The phonological loop is comprised of two components: a store including acoustic or speech-based information, and, an articulatory control which operates similarly to inner speech (Baddeley, 1992). Both components of the phonological loop arguably impact reading ability and this system may aid in comprehension with more difficult text. By extenstion, the phonological loop is a more specific model for describing the interaction of working memory and complicated cognitive tasks involving language and reading.

As an extension of Baddeley's (1992) work, Arrington, Kulesz, Francis, Fletcher, and Barnes (2014) studied the impact of attentional control and working memory on reading comprehension and decoding. Utilizing a path analysis to explore the indirect and direct effects, Arrington et al. (2014) used a battery of reliable reading instruments with a sample of 1,763 students in both middle and high school. Measures of reading comprehension, decoding, working memory, response inhibition and sustained attention, and cognitive inhibition were assessed. The researchers hypothesized that attentional control would have different effects on reading comprehension than on decoding. A significant direct effect was found between working memory and decoding as well as between response inhibition and decoding. There was a significant indirect effect of working memory, through decoding, on comprehension. For both comprehension and decoding, working memory had a direct effect although the predictability

may vary on both outcomes variables. The findings of this study, as supported by the work of Baddeley (1992), demonstrate the need for more exploration of the relationship between working memory, decoding, and reading comprehension in the neurological processing required for reading.

Fluency

Much of the research supports the theory that fluency is a product of automaticity, prosody, and word identification accuracy (Rasinski, 2006). All factors comprise the dynamic that impacts reader comprehension (Paige et al., 2017). Strong skills in prosody, coupled with accurate and automatic decoding of words and their meanings, demonstrates a student's general ability in reading. However, as Rasinski notes, students may learn to read quickly without tuning into other fluency factors such as prosody and word meaning. This may directly impact their ability to comprehend text accurately. Zutell and Rasinski (1991) addressed this issue in a study focused on how teachers may support better fluency development. The multidimensional fluency scale was designed to assist teachers or researchers in analyzing specific parts of fluency. The scale, comprised of measures of phrasing, smoothness, expression, and pace, allows for analysis of student balance in features of fluent reading.

Reading fluency in the middle grades has been explored by various researchers to examine the intersections and impacts of the three components of fluency on reader comprehension. Paige (2014) examined the current research in reading fluency and comprehension suggesting the implementation of fluency strategies for middle-grades readers who progressed without developing fluency in elementary grades will face strong barriers to reading comprehension. Additionally, Paige (2011), examined the relationship between motivation and oral reading fluency, hypothesizing that student extrinsic motivation will

positively impact oral reading proficiency. The nature of both of these studies addresses the issue of declining interest in reading at the middle grades as well as the stagnation in fluency development beyond the elementary grades.

Rasinski et al. (2005) explored the impact of reading fluency at the high school reading level. While reading development does not typically increase in measures of ability during the middle grades, it actually declines from 10th to 12th grades (ACT, 2018; NAEP, 2015). Rasinski et al. (2016) built on the seminal work of Laberge and Samuels (1974) positing that automaticity requires a significant amount of cognitive function to decode words. In testing 303 ninth-grade students at one high school using the Oral Reading Fluency Assessment, the researchers found that, while the students were able to read with a high level of accuracy (97.4% with a SD of 33.2), the students' scores in fluency were more concerning. Although a standard normed measure did not exist for ninth-graders at the time, the fluency scores were compared to those of a norm-referenced measurement for eighth graders. The ninth-grade fluency levels were on average below the 25th percentile on the normed eighth-grade scale.

As students proceed through high school, the issue of college readiness becomes increasingly salient. Rasinski et al. (2016), analyzed the reading abilities of first-year students at Kent State University. Student participants (n = 81) read a passage aloud to researchers. The passage read was considered to be at the 12th-grade reading level. Word accuracy and automaticity means were collected for the student participants. The scores were then correlated with participant ACT scores, fluency, and recognition accuracy. The results suggested a moderate relationship between word recognition accuracy and ACT reading sub-score. The study contributes to the need for more analysis at the college level as more could be understood

regarding the relationship between fluency indicators and pre-matriculation information provided for incoming students.

Prosody

The role of prosody in comprehension of text is also a foundational concept to understanding reading ability. Prosody, as explained by Paige, Rasinski, Magpuri-Lavell, and Smith (2014) involves reading with the appropriate expression for the text. In a study involving 108 ninth-grade students, Paige et al. (2014) determined that prosody acted as a partial mediator between automaticity and comprehension. Automaticity, the number of words read correctly per minute by the reader (Paige et al., 2015), facilitates student's ability to read text with expression and to adhere to relevant cues in the sentence structure. While there is solid support in research for the role of decoding and word knowledge in comprehension, the role of prosody is also emerging as a strong contributor to how well a student is able to comprehend text. Paige et al. (2014) were able to add the impact of prosody on silent reading comprehension to include ninth grade level students when the relationship had previously only been explored through the elementary and middle grades. There remains a gap in the understanding of how prosody impacts the comprehension abilities of college-level readers.

Paige et al. (2017) further explored the relationship between prosody and comprehension. This study utilized the Multidimensional Fluency Scale (Zutell & Rasinski, 1991) to analyze prosodic reading of 250 first-, second-, and third-grade readers. The authors found that while reading rate, a component of automaticity, was not found to be a predictor of comprehension, word identification accuracy and prosody did account for 64.9% of the variance in comprehension. This provides further support for the current literature and contributes more to an understanding of what interventions and developmental support readers struggling with

automaticity and prosody may require. Again, this study focuses on reading ability in the elementary ages. A gap in understanding remains as to how this interplay impacts college-level readers.

The role of automaticity in reading comprehension was also explored by Samuels and Flor (2006). Samuels and Flor (2006) describe automaticity as an ability to perform complicated tasks with a high level of accuracy. Automaticity would be required of strong readers in decoding, phonemic recognition, and word identification so that brain capacity may be better exerted to comprehend the text. This further provides support for the verbal efficiency theory (Perfetti, 1998). Through a series of experiments at the University of Minnesota, Samuels and Flor (2006) found that teachers should engage students in reading speed, accuracy, prosody, and comprehension when considering how well a student is able to decode accurately. The researchers also found that introducing any secondary challenge to a student struggling to master automatic processing in another would be met with failure. Hence, students who have not mastered automatic word recognition and prosody will continue to struggle in learning new content through text as the working memory will be taxed in the process.

Text Complexity

Robust discourse exists in the current literature centering on the role of text complexity. There are two primary arguments that are relevant to the ongoing discussion within this debate. One is that of decreased text complexity over time. The second relates to the impact on college readiness that decreased capacity to decipher complex texts may have on students as they matriculate to college (Hiebert & Van Sluys, 2014). As one of the primary recommendations from ACT (2006) related to college readiness was consistent with the need for more complex

texts, students must also develop capacity to comprehend complex text more broadly in order to succeed in both college and the career field.

Text Complexity and Readiness

Based on the recommendations from ACT in both 2006 and 2014, the level of text complexity to which students are exposed is directly related to the readiness levels in reading regardless of demographic or socioeconomic factors. One contributing argument to this issue is the disconnect between what standards students are measured by in high school versus a lack of standard measurement once students matriculate to college (Williamson, 2008). Students are rarely measured on true reading ability once they have begun college coursework. The challenge in failure to assess students in college on reading ability is that pre-matriculation information may not adequately illustrate remedial needs as the students may have taken the tests in 10th grade but then declined in reading between 10th and 12th grades (ACT, 2018; NAEP, 2015). Based on findings by Williamson (2008), most post-graduate fields, whether the military, a job field, or graduate school, will require a Lexile level higher than the average high school graduate's reading ability. Findings by Wei, Cromwell, and McClarty (2016) support the need for an understanding of text complexity required at the college level. Based on their study of the text complexity of reading materials required in five zones of careers, from food service workers to veterinarians, the complexity demands of reading materials surpassed that of the high school level benchmarks required for the Common Core State Standards.

Text Difficulty

Since World War I, the complexity of textbooks has declined (Gamson, Lu, & Eckert, 2013). Some researchers argue that the measures used to analyze the texts are problematic and further suggest that the responsibility for remediating for the less complicated texts falls unduly

on the shoulders of elementary grade teachers (Allington, McCuiston, & Billen, 2015; Gamson, Lu, & Eckert, 2013). More widely accepted is the evidence supporting the substantial decline in text complexity offered to K-12 level students. Text complexity refers to features of a narrative that may be evaluated, measured, or analyzed for textual elements such as syntax, words, and sentence length (Cunningham & Mesmer, 2014). Cunningham and Mesmer (2014) assert that a differentiation between text complexity and text difficulty should be acknowledged as text difficulty essentially refers to the overall challenge of a text for the reader. Both terms are used in the literature. However, text complexity is most often used to describe the sophistication of the sentence structure and overall passage difficulty (Frantz, Starr, & Bailey, 2015). Stenner (1996) developed the Lexile framework to score passages for instructional purposes based on text complexity.

Hayes, Wolfer, and Wolfe (1996) studied the relationship between textbook complexity and SAT-Verbal scores. A decline in verbal scores on the SAT exists between the years of 1963 and 1979. The researchers argue that this is directly correlated to the decline in text complexity of school books as the first cohort after the decline is marked would have been taking the SAT exam during this phase. The decline beginning in 1963 was abrupt and obvious. After using Lexile levels to analyze texts and periodicals from this time period, Hayes, Wolfer, and Wolfe (1996) clearly found that since 1978, test takers have remained stagnant at the lower plateau for verbal achievement. This accounts for updates to the exam, re-norming of the test for demographics and other factors, and typical fluctuations in college-going populations. Ultimately, it is argued that text should challenge readers to move just beyond the zone of proximal development without becoming too overwhelming to learn new content (Goldman & Lee, 2014).

Lexiles

The Lexile framework is meant to provide measures of text complexity that empower teachers to assign appropriate text levels to students in the classroom, promoting growth in global knowledge and supporting fluency development. Lexile measures can be generated by computer software using texts to measure word frequency (semantic features) and sentence length (syntactic features) (Williamson, 2008). Lexiles are measured on a scale ranging from 200L to 1700L. Designed by Stenner (1996), the Lexile framework is based on empirical evidence that a student with a measured Lexile ability, when given a matching Lexile scored passage to read, will be able to fluently read the text 75% of the time. Reading accuracy increases as the Lexile level falls below the individual's attained Lexile ability. Some dissenters from the wide use of the Lexile levels, particularly as a foundation to the Common Core State Standards, argue the Lexile measures do not capture other text characteristics important to reading, including qualitative aspects that can only be judged by a human rater (Cunningham & Mesmer, 2014; Hiebert, 2012; Hiebert & Van Sluys, 2014). While Lexile measures assist in providing a quantitative measurement of text complexity, human factors of reading, such as prosody, also contribute to how well the student is able to read a given passage.

Theoretical Frameworks

Two theoretical frameworks will guide the design and discussion of this study. The simple view of reading (Hoover & Gough, 1990) will be utilized to explain the role of reading fluency in the student participants. Tinto's (1975, 1993, 2012) theory of student departure will be used to inform the role of pre-matriculation information for students and how entering student characteristics and capacities may solidify academic and institutional commitment. Students who begin college with reading challenges may be limited in academic performance. Decreased

confidence in academic performance, impacted by reading comprehension and text difficulty, may ultimately decrease student performance. Without substantial and appropriate academic expectations and support structures provided by the institution, and by faculty in the classroom, students may not develop the necessary confidence to commit to degree completion. If students do not do well academically- perhaps leading to disengagement with the institution- students will likely leave the university without finishing their intended degree (Tinto, 1993). By extension, students who struggle in academic activities, such as reading, are less likely to persist resulting in lower achievement and outcomes (Barnett & Reddy, 2017).

Simple View of Reading

Building on seminal research by Hoover and Gough (1986, 1990), Gough established conventions for the simple view of reading (1996). Based on Gough's collaborative research, the simple view of reading posits that children learn to read through a combination of decoding words and listening comprehension. The simple view of reading remains widely accepted and many theoretical frameworks discussed earlier in this chapter for how children learn to read build upon the simple view. Essentially, students must learn to decode, or decipher, the words on the page of a text. Once students can interpret the words, they are able to comprehend the meaning. Gough further explains that students cannot simply learn how to decode the text by site word activities or through repeated exposure but must learn how to decipher the code, break down the parts of words into syllables, and assign the proper sounds to the words to crack the code of the meaning (Gough, 1996). The simple view is based on the research design by Hoover and Gough (1986, 1990) in which reading ability is measured as a product of the students' ability to decode the text and how well students can listen to a story and then correctly answer questions about the story. Hoover and Gough's research was conducted with elementary age children and asserted

that the simple view framework could be used to predict reading ability in first through fourth graders with a high level of accuracy.

The simple view of reading views decoding as including phonemic awareness, an understanding of how sounds are represented in words by letters, the ability to automatically identify words or what is called sight-word reading (Ehri, 2014), and fluent reading of text. While students are taught phonics which assists in decoding text, students must practice phonics through reading practice which facilitates the storage of orthographic representations in long-term memory. Another assertion provided by Gough (1996) is the significance of automaticity (LaBerge & Samuels, 1974; Logan, 1988). Automaticity, the rapid and accurate recognition of a word, is also required in reading ability. Automaticity is strengthened as students consistently read various texts.

Tinto's Student Departure Theory

The impact of student readiness on student persistence, both in non-cognitive domains and in academic domains, is highly supported in the literature. The leading theoretical framework for student persistence was designed by Vincent Tinto in 1975. Building on his original theory, Tinto outlined key characteristics and experiences of undergraduate students that facilitate persistence.

Tinto's (1975) student departure theory has evolved from the departure theory rooted in Durkheim's theory on suicide to a more proactive model rooted in holistic supports for students. Tinto's (2012) recent book on completing college focuses on two levels of commitment from the student: a commitment to academics and a commitment to the institution the student is attending. The focus of Tinto's (2012) book flips the lens on retention by not looking at why students leave,

but why they stay. Figure 1 provides an overview of Tinto's most recent model of student departure.

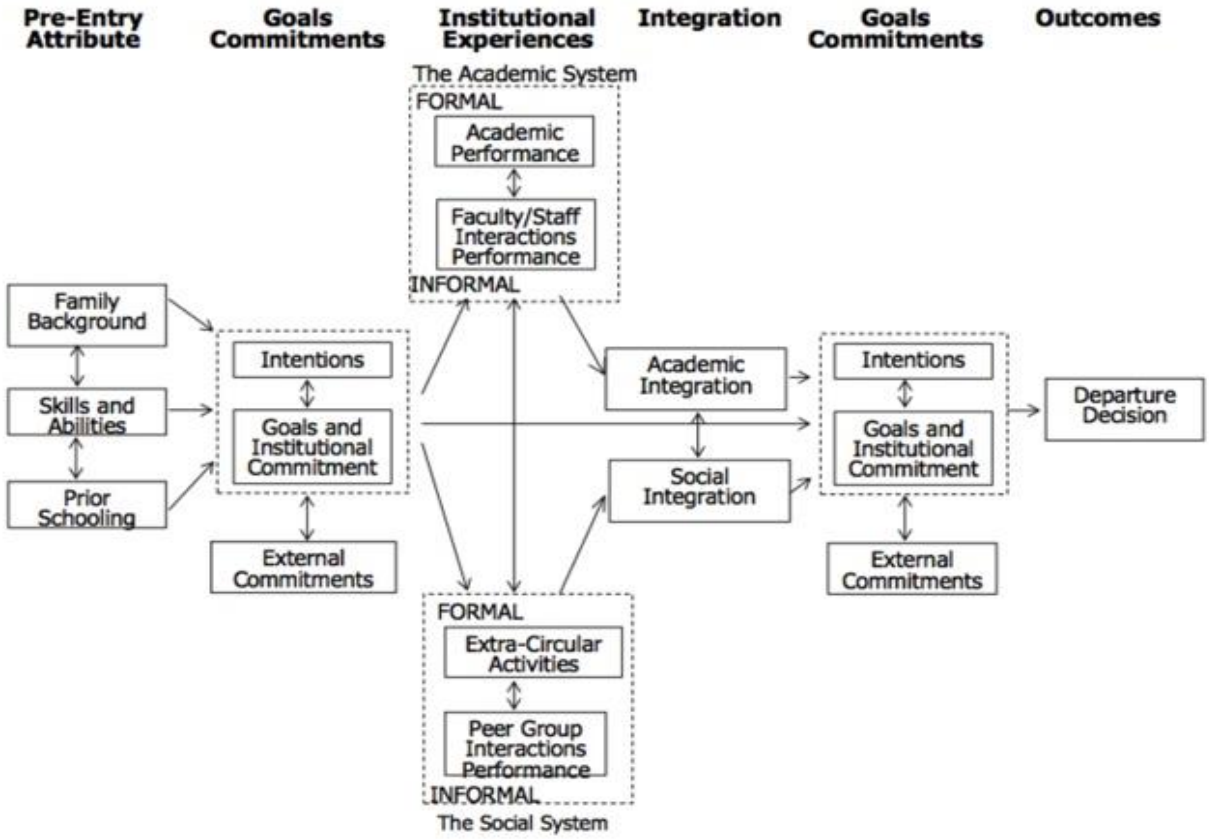

Figure 1. Tinto's Conceptual Schema for Dropout from College (Tinto, 1993)

Entering student characteristics contribute to the ultimate persistence outcomes for students (Aljohani, 2016). While institutions can provide support structures to enhance entering student characteristics, a clear understanding of needs and capacities are significant to the model for student departure as noted in Figure 1. Skills and abilities demonstrated through high school, and frequently measured by GPA and standardized test performance, provide the foundation for success support provided through integration to a postsecondary institution (Conley, 2007). Prior academic performance may provide substantial indication of eventual persistence, while family background characteristics, such as socioeconomic status and highest level of academic

achievement by parents, can influence a student's initial academic commitment (Braxton, Brier, & Steele, 2007). A clear understanding of entering student characteristics assists institutions in providing support for students and families as they transition together into the world of higher education. Familial support largely contributes to the student expectations of the school and may often inform initial major of study declaration and career goals (Savitz- Romer & Bouffard, 2014).

Once initial commitment is made to postsecondary education, a primary component of Tinto's persistence model involves the role of academics; specifically, the academic commitment the student enters with, coupled with the engagement of the student in the classroom. Additionally, clarity of expectations is integral to building the commitment, particularly for low-income students. Academic support is especially critical during the first year of the students' experience. Tinto (2012) further explains that no other academic support is more significant to a student's success than in the area of reading as it is integral to academic performance in all courses (Adelman 2004, Tinto, 2012). Academic self-efficacy is also central to building academic commitment. Students who struggle in courses because of readiness issues, or because of placement in remedial courses, are less likely to persist (Bahr, 2012). Academic integration is also dependent on the student experience in the classroom. Learning and engagement in the classroom with clearly defined expectations for success are integral to student academic commitment and support (Tinto, 2012).

Aligned with the facilitation of academic commitment, students must also integrate into the social system of the institution. Through active learning and social integration, students solidify their commitment to degree completion (Braxton, Jones, Hirschy, & Hartley, 2008). As the role of academic expectations and experiences is equally as important as the social

integration, experiences that allow students to form confidence and competence in academic endeavors along with socialization are highly impactful (Braxton, Brier, & Steele, 2007; Braxton, Jones, Hirschy, & Hartley, 2008). As Tinto (1993) suggests, students develop an understanding of the social norms of the institution as they engage with faculty, staff, and peers thereby fully adopting the culture of the institution (Aljohani, 2016). The interplay of the academic and social integration allows the students to emerge from their undergraduate institution after actualizing goals and commitments to degree completion. The support for this integration begins with a clear understanding of the entering student characteristics and the establishment of clear expectations and supports by the institution throughout the student's experience at the school.

Tinto's (1975, 1993) findings on student persistence are largely agreed upon in the literature. Barefoot (2004) demonstrates agreement with Tinto in her concern for the impact of drop-out and stop-out of students and the university, suggesting that few support strategies truly consider academic engagement. Gardner (2001) contributes to the need for strengthening the academic experience of students in the integral nature of persistence. Braxton, Brier, and Steele (2007) contribute to the assertions of Barefoot (2004) and Gardner (2004) in the ways in which students should be engaged academically to support persistence. Braxton, Brier, and Steele (2007) suggest that fostering academic support through interventions designed for each student should be employed. Courses helping with student transition and those that provide remedial education, without impeding student progress towards degree completion, are significant to the student's feelings of support and commitment.

Inferences for Current Study

Based on the review of the literature, several intersecting inferences may be made about the potential outcomes of this research. The unique aspect of this research design is that it incorporates frameworks in student readiness, literacy, and student persistence. The interactive nature of those components comprises a holistic approach to student academic needs and potential support that is directly reflected in the literature. A significant need for this study has emerged from the review of the literacy research as there are clear gaps in knowledge of college-level reading needs and potential support interventions. The phenomenon of the decline in student reading performance on the NAEP and ACT in the high school years remains largely unexplained. There is also mixed commentary on the reliability of ACT scores as predictors of college student readiness. While the Common Core State Standards are positioned to better align national reading standards, the movement has not been adopted in every state. Additionally, there is not a national measure of reading knowledge or competence that may be used for accurate placement of students consistently at each postsecondary institution. It is evident from the current readiness literature that placement measures and pre-matriculation data are significant to admissions processes at the majority of colleges. All of these factors contribute to the need for a method of analysis that incorporates multiple measures in considering the interactive nature of non-cognitive and cognitive characteristics in reviewing the relationship between ACT sub-scores and reading ability. Based on the review of the literature, it is reasonable to infer a moderately significant relationship between ACT reading sub-scores and indicators for reading fluency for first-year students. It may be expected to see a positive correlation between higher ACT reading sub-scores and stronger fluency, prosody, and accumaticity in reading performance. However, based on existing studies on college-level readers, there is likely to be

some fluctuation in how well students who have an ACT reading sub-score below the readiness benchmark perform on measures of reading fluency (Rasinski et al., 2016).

Summary

The purpose of this literature review was to provide an explanation of foundational research guiding the theoretical frameworks and potential findings of this study. The discussion of how students learn to read facilitated an understanding of the myriad dynamics at play in fluency development and silent reading comprehension. A discussion of factors contributing to college readiness and the need for more research around the impact of individual reading ability on persistence were addressed. The guiding literature supporting the use of the Lexile framework and the Multi- Dimensional Fluency Rubric in the methodology of this study were also discussed. Chapter three provides detailed descriptions and explanations for the research design and assumptions.

Chapter 3: Methodology

This chapter explores the rationale for methods utilized to analyze the relationship between first-year student reading fluency and ACT reading and composite sub-scores. The research design and guiding research questions are explained. An overview of the sample, site and participant engagement will also be explained. The procedures for data collection, rooted in the research questions and each hypothesis, will be explored and limitiations will be discussed.

Utilizing a convenience sample, this study explores the relationships between reading rate, word identification accuracy, and prosody as predictors of scores on the ACT reading and the ACT composite score. As the design of the study does not include an intervention, and as the data used for this study utilizes student responses to surveys and validated assessments as well as existing student background characteristics, the design follows conventions for a single-subjects factorial design (Beaudry & Miller, 2016). While all first-year students at the research site were invited to participate, the students self-selected into the study. Additionally, pre-matriculation factors were included in the background characteristics. Information from pre-surveys in the primary data collection phase also included self-reported information. Based on these factors, considerations for generalizability and controlling for validity of self-reported data must be accounted for.

Research Procedures

Site Selection

The data for this study were collected at a small, private university in the southeast region of the United States. Based on data obtained from the university Office of Institutional Research and Effectiveness (IR&E), the total enrollment of students at the institution for the 2018- 2019 academic year was 3,369 students. Of these students, 2,552 were in the undergraduate

population with 64% identifying as female and 94% of the class enrolled as full-time students. In the fall 2018 cohort, there were 653 students, all of who were invited to participate in this study. The majority of the students in the undergraduate population were from the state in which the university is located (70%) and 35% were identified as first-generation college students.

Of the 653 students in the fall 2018 cohort, 595 reported pre-matriculation ACT scores. The mean ACT reading sub-score for the students (n = 595) in the fall of 2018 was 26.9 while the mean ACT composite score was 25.1. However, the range of scores for ACT reading was 15 to 36 and the composite score range for the fall 2018 cohort was 17 to 35. The average scores were consistent with the average pre-matriculation scores for the university over the last five years.

Participant Selection

Utilizing a convenience sample of the fall 2018 first-time full-time cohort, the student participants had an equal opportunity for participation. All students in the fall 2018 freshman cohort were invited to participate via a university email sent by the researcher. Of the 595 with ACT scores, 101 students submitted a full response, which included: a pre-survey, recordings of two reading samples, and responses to two reading quizzes. Of the 101 students who fully responded to the assessments, six students did not have ACT scores so were subsequently eliminated from the analysis, leaving a final sample of 95 students.

Assessments

Two reading passages were created to assess students at two text complexity levels (Stenner, 1996). The rationale for two levels was to anticipate the possibility that lower-attaining readers in the participant sample may have considerable difficulty reading a college-level text. If this were indeed the case, the passage would inform on their reading ability with a passage they

would likely be able to comfortably read. The first reading sample (Appendix A) was a narrative passage of 156 words that was assessed using the Lexile Analyzer (MetaMetrics, 2016). Results showed the passage was in the 850L to 950L range, a level commensurate with that expected of ninth-grade students. The second passage (Appendix B) was intended to assess college-level reading and comprehension. The passage consisted of an informational text of 167 words that was evaluated using the Lexile Analyzer. The complexity of this text was in the 1400L to 1500L range, a level commensurate with college level reading (Common Core, 2010). For ease of discussion reading passage one will be referred to as the ninth-grade level text and reading passage two will be referred to as the 14th-grade level text throughout this dissertation. Using a headset and microphone, students recorded a reading of both passages, after which they answered five questions about the reading. All of the components of the assessment were included on Moodle,™ an online educational platform used by the institution.

Reading Comprehension

After reading each passage, students answered five, multiple-choice questions at the factual and inferential levels as a method to hold students accountable for their reading. The questions were designed as a quiz in Moodle™ so each student's responses were automatically scored for accuracy. For both reading samples one and two, the five multiple choice questions aligned with depth of knowledge (DOK) levels one and two (recall and application) as students were expected to recall direct facts from the passages and apply inferential concepts (Hess, Jones, Carlock, & Walkup, 2009).

Measured Reading Variables

Each of the two reading passages were evaluated and scored based on the following indicators:

Reading miscues. Reading miscues (miscues) refer to the number of word identification mistakes made by the student while reading the recorded study passages. A miscue includes any word that is mispronounced, a word contained in the passage but not pronounced, and a word not contained in the passage but inserted into the reading by the reader. Self-correction of mispronounced words are not considered miscues. Also, a word or group of words that are re-read are not considered as miscues. Re-reading of words actually increases the amount of time it takes the reader to finish the passage. Excellent readers may have zero miscues in a reading while the upper limit reflects the reader's competence with the text and could be in double digits.

Pacing. Pacing, also called reading rate, refers to how quickly the reader processes words when reading. Pacing is reported as the number of words read (correctly or incorrectly) in one minute. Pacing is important as theorists suggest that when a minimum pace is not achieved, the reader is likely to lose critical information from the text that facilitates understanding of what is read (Paris & Hamilton, 2009). Theorists have also suggested that some minimum pace is necessary to benefit from exposure to new vocabulary contained in the text (Stahl & Nagy, 1986; Stanovich, 1986). In a study of middle school students, Paige and Smith (2018) found that pacing mediated the relationship between academic vocabulary and reading comprehension as students reading at a pace of fewer than 127 words per minute acquired less vocabulary knowledge than others reading at a faster pace. The realistic range for pacing of readers in the present study can range from a low of 100 to over 200 words per minute.

Prosody. As will be explained shortly, prosody reflects the expression and phrasing with which the reader reads the text. Prosody was measured in this study using a four-dimensional

rubric where each dimension was scored on a 1 (poor) to 4 (best) scale. The sum of the four dimensions on the rubric provides a range of 4 to 16.

Data Collection Process

On Moodle™, the entire fall 2018 cohort was grouped into an online class that was made visible to the students in mid-October 2018. The class site remained open through the week after Thanksgiving Break in November 2018. Before the data collection was visible to students on Moodle™, beta testing was completed with three staff members in the researcher's department to test the functionality of the assessments and clarity of directions. Minor adjustments were made to the permissions and directions so that it was as clear as possible for the student audience. One university staff member responsible for the Moodle™ program functionality assisted in setting up the permissions and testing the page in the student dashboard as well. After emailing all students through the Moodle™ class site, the assessments were opened and students were able to submit responses to the instruments on the Moodle™ assignments page. This allowed for each student's responses to be grouped according to each portion of the assessment. The reading comprehension questions for each reading were designed as a quiz and were immediately scored within the Moodle™ system.

Research Questions and Analysis

Research Questions

The guiding research questions for this study include:

1. What is the relationship between indicators of fluent reading and ACT attainment levels?
2. Do reading fluency indicators predict the ACT composite and reading sub-score?

Analysis of Research Questions

To investigate research question one, bivariate correlations were used to examine relationships between fluency indicators and the ACT composite score and reading sub-score. Using Pearson's correlation in the Statistical Package for the Social Sciences (SPSS) version 25 for Windows, all continuous variables included in the study were included in an analysis of variance (ANOVA) table to determine significance of relationships (Beaudry & Miller, 2016). Based on the significant relationships between means, additional statistical analysis was performed to determine explained variance between predictor and outcome variables.

Once statistical significance was determined based on correlations, ordinary least squares regression was utilized to determine strength of predictor variables on outcomes. The predictor variables analyzed included pacing, word miscues, and prosody. The outcome variables were the ACT composite and the ACT reading sub-score for which individual regression analyses were conducted.

Pacing and Miscues

To determine the rate at which readers read the passage, a timer in Moodle™ recorded the beginning and ending times that resulted in the total number of seconds required for the reading. To gather the reading miscues, each reading was later replayed for an evaluation of word pronunciation. A reading miscue or mispronunciation consisted of mistakes in word pronunciation, failure to read words contained in the text, and inserting words that were not in the text. Reader self-correction of mispronunciations were not considered as miscues. Reading miscues were tallied by the researcher and the chair of the research study who individually listened to each recording. Once the miscues were tallied, the number of miscues was subtracted from the total words read (156 for the ninth-grade reading passage and 165 for 14th-grade

reading passage). This difference was then divided by the time it took the student to read the passage in seconds and then multiplied by 60 to determine the product. The product of this equation yielded the accumaticity rate for each passage.

To determine the acceptability of interrater agreement between the two reading evaluators, Cohen's kappa (Cohen, 1960) was calculated. Landis and Koch (1977) suggest that a Cohen's kappa between .61 and .80 reflects substantial agreement between raters. Sim and Wright (2005) suggest that to obtain statistical power of 90% for a one-tail test, a sample size of 18 rater comparisons is required. Using this guidance, a random sample of 20 ratings were selected. A crosstabs analysis was performed between the ratings of each rater with results revealing a 90% agreement that resulted in a Cohen's kappa = .860, $t(7.49)$, $p < .001$, indicating substantial agreement between the two raters (Landis & Koch, 1977).

Prosody

Using the Multidimensional Fluency Scale (MDFS) fluency rubric (Zutell & Rasinski, 1991), student reading samples were scored based on four components: expression and volume, phrasing, smoothness, and pace (Appendix C). Each of the four components of fluency were scored using the four-point rubric for a total fluency score of up to 16 points where the range was 4 to 16. Interrater reliability was determined on the overall prosody rating awarded by the two raters using Cohen's kappa. A random selection of 20 prosody ratings again resulted in 90% agreement, reflecting a kappa statistic of .860, $t(7.49)$, $p < .001$ and indicating substantial agreement (Landis & Koch, 1977).

Pre-Matriculation Data

In order to scale the responses for statistical analysis, each pre-survey question was given a numerical value to create categorical variables (Table 1). The numerical values were not

weighted or representative of scale for the responses. Pre-survey responses were aligned with background information that would be obtained from Institutional Research and Effectiveness (IR & E) at the research site. The pre-survey questions asked about the language spoken at home, how the students intended to pay for college, the level of education of a parent in the home, and the level of education of a sibling, if applicable. The pre-survey questions focused on socioeconomic indicators that may have contributed to outcomes of the study. Based on findings in the ACT reports (2014, 2018) and relevant readiness research, first-generation and lower-SES students may post lower scores on standardized assessments such as the ACT (Barnett & Reddy, 2017; Fowler & Boylan, 2010; Venezia & Jaegger, 2013). The pre-survey questions provided a more comprehensive picture of student background characteristics when compiled with the data obtained from IR & E related to first-generation status and estimated family contribution (EFC). The coded reading samples and pre-sruvey responses were sent to IR & E for assignment of dummy identification numbers to preserve student anonymity in analysis. In addition to the dummy identification numbers, institutional research provided the following: sex, hometown, high school GPA in bands as well as in cumulative form, ACT composite and sub-scores, EFC ranges, first-generation status, and pre-matriculation reported majors of study.

Table 1

Background Charactiristics and Coding of Pre-Survey Questions

Variable	Level of Measurement	Coding
Sex	Nominal, 2 levels	Male = 0 Female = 1
EFC	Ratio	0 – 260,092
High school GPA	Ratio	0 – 4.0
Question 1	Nominal, 8 levels	1 - 8
Question 2	Nominal, 7 levels	1 - 7
Question 3	Nominal, 5 levels	1 - 5
Question 4	Nominal, 2 levels	No = 0, Yes = 1
Question 5	Nominal, 11 levels	0 - 10
ACT reading	Ratio	0 - 36
ACT composite	Ratio	0 - 36

Note. EFC = Estimated Family Contribution

Sample Demographics

As mentioned above, of the 95 participants, 75.8% were female and 40% were identified as first-generation college students. Table 2 displays frequencies and percentages of the sample population background characteristics. The median estimated family contribution (EFC) for the sample was within the $10, 001 to $20, 000 band and the actual figure was approximately $11,000. The EFC is a figure used by the federal government in determing pell eligibility and financial aid. Lower EFC figures may facilitate pell eligibility for students pursuing

undergraduate degrees. Pell eligibility yields loans for qualifying students that do not require the student to pay the loan back (United States Department of Education, 2018).

Table 2

Participant Background Characteristic Frequencies

Variable		Frequency	Percent
Sex	Male	23	24.2
	Female	72	75.8
First Generation	No	57	60
	Yes	38	40
EFC Bands	0- $1,000	15	16
	$1001- $5485	17	18
	$5486*- $10,000	9	9
	$10,001- $20,000	20	22
	$20,001- $50,000	23	24
	$50,001+	11	11

Note: EFC= Estimated Family Contribution
*Pell Eligibility threshold for fall 2018 was $5486.

Human Participants and Ethics

The students in this study experienced minimal risk in participating in the data collection. Student participation was voluntary and each student was informed in the invitation to participate that participation could end at any time if the student chose to begin any portion of the data collection. In accordance with guidelines regarding the protection of human participants, a request for review was submitted to the research site Institutional Review Board. An expedited review was granted and the research study was approved before data collection began. Student participation was incentivized by the researcher through a drawing for a iPad. Students were also offered a meal one evening to encourage participation. Some faculty offered extra credit to students through a first-year student transition course although this was offered by the professors of their own accord. Beyond e-mails to all first-time full-time students in the fall 2018 cohort to encourage participation, there was minimal advertising of the research study.

Summary

This chapter explained the methods in data collection and the participant characteristics for this study. Data was collected through an online platform, Moodle™, hosted by the site university. Reader pacing, miscues, and prosody were analyzed for both passages. Student pre-matriculation and participant demographics were collected though a pre-survey and information received from the Office of Instutional Research and Effectiveness at the research site. Bivariate correlations and ordinary least squares regression will be used to analyze the results. The discussion of the analysis follows in chapter four.

Chapter 4: Results

This study focused on the predictability of ACT composite and reading sub-scores based on fluency indicators in first-year college student reading. Comparing fluency on two reading passages yielded data for analysis of the guiding research questions (1) What is the relationship between indicators of fluent reading and ACT attainment levels and (2) Do reading fluency indicators predict the ACT composite and reading sub-score? The independent variables in this study included pace, phrasing, prosody, and miscues. The dependent variables included in this study were ACT composite score and ACT reading sub-score.

Results

Prior to answering the first research question, the generalizability of the study sample to the overall freshman class was explored. The ACT reading score for the entire freshman class was 27.0 while the ACT composite was 25. A one-sample *t*-test was conducted comparing attainment on the two outcome variables in the study, the ACT reading and ACT composite scores. Results (Table 5) were non-significant for the two variables providing evidence that the study sample is representative of the freshman class in general on the two assessed measures.

Measures on two reading passages were gathered for this study. To determine if the passages resulted in similar reading outcomes, paired sample *t*-tests with a Bonferroni adjustment to account for an inflated Type 1 error rate were conducted for reading miscues, reading rate (pacing), and prosody that compared the ninth-grade level passage and the 14th-grade level passage results. Results for all three measures revealed statistically significant differences where students read the ninth-grade passage at a faster pace than the 14th-grade level passage [$t(94) = 19.54$, $p < .001$], fewer reading miscues were found for passage 1 than 2 [$t(94) = -7.60$, $p < .001$], and prosody was higher for passage 1 than passage 2 [$t(94) = 5.23$, $p < .001$].

These results suggest that the 14th-grade level passage was more challenging to read than the ninth-grade level passage.

Although pre-matriculation and demographic information, such as high school GPA, sex, and first-generation status were collected, the analysis for the research questions was limited to the predictor and outcome variables listed above. As this was a pilot study, the pre-matricualtion variables were collected based on relevant and leading research in the field. As will be discussed within the limitations section, the size of the sample for this study prevented the use of race as some students may have been identified based on the campus population. While comprehension questions were designed and collected on Moodle™ after each reading sample was submitted, the comprehension questions were ultimately excluded from the analysis based on a low Cronbach's alpha ($\alpha = .42$) for reliability (Field, 2009).

Research Question 1

Means and standard deviations of the measured variables are shown in Table 3 while Table 4 shows the bivariate correlations. An examination of the bivariate correlations in Table 4 show that reading miscues for the ninth-grade level passage share a significant and small relationship with ACT reading and ACT composite. The number of miscues for the 14th-grade level passage shares moderate-sized and negative relationships with both ACT measures meaning a larger number of reading miscues is associated with lower scores on the ACT measures. Pacing has a trivial relationship with the ACT measures with the exception of the 14th-grade level passage which shares a small relationship with the ACT composite measure.

Table 3

Means and Standard Deviations of the Measured Variables

Variable	Mean(*sd*)
R1 Miscues	2.16(*1.94*)
R1 Pacing	179.54(*25.13*)
R1 Prosody	14.27(*1.77*)
R2 Miscues	4.05(*3.0*)
R2 Pacing	144.64(*20.73*)
R2 Prosody	13.48(*2.50*)
ACT Reading	27.03(*4.70*)
ACT Composite	24.79(*3.70*)

Table 4

Correlations Among Fluency Indicators and ACT Composite and Reading Sub-Scores

Variable	R1 Miscues	R1 Pacing	R1 Prosody	R2 Miscues	R2 Pacing	R2 Prosody
R1 Miscues	1					
R1 Pacing	-.190	1				
R1 Prosody	-.514**	.387**	1			
R2 Miscues	.582**	-.112	-.446**	1		
R2 Pacing	-.350**	.728**	.417**	-.368**	1	
R2 Prosody	-.436**	.319**	.815**	-.540**	.442**	1
ACT Reading	-.223*	-.067	.167	-.438**	.102	.225*
ACT Composite	-.225*	-.009	.217*	-.465**	.243*	.306**

Table 5

Comparison of Means Based on ACT

	Sample		Fall 2018 Cohort			
	M	SD	M	SD	*t*-test	*p-value*
ACT Composite	24.79	3.68	25.13	3.8	-.167	.868
ACT Reading	27.03	4.70	26.98	3.77	.065	.948

Note. Study sample $n = 95$, Fall 2018 freshmen cohort $N = 653$.

Research Question 2

The second research question asks if reading fluency indicators predict variance in the ACT composite and reading sub-scores. Ordinary least squares regressions were used to analyze research question two to examine the influence of the predictor variables at different levels (Beaudry & Miller, 2016). As discovered with research question one, a correlational relationship was evident between reading fluency indicators (pacing, miscues, and prosody) and ACT composite and reading sub-scores.

The assumptions for ordinary least squares regression are a linear relationship, multivariate normality, no multicollinearity, no auto-correlation, and homoscedasticity (Field, 2009). To assess multicollinearity in the data, a Durbin-Watson statistic was calculated resulting in a statistic of 2.02 suggests an absence of multi-collinearity. Histograms of the measured variables revealed a normal distribution for each. A graph of the ZRESID against ZPRED residuals resulted in a random distribution suggesting homoscedasticity while the normal probability chart also suggested a normal distribution.

ACT reading was regressed onto pacing, reading miscues, and prosody as measured from the ninth-grade level passage. Results showed each of the predictors were statistically non-significant. ACT composite was then regressed onto the same variables from the inth-grade level passage and none of the predictors resulted in significance. ACT reading was next regressed onto pacing, reading miscues, and prosody from the 14th-grade level passage. Results in Table 6 show that of the three variables, reading miscues predicted significant variance in ACT reading, $t = -4.70$, $p < .001$, $b = -.438$, $R^2 = .183$. ACT composite was then regressed onto pacing, reading miscues, and prosody. Again, Table 7 shows that pacing and prosody predicted no variance, while miscues was a statistically significant predictor, $t = -5.06$, $p < .001$, $b = -.465$, $R^2 = .207$.

Table 6

Ordinary Least Squares Regression Results for Predicting ACT Reading

	B	*SE B*	β	*t*	R^2
Constant	29.84	.74		40.38***	
Reading Miscues	-.692	.147	-.438	-4.70	.183

Note. ***$p < .001$

Table 7

Ordinary Least Squares Regression Results for Predicting ACT Composite

	B	*SE B*	β	*t*	R^2
Constant	27.12	.57		47.61	
Reading Miscues	-.574	.114	-.465	-5.06	.207

Note. ***$p < .001$

These results show reading miscues to be a statistically significant predictor of differences in ACT reading and ACT composite scores. To further understand the nature of these

miscues, Table 8 displays the words that were misread by students on the 14th-grade level passage.

Table 8

Summary Table of Reading Miscues for Reading Passage 2

Word	Number of students misreading word
demagogues	38
scepter	35
Socrates	23
succumbed	17
Athenian	10
Athens	4
quorum	4
wrest	2

Summary

Of the fluency indicators that significantly correlated with the ACT reading and composite sub-scores, reading miscues in the 14th-grade level text was the significant predictor, accounting for 18.3% and 20.7% of the variance, respectively. When the number of reading miscues decrease by one standard deviation, ACT reading scores will increase by .438 of a standard deviation. This means that when reading miscues drop by 3 (the standard deviation for reading miscues), ACT reading score increases by 2 points (.438 * 4.701). When reading miscues decrease by one standard deviation, ACT composite scores will increase by .465 of a standard deviation. The interpretation is similar where a one standard deviation decrease in reading miscues (3 miscues) means a 2.19 increase (4.701 * .465) in the ACT composite score. Further discussion of these findings and implications for student retention and the understanding of college-level reading will be addressed in chapter five.

Chapter 5: Discussion

This study examined the relationship between reading fluency indicators and ACT composite and reading sub-scores and served as a pilot for future replicaion at the research site. Specifically, this study sought to predict ACT reading and composite outcomes based on reading fluency of first-year college students. The study synthesized three areas of education related to student success: reading literacy, college student readiness, and student persistence to degree completion. To better understand fall 2018 entering student literacy at the research site, student fluency was measured by recorded samples of two reading passages. Each reading passage was scored for reader miscues and the time taken to read the passage which yielded an accumaticty score. The Multi-Dimensional Fluency Scale was used to score the student passages for smoothness, pace, expression, and phrasing (Zutell & Rasinski, 1991). Initial correlation analysis determined that the ninth-grade level passage did not have enough variance to yield significance. The reading passage at the 14th-grade level yielded greater significance in correlational relationships and emerged as the focus of the data analysis. The guiding research questions for this quantitative study were:

1. What is the relationship between indicators of fluent reading and ACT attainment levels?
2. Do reading fluency indicators predict the ACT composite and reading sub-score?

This study contributes to the literature in reading fluency at the postsecondary level. While there are solid foundational theories of literacy development, gaps remain in an understanding of reading difficulties college students face and how to better academically support them. The stagnation in national reading measures, such as demonstrated on the NAEP and ACT tests, supports the need for a better understanding of how reading effects students and where or how in that process issues with comprehension and word recognition occur. While it is clear that

fluency, the appropriate recognition of words, the rate at which a student reads, and how well the student demonstrates prosody in reading, contributes to comprehension, educators at the postsecondary level should continue to discover strategies that may be shared in support of stronger classroom performance for admitted students. Postsecondary instutions have an ethical repsonsiblity to support the students that matriculate to their institutions. This pilot study was meant to provide a benchmark for clarity in the relationship between fluency and pre-matriculation information, such as the ACT scores. The significant findings of this study certainly justify the motivation for the study and the need for further exploration. Although, as the study is a pilot and as the broader understanding of how students at the college-level struggle with reading, potential solutions for assisting college-level readers may only be devised through more extensive exploration of the reading issues the students may face.

Synthesis of Findings

Based on the findings, it is evident that a number of fluency indicators are correlated with both the ACT composite and ACT reading sub-score. While all indicators were positively correlated with ACT composite, prosody, expression, and smoothness were positively correlated with both ACT scores. Miscues, however, were clearly negatively correlated with both the composite and ACT reading sub-score. The correlations answering research question one contribute directly to the findings of research question two. As a student stumbles on miscues more frequently throughout a text, they are less likely to perform well on the ACT as a whole and, in particular, the reading sub-section.

An additional point of consideration in the synthesis of the findings is related to the variance demonstrated in the average miscues within the sample. While the mean miscue rate was 4.05 with a standard deviation of 2.98, the students in the whole sample ranged from zero to

12 miscues. With a mean sample ACT reading score of 27.03, the number of miscues was higher than one might have expected given the high mean ACT score of the group. The significant miscues was evident with a number of the words in the 14th-grade level reading. In particular, 38 students stumbled over the word “demagogues”. Additionally, 35 students miscued “scepter” and 17 struggled with “succumbed”. Based on the simple view of reading, it can be argued that the phonemes in these particular words impacted students’ ability to automatically recall the word. The verbal efficiency theory may be used to explain the behavior of some students when they got to these words in the passage. Many students paused, both before and after, or attempted to sound out the word. The comprehension of the whole text may have been impacted if students were attuning to the phonetics of the word versus the meaning. As readers engage the phonological loop within the system of working memory, reading comprehension and decoding are both impacted. Based on the simple view, students were unable to decode these three words at a very high frequency for the level of text. The 14th-grade level reading passage was similar to that of a first-year college history class. The inability to decode words at the collegiate Lexile level could increase the amount of time required for reading homework assignments, could frustrate a student to the point of reading the texts altogether, and could thereby negatively impact student learning in the course and ultimate grade point average. Academic support and guidance from faculty could be used to help students in this struggle- but without adequate measurements of what is actually happening in the complicated reading process for a student- educators miss an opportunity to impact a student’s academic capacity.

Implications for Theoretical Framework

This study provides support for the simple view of reading as the inability to properly identify words contributed to the impact on ACT reading and sub-scores. In previous studies assessing students in elementary and secondary grades, prosody, including rate and accuracy, have demonstrated an influence on student reading. The current debate tends to center on which component of reading has more of an impact on reading comprehension: prosody versus automatic and accurate word recognition. This study supports both arguments with greater weight assigned to the role of accurate word recognition based on the clear significance of miscues as a predictor of the outcome variables. However, the variance explained by the findings of this study is limited. While miscues explained up to 20% of the variance in the ACT composite score, there are a number of additional factors that could be contributing to the outcomes.

The findings in this study also support the argument for a better understanding of student academic competencies prior to matriculation at a university. As was discovered by the variance in miscues, even students with strong ACT reading and composite scores may still have trouble reading college level words which could directly impact comprehension of complicated texts. Particularly in science and math courses, it was evident that word recognition could impact student performance on the test indicators. As Tinto (1993, 2012) explains, what occurs in the classroom is just as significant to a student's commitment to degree completion as what happens outside of the classroom. Academic struggles that are unmet with varied and insufficient academic support could directly impact a student's persistence to degree completion. To truly understand what incoming students need, postsecondary institutions should continue some form of assessment to not only align academic support and to advise properly, but to contribute to a

braoder understanding of literacy the the college-level. As noted in chapter two, reading ability in the United States has been stagnant for decades with students entering college with lower reading scores than they had when they started high school. This potentially poses a dilemma for postsecondary schools: build the infrastructure to authentically support the gaps in readiness of incoming students, or, make a decision related to admissions benchmarks and a threshold for what academic needs the institution can feasibly support.

Limitations

This study took place in the mid to late fall of the first semester at the university for the cohort sampled. The timing of the school year, with the ebb and flow of academic and social life on campus, may have impacted the attention students paid to the requests for participation. While over 115 students contributed samples to the study, only 95 were viable based on all variables necessary. Had the sample size been larger, more variance in prosody and miscues may have been evident, allowing for isolation or grouping of students into benchmarks for academic competencies. This would allow the institution to provide more targeted supports for students admitted that fall within this range of reading fluency. Additionally, students with stronger reading ability may have been more likely to participate. Collecting the samples online may have minimized any chilling effect in participation as compared to one on one sessions with a trained staff person. The smaller nature of the sample size overall impacted the generalizability of the study beyond this particular cohort at this particular institution. However, the means comparision between the sample and fall 2018 cohort did mitigate this issue as no significant difference was found between the mean ACT composite and reading scores for the groups. Additionally, the text genre may have been a limitation of the study. Although the passage selected was representative of a college-level history text, a passage in a science or math content

area, or English literature, may have yielded different results. Multiple readings of similar passages may have also contributed to some variability in the outcomes.

Although most students were able to load the recordings without issue based on instructions posted to the Moodle™ page, some students uploaded videos or struggled to record the samples with sound. This was a limitation of the clunky functionality of the Moodle™ settings. Students could also conceivably modify the submissions based on the limitations in design of the Moodle™ site. However, directions clearly stated that students should load recordings once and a digital time stamp enabled the researcher to note multiple submissions. This was not an overall issue in the research design as only students who were asked to re-submit based on issues with the recording submitted samples more than once.

Opportunities for Future Research

As this study was a pilot initiative yielding significant results, the study should be replicated to increase the sample size with the same instrument. It is clear from the findings that reading capacity is integral to student academic performance. As some institutions are considering test optional admissions policies, including the research site institution, the role of appropriate academic placement in a student's likelihood to persist should be seriously considered. To admit students without any understanding of their academic aptitude places the students and their advisors in a precarious situation. As more students are graduating from high school below college readiness benchmarks, high school GPA will eventually become an erroneous measure for postsecondary academic competency. There is no way to know if learning has occurred without measurement. This pilot study attempts to provide a smore specific insight into the complicated web of processes involved in reading. As the depth of literacy research on college-level reading is expanded, postsecondary faculty and staff members

may ultimately provide interventions to support student success. However, the abilities of the person providing the interventions impacts the efficacy of the intervention. More exploration of literacy and readiness concerns will ultimately assist in the designation and training required for appropriate strategic interventions for students. Ultimately, future analysis should continue exploring ways to better support college-level readers to facilitate even stronger persistence to degree completion as the foundations for adult literacy will continuously enrich all students lives in college and beyond to the career field. In the era of decreasing confidence in accountability and outcomes, specifically of liberal arts institutions, failure to provide the infrastructure to support students with academic gaps is an ethical issue. To maintain a mission driven focus on holistic student support, some institutions may face an inherent dilemma in service delivery: continue admitting students that are underprepared and underserved by the institution, or, provide stronger and more comprehensive assessment of academic capacity for more closely aligned placement and stronger experiences in and out of the classroom.

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Appendix A: **Reading Sample #1**

A Walk in the Woods

Jane walked as quietly as she could over the dark, sodden trail. Decayed leaves, sticks, and fallen branches were strewn across the trail. She stepped over them as best she could but the going was difficult, and her objective was to get back to camp soon. Her friends were there and she knew they would be worried about her as it had been over two hours since she told them "I'll be right back."

High above tree branches formed a dense canopy, obscuring the sun. If she looked carefully she could see that dusk was imminent. But as much as her impulses said run, Jane knew she needed to be careful not to take a nasty fall. If she were to seriously injure herself no one would know where to find her, and in an instant her walk could become dire. The last thing she wanted was to spend the night in woods, injured and alone.

1. What is the meaning of "sodden" as used in the story?
    a. Lumpy, poorly prepared
    b. Saturated with moisture, wet
    c. In a state of disrepair, sad shape
    d. Overrun with debris

2. Why is Jane anxious about returning to camp?
    a. She is feeling exhausted and ill
    b. This is her first time alone in the woods
    c. She is responsible for preparing dinner
    d. She did not want to worry her friends

3. Besides returning to camp, what is Jane's primary concern?
    a. To be a good steward of nature
    b. Not to accidently injure herself
    c. To travel as quickly as possible
    d. Avoiding dangerous animals

4. During what time of day does the story take place?
    a. Early morning
    b. Early evening
    c. Noon
    d. Night

5. How does the time of day likely affect Jane?
    a. It has little affect
    b. Causes her concern about her safety
    c. Causes Jane to consider alternate plans
    d. Helps Jane to remain calm

***Appendix B*: Reading Sample #2**

James Madison traveled to Philadelphia in 1787 with Athens on his mind. He had spent the year before the Constitutional Convention reading two trunks full of books on the history of failed democracies, sent to him from Paris by Thomas Jefferson. Madison was determined, in drafting the Constitution, to avoid the fate of those "ancient and modern confederacies," which he believed had succumbed to rule by demagogues and mobs.

Madison's reading convinced him that direct democracies - such as the assembly in Athens, where 6,000 citizens were required for a quorum - unleashed populist passions that overcame the cool, deliberative reason prized above all by Enlightenment thinkers. "In all very numerous assemblies, of whatever characters composed, passion never fails to wrest the scepter from reason," he argued in The Federalist Papers, the essays he wrote (along with Alexander Hamilton and John Jay) to build support for the ratification of the Constitution. "Had every Athenian citizen been a Socrates, every Athenian assembly would still have been a mob." Answer the following questions based on your understanding of the passage.

1. What "Athens" did Madison have on his mind?
   a. Athens, Georgia
   b. Athens, Ohio
   c. Athens, Tennessee
   d. Athens, Greece

2. Why was Madison travelling to Philadelphia?
   a. To attend to the writing of the Declaration of Independence
   b. To mint the Liberty Bell
   c. To attend the Constitutional Convention
   d. To buy the Dolly Madison cake company

3. In citing "ancient and modern confederacies," what is Madison referring to?
   a. The Confederate States of America
   b. Greece, Belgium, Germany, and others
   c. The United States
   d. Ancient Egypt

4. What was Madison's opinion of "direct democracies?"
   a. He found them to be the purest form of self-government
   b. They could only be successful within an educated population
   c. One person, one vote would keep people involved in government
   d. Direct democracies lead to mob rule

5. Madison believed which of the following?
   a. Government must be a deliberative process
   b. Passion is preferable to intellectuality
   c. The people best express themselves through demonstrations
   d. The Constitution as written needed amendment

Appendix C: **Multi-dimensional Fluency Rubric**

MULTI-DIMENSIONAL FLUENCY RUBRIC

	1	2	3	4
Expression and Volume	Reads in a quiet voice as if to get words out. The reading does not sound natural like talking to a friend.	Reads in a quiet voice. The reading sounds natural in part of the text, but the reader does not always sound like they are talking to a friend.	Reads with volume and expression. However, sometimes the reader slips into expressionless reading and does not sound like they are talking to a friend.	Reads with varied volume and expression. The reader sounds like they are talking to a friend with their voice matching the interpretation of the passage.
Phrasing	Reads word-by-word in a monotone voice.	Reads in two or three word phrases, not adhering to punctuation, stress and intonation.	Reads with a mixture of run-ons, mid sentence pauses for breath, and some choppiness. There is reasonable stress and intonation.	Reads with good phrasing; adhering to punctuation, stress and intonation.
Smoothness	Frequently hesitates while reading, sounds out words, and repeats words or phrases. The reader makes multiple attempts to read the same passage.	Reads with extended pauses or hesitations. The reader has many "rough spots."	Reads with occasional breaks in rhythm. The reader has difficulty with specific words and/or sentence structures.	Reads smoothly with some breaks, but self-corrects with difficult words and/ or sentence structures.
Pace	Reads slowly and laboriously.	Reads moderately slowly.	Reads generally at an appropriate rate throughout reading.	Reads at an appropriate conversational pace throughout the reading.

Scores of 10 or more indicate that the student is making good progress in fluency.

Score _____