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Honors Program as a Predictor of College Readiness of Private School Students in Arkansas

Jonathan G. Jones
Harding University

HONORS PROGRAM AS A PREDICTOR OF COLLEGE READINESS OF PRIVATE SCHOOL STUDENTS IN ARKANSAS

by

Jonathan G. Jones

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DEDICATION

This dissertation is dedicated to my grandmothers, Velma Smith Hendricks and Irene Brock Jones, whose encouragement, love, and support made higher education a reality for my family.

ABSTRACT

by
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Title: Honors Program as a Predictor of College Readiness of Private School Students in Arkansas (Under the direction of Dr. David Bangs)

The purpose of this study was to add to the research available related to college readiness. Each of the four hypotheses were constructed to determine the predictive effects of academic program type (honors or regular) over and above the predictive effects of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years on mathematics, English, science, and reading performance measured by ACT scores for 12th grade students in a private Christian school in Arkansas. A review of the literature identified the various aspects of college readiness, the characteristics of effective programs for college readiness, and the implications of such programs on providing students with college readiness knowledge and skills.

A quantitative, hierarchical regression strategy was used to analyze the data collected for each of the four hypotheses. Hierarchical regression allowed the researcher to parcel out the predictive contribution of one factor over and above the contributions of other factors. The results indicated, in stage 1 of the hierarchical regression, all four hypotheses explained a significant portion of performance on the ACT subject area test. Results ranged from 66 % in Hypothesis 4 to 78% in Hypothesis 2. Therefore, collectively the factors included in stage 1 provided a strong basis for explaining ACT

testing performance and college readiness. Of the factors included, the Plan test score was the most robust covariate in all four hypotheses. The strong correlation between the Plan test and ACT performance in this study adds to the validation that the Plan test is an effective predictor of ACT performance.

In stage 2 of the hierarchical regression, program type was added to the model. The addition of program type added to the models' explanation in Hypotheses 1-4. This increased explanation was statistically significant, which required the rejection of the null hypothesis in each case. However, although each hypothesis was statistically significant, the results in each case were not of practical significance.

Many of the studies reviewed revealed a greater effectiveness in academic program type than this study discovered. Academic program types might generally affect students' college readiness; however, these findings revealed that academic program type, even though it did not add practical significance to the model, when paired with gender, Plan test scores, number of times the ACT was taken by an individual, explained a significant portion of ACT performance and college readiness. Thus, future studies could provide broader understanding of college readiness by the variables included in this study and other relevant variables with larger more diverse populations.

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CHAPTER I

INTRODUCTION

Educators have a national interest in ensuring that students are academically prepared and have transition and financial tools needed to succeed in postsecondary education (Alliance of Excellence in Education, 2007). In the modern and increasingly competitive global economy, graduating from college is crucial for individuals to secure a good job and develop a promising future. In 85% of current jobs and nearly 90% of the fastest growing and best paying jobs, employers require individuals to have a postsecondary education, a high school diploma, and the job skills needed to succeed in the workplace (National Center for Public Policy and Higher Education, 2006). Additionally, college readiness is an important issue for stakeholders who have vested interests in high school students who are college ready (Housman, Muller, & Chait, 2006). Interested parties include major foundations, for example, the Bill and Melinda Gates Foundation and the Carnegie foundation, as well as policy making groups like the Governor's association, postsecondary educational institution leaders, parents, and students (Houseman et al., 2006).

The gap between high school preparation and college readiness exists. One-third to one-half of students who completed high school had the skills needed to succeed in college (Balfanz, 2009). California State University (2014) officials found that 44% of entering students were placed into remedial English or mathematics during the 2012–

2013 school year. Researchers estimated the annual cost of remediation was $1.9 to $2.3 billion at community colleges and another $500 million at 4-year colleges (Bettinger, Boatman, & Long, 2013). Officials in many states estimated remediation costs range from $10 million to $100 million annually (Strong American Schools, 2008).

One goal of the officials who developed the U.S. Department of Education Elementary and Secondary Act Blueprint for Reform was to improve college readiness among high school graduates (U.S. Department of Education, 2010). College readiness means a student can enter a college classroom without remediation courses, and the student can complete entry-level college requirements successfully (Conley, 2011). College readiness is a complicated benchmark measured in many ways including the analysis of standardized test results, programs of study, and grade point averages (Roderick, Nagaoka, & Coca, 2009). A strong relationship exists between high school academic rigor and college readiness (Dervarics & O'Brien, 2012).

Commonly, college readiness is assessed by student performance in standardized tests such as the Scholastic Assessment Test (SAT) or the American College Test (ACT). Each assessment comprises a larger program that provides tools for school officials to evaluate the effectiveness of college readiness initiatives and individual student readiness (Conley, 2007). In addition to the SAT, the College Board's college readiness system officials provide college readiness standards. Often, during high school, school officials use advanced placement credit through examination courses and assessments to show students' levels of college readiness (College Board, n.d.). The ACT Educational Planning and Assessment System tests align with the content and skills that

postsecondary educators have identified as important for students' college readiness (Allen, Bassiri, & Noble, 2009).

Statement of the Problem

The purposes of the proposed study were fourfold. First, the purpose of this study was to determine the predictive effects of program type (honors or regular) over and above the predictive effects of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years on mathematics performance measured by ACT scores for 12th grade students in a private Christian school in Arkansas. Second, the purpose of this study was to determine the predictive effects of program type (honors or regular) over and above the predictive effects of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years on English performance measured by ACT scores for 12th grade students at a private Christian school in Arkansas. Third, the purpose of this study was to determine the predictive effects of program type (honors or regular) over and above the predictive effects of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years on science performance measured by ACT scores of 12th grade students in a private Christian school in Arkansas. Fourth, the purpose of this study was to determine the predictive effects of program type (honors or regular) over and above the predictive effects of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years on reading performance measured by ACT scores of 12th grade students in a private Christian school in Arkansas.

Background

College readiness is vital to the economic success of the United States (Callan, Finney, Kirst, Usdan, & Venezia, 2006). A recent Brookings Institution report indicated that state investments in higher education caused economic growth (Aghion, Boustan, Hoxby, & Vandenbussche, 2009). Officials in colleges and universities in the United States are not keeping pace with the demand for college graduates. In 2011, the percentage of Americans between the ages of 25 and 64 with a 2- or 4-year college degree was 38.7% (Lumina Foundation, 2014). However, officials at the Center for Education and the Workforce cited that 63% of all jobs will require a college education by 2018 (Carnevale, Smith, & Strohl, 2010). Students who fail to graduate from high school without being prepared to attend a 4-year college are less likely to have full access to economic, political, and social opportunities (Peter D. Hart Research Associates, 2005). College readiness is obtained when a student has acquired the knowledge needed to be proficient in entry-level courses (Conley, 2011). A *college ready* student can understand what is expected in a college course and can cope with the knowledge presented (Gigliotti, 2012).

The most direct approach to determining college readiness is to test student knowledge of elements needed to succeed in college (Maruyama, 2012). According to ACT (2005a), school officials used standardized tests to assess college readiness by determining scores that correlated with college readiness benchmarks. The most widely used college readiness testing instrument is the ACT (Pope, 2012). The ACT was first administered in 1959 and has been administered in all 50 states since 1960 (ACT, 2014a).

The ACT Educational Planning and Assessment System is curriculum-based and contains questions linked directly to what students have learned in high school (ACT, 2011).

ACT's (2013) research showed, of the students from the 2013 graduating class who took the ACT more than once, 57% increased their composite score on the retest, 21% had no change in their composite score on the retest, and 22% decreased their composite score on the retest. Research indicated that the enrollment in short-term test preparation courses and the obtainment of additional subject area content knowledge account for retest score increases (Moss, Chippendale, Mershon, & Carney, 2012).

The Plan test, a standardized test that assesses participants in the areas of English, mathematics, reading and science, functions as a stand-alone program or as the midpoint of the secondary-school level of ACT's College and Career Readiness System. ACT (2013) noted that the results from the Plan test can be used to help students make adjustments in their course work to help ensure that they are prepared for what they want to do after high school. They pointed out that the Plan test is similar to the other two assessments used in the ACT's College and Career Readiness System, in that, it includes four multiple-choice tests: English, Mathematics, Reading, and Science. In addition to the academic testing, ACT emphasized that the Plan test also collects information about student interests, needs, plans, and selected background characteristics that can be useful in guidance and planning activities. The Plan program has been designed to be administered within a half day during school-supervised sessions. It takes about 3 hours and 15 minutes to complete the entire program: approximately 60–70 minutes for the non-test sections and 2 hours and 10 minutes for the four tests of educational development.

Academic achievement and college readiness are measured through achievement tests. The results of these tests are often used in making admissions decisions for students. Therefore, it is important that gender-related performances differences are understood. To ensure fairness in testing, achievement tests have been evaluated and calibrated to account for differences related to gender (Guiso, Monte, Sapienza, & Zingales, 2008). Certain tests, such as the SAT and PSAT, have routinely documented differences, and SAT mathematics performances show a large gap between genders (Nankervis, 2011). ACT research showed slight differences between the genders when students select to take the test. However, these differences dissipate when entire groups participate in a required administration of the test (ACT, 2005b).

Student mobility is widespread in the United States (Baker-Boudissa & Cross, 2008; Kaase, 2005). Mobility can negatively affect the students who change schools and can harm the classrooms and schools they attend (Rumberger, 2003). Student mobility can have a profound influence on students' college readiness because of decreased instruction time and differences in curriculum between schools (Lash & Kirkpatrick, 1994). It is important to understand gender and student mobility issues when attempting understand how to provide an environment that promotes college readiness.

Another factor that must be considered is the apparent gap between high school expectations and entry-level college expectations. Despite the significant societal and personal importance of graduating from high school and being prepared for college, incongruence occurs between requirements needed to graduate from high school and the requirements to enter college (Conley, 2007). The requirements to graduate from high school are less rigorous than the requirements to enter a 4-year college (Geiser &

Santelices, 2007). Many high school graduates are ineligible for regular college enrollment because of the incongruence (Roderick et al., 2009). The lack of alignment between high school programs and entrance requirements for institutions of higher learning results in a high percentage of American high school graduates who are unprepared for college (Lerner & Brand, 2006). For example, readiness rates increase when students are continuously enrollment in mathematics courses through the entire high school career (Zelkowski, 2010). Secondary mathematics is the predominate predictor of bachelor degree completion (Zelkowski, 2010). The level of high school mathematics a student completes is a significant indicator of the chance a student has to complete a bachelor's degree (Adelman, 1999).

Examining college remediation rates highlights the gap between high school preparation and the college readiness gap. A large percentage of students taking remedial reading will not complete a bachelor's degree (Radford, Pearson, Ho, Chambers, & Ferlazzo, 2012). In 2011, a mere 24% of seniors who took the ACT met the college-ready benchmarks in all four subject areas (ACT, 2011). Poor testing results are caused by lack of coordination between high school curriculum and college readiness standards. Ultimately, the nature and quality of courses that students take are important; yet, few accurate measures of course quality exist (Conley, 2007). Federal statistics indicated that 40% of admitted and enrolled students take at least one remedial course in college (National Center for Educational Statistics, 2004). The readiness gap increases the time students need to complete their degrees and increases the likelihood that the students will not graduate from college (Adelman, 2006).

A curriculum embedded with college readiness indicators is effective in closing the readiness gap (Roderick et al., 2009). Several key high school interventions exist that can be used to develop and ensure postsecondary readiness (Savitz-Romer & Jager-Hyman, 2009). Researchers and readiness advocates have suggested that school officials need to increase the rigor and relevance of the curriculum (American Youth Policy Forum, n.d.). Most school officials accept a few sets of curriculum standards; for example, the ACT, College Board, Standard of Success, and the American Diploma project all provide college readiness standards (Rolfhus, Decker, Brite, & Gregory, 2010). One of the goals of the Common Core initiative is to provide a national set of standards to minimize the preparation gap between high school courses and college readiness (Common Core State Standards Initiative, 2012).

Rigor and relevance can be increased when students are in programs that provide courses that model college content and expectations (Conley, 2007). Two types of courses could be used in high school academic programs to provide the rigor needed to foster college readiness (Thomas, Marken, Gray, & Lewis, 2013). The two courses include dual credit courses (courses that provide both high school and college credit) and exam based courses (Thomas et al., 2013). Dual enrollment courses are used to allow high school students to take college courses and earn college credits while they are in high school (An, 2013). The most common forms of exam-based courses are advanced placement courses and International Baccalaureate courses (Thomas et al., 2013). Increasing the availability of dual credit courses and exam based courses may result in a top-down improvement in curriculum and assist students with smoother transitions into college (Hyberg, 1993).

Schools can change pace and rigor in the curriculum by participating in early college high school partnerships (Leonard, 2013). According to Venezia and Jaeger (2013), early college high schools are small schools (the average size is around 250 students) that serve students historically underrepresented in college populations and that aim to coordinate student services, decrease repetition in curriculum, make college attainable, and eliminate the need for remediation. These programs align the last two years of high school so that every credit students earn is dual credit and can be used as college level credit. Thus, a student who successfully completes the program would graduate from high school with the equivalent of two years of college credits (Hoffman & Vargas, 2005). The merit of the early college program is that it is used to provide students with the academic rigor needed for college readiness and provides a head start, thereby, increasing the likelihood of students completing bachelor's degrees successfully (American Institutes for Research and SRI, 2013).

The honors program at a private school in Arkansas studied provided dual credit and credit by examination courses and required continuous enrollment in mathematics courses. The school that is subject to this study provides 11th and 12th grade students the opportunity to take each core course in either the advanced placement or dual credit format. These opportunities were designed to function as a version of an early college high school.

Hypotheses

An initial review of the literature showed a consistent pattern: high school programs high in academic rigor encourage college readiness. Data specifically related to determining the predictive effects of the variables included in this study on college

readiness were lacking in that most every other study of this nature considers high school grade point average as a predictor of readiness. The literature suggested that academic program type, ACT subtest and composite scores, and reduced student mobility correlate to college readiness. Therefore, the following hypotheses were developed.

1. No significant predictive effect of program type (honors or regular) will exist on mathematics performance measured by ACT mathematics scores for 12th grade students in a private Christian school in Arkansas over and above the predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years.
2. No significant predictive effect of program type (honors or regular) will exist on English performance measured by ACT English scores for 12th grade students in a private Christian school in Arkansas over and above the predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years.
3. No significant predictive effect of program type (honors or regular) will exist on science performance measured by ACT science scores for 12th grade students in a private Christian school in Arkansas over and above the predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years.
4. No significant predictive effect of program type (honors or regular) will exist on reading performance measured by ACT reading scores for 12th grade students in a private Christian school in Arkansas over and above the

predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years.

Description of Terms

Advanced placement courses. Educators use advanced placement courses to provide academic rigor at the level comparable to college courses. The courses require a higher level of analysis and critical thinking in an effort to prepare students for the advanced placement exam. Students earn college credit for each course based on their performance on the comprehensive exam (Thomas et al., 2013). Exams are administered annually on national testing dates in May.

American College Test (ACT). Educators use the ACT to assess the general educational development of high school students and their abilities to complete college-level work. The multiple-choice test addresses four skill areas: English, mathematics, reading, and science. An optional writing test can be used to measure skills in planning and writing a short essay (ACT, 2009). The writing component was not a variable in this study.

Aspire Assessment System. Launched in 2014, this assessment system is the first digital, longitudinal assessment system to fully connect student performance from elementary grades through high school. This system is aligned with Common Core State Standards and ACT College Readiness Benchmarks (ACT, 2014c).

College readiness. College readiness means that a student can enter a college classroom without remediation and successfully complete entry-level college requirements (Conley, 2011).

Common Core Standards Initiative. The Common Core State Standards Initiative (2012) is a state-led effort coordinated by the officials of the National Governors Association Center for Best Practices and officials of the Council of Chief State School Officers. Teachers, school administrators, and experts collaborated to develop standards to provide a clear and consistent framework to prepare students for college and the workforce. The standards are used to define the knowledge and skills students should have within their K-12 education programs to enable them to graduate high school and succeed in entry-level, credit-bearing academic college courses and workforce training programs.

Dual enrollment. Dual enrollment programs require a partnership between a school or district and a local institution of higher education. Courses offered can be academic or career/technical, and students earn college credit by passing the courses. Although students may or may not simultaneously earn high school credits (i.e., dual credits), their college performance is documented on a college transcript (Cassidy, Keating, & Young, 2010).

International baccalaureate courses. International baccalaureate courses require students to take written examinations at the end of the program, which are graded by external international baccalaureate examiners (International Baccalaureate Association, n.d.). Additionally, students complete assessment tasks in the school, which are marked initially by teachers and moderated by external moderators, or sent directly to external examiners. International baccalaureate course assessments are criterion based. The ranges of scores students attained have remained stable statistically over time because of the rigor and consistency of the courses.

Student mobility. Rumberger (2003) defined student mobility as students making non-promotional school changes. High rates of student mobility are associated with a range of negative academic outcomes, both for students who leave their schools and those who remain behind (Finch, Lapsley, & Baker-Boudissa, 2009).

Significance

Research Gaps

A number of studies exist in which researchers have evaluated predictors and frameworks that explain college readiness. All of these studies present evidence on a variety of methods used to provide results that are beneficial for students such as the implementation of high rigor courses and continual enrollment in certain academic courses (Adelman, 1999, 2006; Edmunds et al., 2012; Wimberly & Noeth, 2005). These studies are important because they assist educators with the information to provide opportunities for students to develop college readiness skills needed to successfully transition to higher education. Students, who transition from high school to college with the proper readiness skills in place, tend to experience success in college compared to those who have inadequate readiness skills. However, none of these studies combined the predictors used in this study (program type, gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years) as their model to determine academic performance (measured by the ACT subtest scores of mathematics, English, science and reading).

Potential Implications for Practice

College readiness is important for students in the current context of education; it can determine their future academic and career successes. College-bound high school

students are required to submit ACT scores for admission into higher educational institutions. The ACT scores of incoming college freshman determine if the student will be enrolled in the remedial classes or regular college programs. The ACT officials have established college readiness benchmark scores for each subtest. The benchmark scores for each subtest include a 22 in mathematics, an 18 in English, a 23 in science, and a 22 in reading (ACT, 2014b). High school officials nationwide can benefit from knowing if academic rigor impacts ACT subtest scores. High school officials who find their students' ACT scores below average can design academic programs and interventions that improve overall college readiness.

Process to Accomplish

Design

A quantitative, hierarchical regression strategy was used in the current study. The independent or predictor variables for all four hypotheses were the same. The predictor variable for Hypotheses 1-4 was program type (honors or regular). The covariate variables for the four hypotheses included gender, Plan test scores, number of times the ACT was taken by an individual, and longevity in years. Each hypothesis had a different dependent or criterion variable including mathematics, English, science, and reading performance measured by ACT scores for 12th grade students in a private Christian school in Arkansas, respectively.

Sample

Participants in the current study were selected from the total student population of the 2011 graduating classes from a private Christian school in Arkansas. A simple random sample was taken from the population, and 80 participants were selected. Of the

participants, 46 were honors students, and 34 were students not exposed to the honors program. The class of 2011 contained 31 women and 49 men. The participants ranged from 17 years and 2 months of age to 18 years and 3 months of age at the time of testing. From the 80 participants, 99% entered college after graduating from high school. All students in the sample took the ACT for the final time during their senior year of high school.

Instrumentation

In the spring of 2011, high school seniors attending a private Christian school in Arkansas completed all the requirements for graduation. The researcher collected the following data from the sample: program type (honors or regular), gender, Plan test scores, number of times the ACT was taken by an individual, longevity in years, and ACT subtest scores.

For this study, the ACT subtest scores served as the criterion variables for the four hypotheses because each of the students took the ACT for university entrance. In fact, about 47% (approximately 1.57 million) graduates of all 2010 high school graduates in the United States took the ACT during high school, and approximately 1 in every 3,300 students had a perfect score of 36 (ACT, 2011). Many schools use the ACT because of its stable reliability. ACT has a reliability score in English of .91, mathematics of .91, reading of .85, science of .80, and a composite reliability score of .96 (ACT, 2007). ACT (2007) officials noted that Arkansas administrators administered the ACT to 88% of all high school graduates in 2012, and they scored an average composite score of 20.3. The ACT exam contains 215 items with time limits for each area. The mathematics section has 60 questions with a 60-minute time limit, and the English section has 75 questions

with a 45-minute time limit. Both the science and reading sections contain 40 questions with each timed at 35 minutes. The writing prompt component of the test was not used in the current study. The students' ACT subtest scores in mathematics, English, science, and reading were collected for the current study.

The other test scores collected were from the PLAN test program; these scores served as a predictor variable for the participants. ACT (2013) noted that this program was designed to be administered within a half day during school supervised sessions. It takes approximately 3 hours and 15 minutes to complete the entire program: approximately 60 to 70 minutes for the non-test sections and 2 hours and 10 minutes for the four tests of educational development. The Plan procedures and materials allow school officials the option of dividing the administration over two or more days. The non-test sections, including student plans and background information, Interest Inventory, and course/grade information, may be administered in a nonsecure, supervised school setting on or before the test day. The four tests of educational development must be administered in a single session on the designated test day.

Data Analysis

To address each hypothesis, a hierarchical regression strategy was conducted to determine the degree of predictive effect program type (honors or regular) had on several criterion variables over and above the other predictor variables in the model (gender, Plan test scores, number of times the ACT was taken by an individual, and longevity in years). The criterion variables included academic performance measured by ACT subtests (mathematics, English, science, and reading) at the completion of high school. Each analysis involved the significance of the model as a whole with all the predictors. Then,

each analysis involved determining how much each predictor variable related to the overall formula. The hypotheses were tested using a two-tailed test with a .05 level of significance.

CHAPTER II

REVIEW OF RELATED LITERATURE

The literature review in this chapter provided a research-based foundation for this study and its findings and was organized into four parts. First, an overview of the College Readiness was presented. Second, an examination of tests that measure college readiness were discussed. Third, the researcher took an in-depth look at student factors for college readiness and their effects on student achievement. Fourth, material was presented to offer an in-depth look at academic programs for college readiness.

College Readiness

College readiness is a national priority in the United States (Callan et al., 2006). The president of the United States communicated the importance of college readiness by making it a major thrust in this administration's education policy. In his address to the Joint Session of Congress on February 24, 2009, President Obama (2009) stated,

> I ask every American to commit to at least one year or more of higher education or career training. This can be community college or a four-year school; vocational training or an apprenticeship. However, whatever the training may be, every American will need to get more than a high school diploma. (para. 63)

In making these statements, President Obama acknowledged that more than a high school education was needed for those preparing for a career. Consequently, the priority of preparation for post high school endeavors has continued to be a major policy focus. In

President Obama's blueprint for the reauthorization of the Elementary and Secondary Education Act, starting with its signature education reform initiative—Race to the Top, the Obama administration set a new agenda that put state level innovation at center stage. Race to the Top served as an invitation for the state administrators' best ideas on raising standards to prepare all students for college and careers (Barnes, Slate, & Rojas-LeBouef, 2010).

In addition to the President of the United States, other key stakeholders including the American public, policymakers, educators, and employers have become aware that a high school diploma does not signify that a student is prepared to succeed in college (Arnold, Lu, & Armstrong, 2012). In the past, a high school diploma was all that was required for an individual to obtain a job that could guarantee entrance into the middle class; however, currently at least a coherent program of postsecondary training, if not a college degree, is typically necessary to achieve the same economic status (Kirst & Bracco, 2004).

For instance, the Brookings Institution report indicated that the state investments in higher education cause economic growth (Aghion et al., 2009). To meet the demands of production, adjust to rapidly changing technologies, and participate in the global environment, the officials must develop an adaptable and highly skilled workforce to remain economically competitive (Bernanke, 2007).

This literature review indicates that successful college completion is the gateway of vocational success for an individual and economic growth for the United States. The aforementioned factors require a clear understanding of college readiness. College readiness refers to a student's capacity to enroll at a postsecondary institution, take credit-

bearing classes in the first year, earn passing grades in courses, and persist to meet educational goals. Conley (2007, 2011) communicated that College readiness is obtained when a student has acquired the information needed to be proficient in entry-level courses. A college-ready student can understand what is expected in a college course and cope with the knowledge presented (Conley, 2007, 2011). A high school graduate is considered college ready when he or she has acquired the English and mathematics knowledge and skills needed to be successful in college courses without the need for remedial coursework (ACT, 2007; Conley, 2007).

Readiness Gap

Studies conducted over the course of the last decade have indicated that nearly all high school students both desire to attend college and understand the importance of college, because over 90% of high school seniors say that they intend to go to college (Schneider & Stevenson, 2000). Nearly all entering ninth-graders in the United States expect to attend college (Chait & Venezia, 2009). Unfortunately, secondary school students do not realize their aspirations as evidenced by intensive remediation and low completion rates at colleges (Pennington & Vargas, 2004). In fact, administrators at colleges and universities in the United States are not keeping pace with the demand for college graduates. Officials at the Center for Education and the Workforce cited that 63% of all jobs would require workers with a college education by 2018 (Carnevale et al., 2010).

Many students confuse college eligibility with college readiness (Conley, 2005). Students who graduate from high school without being prepared to attend a 4-year college are less likely to gain full access to economic, political, and social opportunities

(Peter D. Hart Research Associates, 2005). Despite the societal and personal value for students to graduate from high school and to prepare for college, incongruence occurs between the requirements needed to graduate from high school and the requirements to enter college (Conley, 2007). Unfortunately, the requirements to graduate from high school are less rigorous than the requirements to apply to a 4-year college (Geiser & Santelices, 2007). This, of course, gives the misconception that any student that graduates from high school is ready for college.

Some high school graduates are ineligible for regular college enrollment because of curricular incongruence (Roderick et al., 2009). The lack of alignment by administrators between high school programs and entrance requirements into institutions of higher learning has resulted in a high number of American high school graduates who are not college-ready (Lerner & Brand, 2006). The lack of coordination between high school curricula and college readiness standards manifests itself in poor achievement test performance, which results in a student being required to take remedial courses. The college readiness gap can be understood by examining college remediation rates. Federal statistics indicated that 40% of admitted and enrolled students take at least one remedial course in college (National Center for Educational Statistics, 2004). In 2011, only 24% of seniors who took the ACT met the college-ready benchmarks required in all four major subject areas (ACT, 2011). Ultimately, the nature and quality of the courses students are exposed to are of importance; yet, few accurate measures of course quality exist (Conley, 2007).

Moreover, a large percentage of students taking remedial reading will not complete a bachelor's degree (Radford et al., 2012). Students are affected because the

readiness gap extends the time students need to complete their degrees. The readiness gap is associated with the increased likelihood that the students will not graduate from college due to the loss of academic momentum (Adelman, 2006). The college readiness gap that leaves a high percentage in need of remedial courses after high school is disconcerting. However, the connection between the need for remediation and the increased likelihood that a student will not graduate from college makes this an alarming situation for all who have a vested interest in the success of students.

The literature examined indicated that the obtainment of college readiness skills is essential for all students. College readiness is the gateway to college completion and vocational success. This study was designed to examine the ability of certain predictor variables to explain college readiness as measured by ACT performance.

Tests for College Readiness

The ACT

College readiness is most commonly assessed by performance on a national exam such as the ACT. The ACT is not the only means of assessment, but researchers agree it is an effective tool and is currently taken by more students than any other college placement assessment (Pope, 2012). The ACT test measures a student's college readiness level in the areas of, mathematics, English, science and reading. The ACT was founded by Ted McCarrel and E. F. Lindquist in 1959. Since that time, ACT testing results have provided important feedback for students, parents and educators (ACT, n.d.a). In 1996, the organizational officials formally changed the organization name from American College Testing to ACT (ACT, n.d.a).

The ACT was borne out of a need for a test that went beyond local parameters. The test needed to be encompassing enough to be used by colleges nationwide. In the words of Jacobsen (n.d.),

> Lindquist suggested a need for a new regional or national test for college bound high school students, for reasons including: (a) the SAT is used primarily by selective colleges in the northeastern U.S., but not by most public institutions as well or by universities in other regions of the country; (b) the new test should be used not just for admissions but placement as well; and (c)the test should primarily be useful as an indicator of academic preparation, (i.e., it should be an *achievement* test). (para. 1)

As intended by McCarrel and Lindquist, educators use the ACT to assist students in making decisions regarding college or university choices and programs of study. Additionally, university officials use the ACT test to assist with the admittance process. The service is used to provide information that helps college administrators regarding admission policies and data, which may increase the probability of future success of students (Wimberly & Noeth, 2005).

The ACT consists of four multiple-choice tests: mathematics, English, science, and reading. Each test is comprised of questions designed to measure typical knowledge and skills acquired in high schools courses (ACT, n.d.b). The English test is a 75-question, 45-minute test covering usage/mechanics and rhetorical skills. The ACT mathematics test is a 60-question, 60-minute test designed to measure the mathematical skills students have typically acquired in courses taken by the end of 11th grade. The reading test is a 40-question, 35-minute test that measures a student's reading

comprehension. Students are asked to read several passages and answer questions to show their understanding of what is directly stated and statements with implied meanings. The science test is a 40-question, 35-minute test used to measure the skills and knowledge of the natural sciences including interpretation, analysis, evaluation, reasoning, and problem solving (ACT, n.d.c). The ACT subtests: English, mathematics, science and reading were used as criterion variables in this study.

The ACT's Educational Planning and Assessment System

The ACT and other standardized tests are used to assess college readiness by determining scores that correlate with college success. For example, ACT officials defined college readiness benchmarks and then used the benchmarks to outline the relationship between test scores and the probability of success in first-year credit-bearing courses (ACT, 2005a). In preparation to meet the benchmarks, the ACT's Educational Planning and Assessment System (EPASTM) was designed to be curriculum-based and contained questions relating directly to subjects students have learned in high school.

All testing systems are designed to evaluate a student's level of knowledge regarding a set of standards or benchmarks that indicate early success in college (Allen et al., 2009). In addition to benchmarks for the ACT, corresponding Explore and Plan benchmarks are available for students to gauge their progress in college readiness, when they take the Explore test in the 8th grade and the Plan test in the 10th grade. The ACT's college readiness benchmarks are defined as the minimum ACT scores required for students to have a high probability of success in credit-bearing college courses (i.e., English composition, social science courses, college algebra, and biology) (ACT, 2011). In the literature, when using the scores to predict early college success, the subtest scores

of English and mathematics were found to be strong predictors; conversely, the subtest scores of reading and science were found to have less strength in predicting performance in college (Hurley, 2013). The researcher used two components of the EPASTM in the current study: Plan tests' composite scores and the ACT subtest scores in English, mathematics, reading, and science.

Number of Times the ACT Test was taken by an Individual

Another performance consideration involves the number of times an individual student has taken the ACT test and the effects of multiple testing. ACT (2013) officials noted that, of the students from the 2013 graduating class who took the ACT more than once, 57% increased their composite score on the retest, 21% had no change in their composite score, and 22% decreased their composite score. This supports the idea that taking the ACT multiple times is beneficial.

Many claims exist of large increases attributed to ACT preparation (primarily by commercial coaching firms); however, very little objective evidence exists to establish the actual gains that can be directly linked to a particular coaching program (Moss et al., 2012). ACT officials explained the best test preparation involves taking longer term, college preparatory classes. ACT officials stated, "The results of activities, such as commercial test preparation classes and test preparation tutoring on ACT subject test scores were small: score increases associated with these activities did not exceed one point for ACT English, mathematics or reading" (ACT, 2005a, p. 1). ACT test preparation courses can be purchased in a number of formats and from many vendors, even from ACT; however, the most meaningful gains come when a student obtains subject area information that is compatible with the ACT test.

The Plan Test

The Plan test is the second of three assessments that make up the ACT testing program known as the EPASTM. The Plan test is designed to evaluate a student's college readiness level at the midpoint of a high school career. Plan test scores provide students with an understanding of their academic readiness for college or the workplace based on their post-high school educational and considered career options. Results can be used to help students identify their academic strengths and weaknesses as they consider decisions for high school and beyond (Office of Student Assessment Services, West Virginia Department of Education, 2005). Additionally, Plan results may be used to identify students with potential for success in Advanced Placement and other rigorous courses.

According to *Understanding the Plan Test* (n.d.), the Plan test includes four multiple-choice subtests: English, mathematics, reading, and science. Similar to the ACT, the test provides students with an overall composite score ranging from 1 to 32. A Plan score report lists scores for each subtest ranging from 1 to 32. For the English and mathematics tests, students receive subscores in usage/mechanics, rhetorical skills, pre-algebra/algebra, and geometry with each ranging from 1 to 16. Students can see how they scored compared to other students taking the Plan test at their school, in their state, and across the nation. Students are given their percentile performance overall and in each test (e.g., if a student scores in the 61st percentile, he/she scored at or above 61% of the students taking the Plan, and lower than 39%) (*Understanding the Plan Test*, n.d.).

The Plan test can forecast a student's college readiness at the midpoint in high school. Thus, this test provides the information needed by students and their support systems to make decisions related to college readiness during the last half of their high

school career. Composite Plan test scores were used as one of the covariates in the model for this study.

Student Factors for College Readiness

Gender

Achievement tests such as the ACT and Plan test are strong in measuring academic achievement and college readiness, but determining gender differences in performance is another issue. To ensure fairness, achievement tests have been tested and calibrated to account for differences regarding gender (Guiso et al., 2009). Particular tests, such as the SAT and the Preliminary Scholastic Assessment Test (PSAT), have routinely documented such differences. SAT mathematics performances have shown a large gap between genders. Although scores have been comparable on the reading and writing sections, nationally, males average 35 points (one third of a standard deviation) higher compared to females on the SAT mathematics section with the gender gap being as large as 50 points in some states. Nankervis (2011) noted that SAT results under predict performance of the future college success of females. Nankervis argued that the National Merit test, which uses the PSAT, is biased against females. In addition, he contended that the PSAT is misused because the National Merit uses an achievement test to determine merit.

The Education Forum officials (Guiso et al., 2008) stated that gender performance in mathematics scores seemed to have equalized in societies that provide equality of opportunity. When using the ACT as a measure in determining college readiness, the differences between genders, if any, must be understood. In addition, ACT research showed slight differences between the genders. However, the differences dissipated when

an entire population was tested (ACT, 2005b). The differences in achievement test performance, by gender, were used as a covariate in this study.

Student Mobility

Researchers have agreed that student mobility has a negative effect on academic achievement, and it is another important factor to consider when reviewing readiness. Student mobility is a widespread phenomenon in many schools and educational districts throughout the United States. Mobility can harm the students who change schools and can harm the classrooms and schools attended (Rumberger, 2003). Student mobility can have a profound influence on a student's college readiness because of lost instruction time and differences in curricula from school to school (Lash & Kirkpatrick, 1994). Americans change residences more often compared to people in any other industrialized country (Garriss-Hardy & Vrooman, 2004). In fact, 31% of students have changed schools two or more times by eighth grade, 10% of students will move four or more times by the 12th grade, and the rates seem to be increasing (Kaase, 2005).

A negative correlation exists between student mobility and student performance. Students on either end of the K-12 spectrum including students in K to 2nd grade and 11th to 12th grades are at the greatest risk for being affected negatively by student mobility. Mobility has a statistically significant relationship to academic achievement. One move in a 3-year period will lower a student's performance score by 2.5% (Robinson, 2012).

When a student moves, curriculum, order, and pacing can all be affected to the detriment of the student (Sanderson, 2004). In the upper end of the continuum, high school students can be affected negatively by lack of credit transfers or other

incompatibilities between schools. Over time, multiple moves will exert a cumulative detrimental influence on academic achievements. Changing schools frequently leads to losing ground academically. “In a study conducted by of the National Assessment of Educational Progress 1998 mathematics assessment, researchers stated, 34% of 4th graders, 21% of 8th graders, and l0% of 12th graders changed schools at least once in the previous 2 years” (Rumberger, 2003 pp. 6-7). Researchers for the 2004 Annual Social and Economic Supplement to the U.S. Census found 15 to 20% of all school-aged children moved in 2003 (National Center for Education Statistics, 2004). In addition, between 2006 and 2007, 14% of all school-aged children in the United States changed their residences (Isernhagen & Bulkin, 2011).

Often, the impact of high mobility is negative for mobile students, non-mobile students, teachers, and schools. Highly mobile students are at highest risk for failure. Officials of the U.S. Government Accounting Office revealed that students who change schools more than three times before eighth grade are at least four times more likely to drop out of school (Ashby, 2010). Researchers of mobility and achievement studies concluded that mobility is a large threat to academic achievement and the school environment (Reynolds, Chen, & Herbers, 2009). Mobility is “a ‘chaos’ factor that impacts classroom learning activities, teacher morale, and administrative burdens” (Rumberger, 2003, p. 11). School mobility is an unavoidable reality of the American school system, having the most detrimental effects upon the academic achievement on the most vulnerable students. Students at both ends of the continuum are most likely to move (K-2 and 8-12). However, the negative effects of student mobility were found at all grade levels. Instructional interruptions due to mobility issues have been documented to

have a greater effect on mathematics performance compared to English performance. In the majority of grade levels, the effect of student mobility had a stronger negative effect on mathematics scores compared to reading scores (Finch et al., 2009). Like the Plan test scores and gender, student mobility was used as a covariate in this study.

Academic Programs

A myriad of factors exist that can contribute to the obtainment of college readiness knowledge and skills. This study used and explored several criterion variables and covariates. The predictor variable used in this model was academic program type. Academic program type was used as the predictor variable in this study because the research indicated that academic preparation, which is driven by the rigor and intensity of a particular academic program, is the key determinate of college readiness. Widespread consensus exists that high school academic preparation is at the center of college readiness (Adelman, 1999; Arnold et al., 2012). Researchers and readiness advocates have suggested that school officials need to increase the rigor and relevance of the curriculum (American Youth Policy Forum, n.d; Dervarics & O'Brien, 2012). In the context of high school improvement, academic rigor could be used as shorthand for a set of ideas, principles, and strategies that lead to the desired outcome, which is that all students are well prepared for postsecondary education (National High School Alliance, 2006). Rigor can be discussed in terms of specific course requirements and curricula, the quality of content and instruction, and strategies to support improved student achievement (National High School Alliance, 2006).

In a publication regarding the use of American Recovery and Reinvestment Act that provides funds for school reform efforts, researchers discussed examples of actions

that district and school reform efforts, Theodore and Madison-Harris (2009) discussed examples of actions that district and school officials may take to promote higher standards and effective assessment systems. First, schools should increase student participation in rigorous advanced courses such as advanced placement, international baccalaureate, and dual enrollment in postsecondary credit-bearing courses and provide training for teachers and counselors to support the initiatives. Second, Theodore and Madison-Harris noted that schools should use formative and interim assessments that are valid and reliable for all students, especially students with disabilities and English language learners (ELLs). They should also provide timely data to help educators track and improve student progress. If assessments are technology based, they should train teachers on the use of the technology. Third, the researchers contended that schools should implement a high-quality curriculum aligned with standards with embedded assessments. Schools should include instructional materials appropriate for ELLs and students with disabilities and train all teachers in effectively using the curriculum with their students. These key components of academic programs: rigorous courses, testing, standards alignment, and college knowledge served as a framework for explaining academic programs that promote college readiness.

Rigorous Advanced Courses: Dual Credit and Credit-by-examination Courses

Though universal standards for academic course quality in high schools are nonexistent, two types of courses seem to provide the rigor needed to foster college readiness. The two course types are dual credit courses (courses that provide both high school and college credit) and credit-by-examination courses (Thomas et al., 2013). First, dual enrollment courses are used to allow high school students to take college courses

and earn college credits while they are in high school (An, 2013). Currently, 1.2 million high school students are enrolled in dual credit courses (Cassidy et al., 2010). Evidence has shown that students who earn dual enrollment credits have outcomes that are slightly more positive in postsecondary education (typically 4% to 5%) compared to similar students who do not earn dual enrollment credits (Lewis & Overman, 2008). Second, credit-by-examination courses are used to award college credits to students based on their performance on specific comprehensive examinations (Bailey & Karp, 2003). The most common forms of credit-by-examination courses are Advanced Placement courses and international baccalaureate courses (Thomas et al., 2013). Increasing the availability of dual credit and credit-by-examination courses might result in a top-down improvement in curricula and assist students in smoother transitions into college (Hyberg, 1993).

High-level Content Aligned to Standards

Recently, driven by the Race to the Top initiatives, a national movement has been underway to ensure high program standards, rigorous curricula, and assessments that are aligned with colleges and career readiness (Arkansas Department of Education, 2010). Several essential high school interventions are used to develop and ensure postsecondary readiness (Savitz-Romer & Jager-Hyman, 2009). Regardless of the division of students, the curriculum measure is used to produce a higher percentage of students earning bachelor's degrees compared to either of the other measures. The correlation of curriculum with bachelor's degree attainment is higher (.54) compared to test scores (.48) or class rank/grade point average (.44) (Adelman, 1999). Course curriculum is created based on academic standards.

Most school officials accept a few sets of standards. The American Diploma Project (ADP) standards, ACT College Readiness Standards, College Board, Standard of Success (S4S), and Common Core are all accepted standards (Rolfhus et al., 2010). All of these standards are designed to help improve academic programs that prepare students for success after high school. For example, the ADP and S4S standards are recent creations by groups focused on college readiness and high school reform. On the one hand, the ADP, created by Achieve (2007), has assembled a network of state policymakers and other leaders to align state standards and assessments and raise them to a level that will prepare students for success in postsecondary education. As of 2009, 35 states were part of the ADP network. The ADP standards were developed through a 2-year process that solicited input from business leaders and postsecondary educators from five states including Texas, Indiana, Kentucky, Massachusetts, and Nevada. This group identified prerequisite knowledge and skills for success in postsecondary education such as entry-level English courses. A working set of standards representing content in the domains of English and mathematics emerged from this research as a basis for refining state K12 standards and assessments. The ADP English language arts standards are divided into eight strands: communication, informational text, language, literature, logic media, research, and writing (Achieve, 2004, 2009). On the other hand, the S4S set of standards was developed by David Conley at the University of Oregon Center for Educational Policy with a grant from the Pew Charitable Trusts in partnership with the American Association of Universities. The S4S standards require students to correctly use and apply general concepts to interpret or explain more specific knowledge and skills (Conley

2005, 2007). The standards represent six content domains: English, mathematics, natural sciences, social sciences, second languages, and the arts.

In contrast to the recent creations of ADP and S4S standards, both the College Board and the ACT have been around for many years. However, College Board and ACT standards have become more important to a wider range of schools and students as college readiness has become more of a focus in high schools over time. The purposes of the College Board's College Readiness Benchmark for students enrolled in first year college courses were to increase their scores on the SAT, to increase college attendance and college completion, and to reduce college remediation rates (College Board, 2012). College Board standards were developed in two content domains including (a) English language arts and (b) mathematics and statistics, which provided a framework of model courses for states and districts to follow in preparing students for college. The Expert Standards Advisory Committee composed of postsecondary teacher education faculty, middle and high school teachers, and assessment and curriculum specialists with experience in developing standards developed the standards over four years using a multi-step expert judgment process. The committee first identified the English language arts knowledge and skills required for entry-level college students. Then, working backward from these skills, the committee identified the prerequisite knowledge and skills from grade 6 through college. These skill sets subsequently became sets of standards. The College Board set of standards for English language arts defined performance expectations for five strands: listening, media literacy, reading, speaking, and writing (College Board, 2011).

This study focused on the ACT College Readiness Standards. The ACT College Readiness Standards, developed by ACT, are intended to represent a range of knowledge and skills that most students should be able to demonstrate based on their scores on the ACT assessments. Students receive individual results, and their performance relative to the standards is intended to assist students, parents, and teachers in identifying individual skill deficits and assist each teacher's modifying instruction to address student needs. The ACT assessment standards were developed through a multistage process by ACT staff and reviewed by scholars (identified by ACT as nationally recognized) from high school and university English and reading education departments. Based on the distribution of student scores on ACT's EPASTM and 40 years of research on ACT student assessment data, ACT identified eight score ranges that most accurately identified students' levels of achievement. Four ACT content teams reviewed several forms of the ACT assessments by content domain English, mathematics, science, and reading and conceptualized what each ACT assessment measured. ACT staff wrote the college readiness standards based on their expert analysis of the knowledge and skills a student needs to respond correctly to the assessment items. Finally, independent reviewers validated the English language arts college readiness standards, which were divided into three strands: English, reading, and writing (ACT, 2007).

In particular, the advent of the Common Core State Standards Initiative (2012) increased the probability of a universally accepted set of readiness standards in the future. One of the goals of the common core initiative is to provide a national set of standards that tighten the preparation gap between high school courses and college readiness. The goal is to provide students with readiness skills that place all students at an internationally

competitive level. Two overlapping groups, the Partnership for Assessments for Readiness for College and Careers (PARCC) and Smart Balance Assessment Consortium, are partnerships of states that have worked to create electronic assessments that are aligned with Common Core standards and that will gauge a student's academic achievement and college readiness (Center for K-12 Assessment & Performance Management at ETS, 2013). In addition, the groups were awarded Race to the Top grants from the federal government for the specific purpose of creating assessments that measure readiness in language arts and mathematics (Smarter Balance Assessment Consortium, n.d.).

The PARCC is based on the core belief that assessments should work as tools for enhancing teaching and learning. Assessments are aligned with the Common Core State Standards (CCSS); therefore, the assessments are designed to ensure that every student is on a path to college and career readiness by measuring what students should know at each grade level (Partnership for Assessment of Readiness for College and Careers, n.d.). The assessments will be used to provide parents and teachers with timely information to identify students who might be falling behind and need extra help (Partnership for Assessment of Readiness for College and Careers, n.d.). Both the PARCC and Smart Balance officials field-tested their assessments during the spring of 2014. Each group plans to implement its assessment program fully during the 2014-2015 school year.

Achieve (2009) and ACT (2014a) officials have proposed specific course requirements as essential to a meaningful high school education. A general agreement exists that the academic content, regardless of how it is taught, of high school experience should include at a minimum of four years of English and three years of mathematics,

social studies, and laboratory sciences, in addition to electives. Some analysts have called for requirements that are more stringent with the addition of foreign language and other content areas (National High School Alliance, 2006). A curriculum embedded with college readiness indicators could be effective; however, readiness indicators matter early in a career. Students should be introduced to high rigor courses that promote college readiness early in an academic career and should remain enrolled in these types of courses through to graduation. For example, the level of high school mathematics a student completes is a significant indicator in the probability a student has to complete a bachelor's degree (Adelman, 1999) with Algebra I acting as a gatekeeper to more advanced courses (Spielhagen, 2006). Students who take Algebra I in the eighth grade attend college in greater numbers. A high correlation exists between completing Algebra I, eighth grade students, and college readiness (University of Arkansas College of Education and Health Professions, 2010). Continuous enrollment in high school mathematics is crucial (Zelkowski, 2010). The literature indicates how a student performs in one subject area or course can be powerful a predictor when examining college readiness. Some schools and districts have created more comprehensive readiness settings. In all, these programs almost always require high rigor courses in English, mathematics, reading and science.

Leaders within the entire school system have discovered that more students succeed when rigorous courses are required. Officials of the San Jose Unified School District in California require all students to complete the full set of courses mandatory for admission to California public college and universities (Achieve, 2007). In 2004, 65% of

San Jose high school graduates completed all mandatory courses with a grade of C or better, which was an increase from the 2001 level of 37%.

College Knowledge: Connections Between High School and Higher Education

The K-12 and higher educational systems have operated largely independently for over a century (Kirst & Usdan, 2009). Strengthening the connection from high school to higher education is imperative if college readiness levels are to become more robust (National Center for Public Policy and Higher Education, 2010). Connecting students to college, via the K-16 system, creates systemic links between high school and college. By explanation, K-16 refers to kindergarten through grade 16 or the end of a 4-year undergraduate program. Some state officials call their efforts P-16 or preschool through grade 16 reforms (Venezia & Jaeger, 2013).

McCabe (2001) communicated that a truly integrated K-16 system provides the best opportunity for students to transition from high school to college successfully. In an integrated K-16 system, the transitions from one level to the next are planned and highly structured (Wright & Bogotch, 2006). Given the bigger picture, officials use K-16 systemic thinking to promote information about what is needed for college success. Parents, teachers, and counselors need better college knowledge to guide students to the right courses, skills, and competencies.

The early college high school program is used to align the last two years of high school so every credit a student earns is considered a dual credit and can be used as college-level credit (Hoffman &Vargas, 2005). Thus, a student who successfully completes the program would graduate from high school with the equivalent of two years of college credits (Hoffman, 2005). The merit of the early college program is that the

program provides students with the academic rigor and college knowledge needed to be college-ready, thereby, increasing the likelihood of students completing a bachelor's degree successfully (American Institutes for Research and SRI, 2013).

The framework for early college high school, encountering the rigor, depth, and intensity of college work at an earlier age, inspires average, underachieving, and well-prepared high school students (Almeida, Johnson, & Steinberg, 2006). In addition, the early college high school model can be used to help reduce financial and admissions barriers faced by many low-income students (Almeida et al., 2006). Further, Nodine (2009) remarked:

> Several states and school districts are using dual enrollment policies to put students on an early path toward college success. The Hidalgo Independent School District (HISD) in Texas, for example, has adopted an Early College High School model throughout its schools as a way to expose students to rigorous, college-level coursework as early as ninth grade. Rather than viewing dual enrollment as an enrichment opportunity for students who are ahead of the curve, HISD encourages all students to complete the Recommended High School Program, Texas's college readiness curriculum. This policy is reflective, in part, of the Texas push to promote college readiness. Dual enrollment policies in Texas are supported in large part by House Bill 1, fiscal legislation that provides additional funds for programs aimed at increasing college enrollment and completion rates. (para. 3)

The school that was the subject of the current study provided 11th and 12th grade students the opportunity to take each core course in either the advanced placement or dual

credit format. The opportunities are designed to function as a version of an early college high school program.

Conclusion

The obtainment of college readiness by the end of high school is an aspiration of nearly all high school students. In 2010, 93% of high school seniors expected to attend a postsecondary institution, with 60% having definite plans to graduate from a 4-year college program and 24% having plans to attend graduate or professional school after college (Aud et al., 2012). Additionally, college readiness is a high national priority. National education policy and the work of many school reform groups are focused on helping students obtain college readiness skills. Kirst and Venezia (2006) explained that there is widespread agreement among policymakers, the business community, and educational leaders that the U.S. must raise the educational achievement of its young population. Simply stated, in the 21st century labor market, all high school students must graduate with the knowledge and skills needed to succeed in some form of postsecondary education. The research related to college readiness noted that there is a gap between the college readiness preparation students receive in high school and the expectations of the aforementioned stakeholders.

This college readiness gap is alarming because it means that many students have to enter college taking remedial courses. Half of beginning postsecondary students took some remedial course after entering college in 2003–2004. The mathematics remediation rate was 57% for those entering 2-year institutions and 29% for those entering 4-year institutions (National Science Foundation, 2014). In addressing the readiness gap, certain themes and frameworks have emerged that help foster college readiness. When high

school students engage in courses that provide the rigor and intensity of entry-level college courses, college readiness as measured by performance on the ACT test usually increases because these courses provide the content that is very similar to the content found in entry-level college courses (ACT, 2014a). Advanced courses such as Dual Credit and Credit-by-examination courses also offer high-level content aligned to college readiness standards and programs. These types of courses contribute to seamless connections between high school and higher education and foster college readiness.

As a nation, college readiness is the focal point of education reform. For this reason, this study examined factors that predict college readiness. Determining what predictors are most closely related to readiness may provide actions that could be taken to produce college readiness skills in greater numbers in high school students. Covariates such as gender, student mobility, the number of times the ACT was taken by an individual, and Plan test scores were used in this model. Academic performance served as the criterion variable, and academic program was the predictor variable.

CHAPTER III

METHODOLOGY

The review of literature presented evidence that student participation in high school academic programs that contain rigorous courses embedded with content similar to that found in entry-level college courses has a positive effect on the development college readiness in students. In most of the studies, college readiness was measured by students' performance on standardized tests that were designed to explain their knowledge level in relation to the knowledge needed to succeed in entry-level college courses.

In the present study, the researcher had three main questions. First, to what extent do differences exist between two academic programs, the honors or regular program, at the school used in this study? Second, what are the predictive effects of the following covariates on these program differences: gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years? Finally, what is the collective predictive effect of the following covariates: gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years? From these variables, the researcher generated the following hypotheses.

1. No significant predictive effect of program type (honors and regular) will exist on mathematics performance measured by ACT mathematics scores for 12th grade students in a private Christian school in Arkansas over and above

the predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years.

2. No significant predictive effect of program type (honors and regular) will exist on English performance measured by ACT English scores for 12th grade students in a private Christian school in Arkansas over and above the predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years.
3. No significant predictive effect of program type (honors and regular) will exist on science performance measured by ACT science scores for 12th grade students in a private Christian school in Arkansas over and above the predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years.
4. No significant predictive effect of program type (honors and regular) will exist on reading performance measured by ACT reading scores for 12th grade students in a private Christian school in Arkansas over and above the predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years.

The goals of this chapter were to explain the research design of this study, describe the participants and explain the sample selection process, and identify and describe the instrumentation. In addition, this chapter explains the data collection process, provides justification for the analytical methods used, and notes any limitations of this study.

Research Design

A quantitative, non-experimental hierarchical regression strategy was used in the current study. The purpose of multiple regression is to predict a single variable from one or more independent variables. Hierarchical regression extends multiple regression. According to Stockburger (2013), "Hierarchical regression adds terms to the regression model in stages. At each stage, an additional term or terms are added to the model, and the change in R^2 is calculated. A hypothesis test is done to test whether the change in R^2 is significantly different from zero" (para. 14). Thus, the hierarchical regression allows the researcher to parcel out the predictive contribution of one factor over and above the contributions of other factors.

The independent or predictor variables for all four hypotheses were the same. The main predictor variable for Hypotheses 1-4 was program type (honors or regular). The covariate variables for the four hypotheses were gender, Plan test scores, number of times the ACT was taken by an individual, and longevity in years. Each hypothesis had a different dependent or criterion variable. The criterion variables for Hypotheses 1-4 academic performance identified by mathematics, English, science, and reading performance, respectively, measured by ACT scores for 12th grade students in a private Christian school in Arkansas.

Sample

Participants in the current study were selected from the total student population of the 2011 graduating classes from a private Christian school in Arkansas. A simple, random sample was taken from the population, and 80 participants were selected. Of the participants, 46 were honors students, and 34 were students not exposed to the honors

program. The class of 2011 contained 31 women and 49 men. The participants ranged from 17 years and 2 months of age to 18 years and 3 months of age at the time of testing. From the 80 participants, 99% entered college after graduating from high school. All students in the sample took the ACT for the final time during their senior year of high school. All data collected during this study remained confidential and were only used to address the goals of this study this research. The identification of the individuals whose scores were examined as part of this study were not recorded, published, or made public in any way.

Instrumentation

ACT

Two of the standardized assessments, the ACT and Plan test, from the ACT's EPASTM program, were used to provide the data needed for the predictor and criterion variables. The ACT was first administered in 1959 and has been administered in all 50 states since 1960. In 2008, 1.4 million students took the ACT and scored an average of 21.1, which was a decrease from 2007 of 0.1 points. Approximately 1 in every 3,300 students scored a perfect score of 36. Upon retesting, ACT (2008) reported that 55% increased their composite score, 22% had no change in their composite score on the retest, and 23% decreased their composite score. ACT has a reliability score in English of .91, mathematics of .91, reading of .85, science of .80, and a composite reliability score of .96 (ACT, 2007). ACT (2011) noted that Arkansas administered the ACT to 73% of all high school graduates, and they scored an average composite score of 20.6.

According to ACT (2007), the exam contains 215 items with time limits for each area. Reading and Science both contain 40 questions, each timed at 35 minutes;

mathematics has 60 questions and is a 60-minute test; and English has 75 questions lasting 45 minutes. Each subject area has specific content that is being evaluated via a collection of subtests that are reported as subscores for each section. The combined sub scores make up the overall score for each section.

ACT mathematics test, three subscores are based on six content areas: pre-algebra, elementary algebra, intermediate algebra, coordinate geometry, plane geometry, and trigonometry. The ACT mathematics test measures mathematical skills students have typically acquired in courses taken up to the beginning of grade 12 (ACT, n.d.d). Scoring above the ACT college readiness in the assessed areas indicates that a student has obtained the knowledge needed for success in entry-level college courses in mathematics.

The ACT English test is designed to evaluate a participant's knowledge in the six elements of effective writing: punctuation, grammar and usage, sentence structure, strategy, organization, and style. The questions covering punctuation, grammar, and sentence structure make up the Usage/Mechanics sub score. The questions covering strategy, organization, and style make up the Rhetorical Skills sub score. Overall, the ACT English test is designed to measure English and rhetorical skills (ACT, n.d.d). In the

The ACT science includes biology, chemistry, physics, and the Earth/space sciences (for example, geology, astronomy, and meteorology). Advanced knowledge in these subjects is not required, but background knowledge acquired in general, introductory science courses are needed to answer some of the questions. The test emphasizes scientific reasoning skills over recall of scientific content, skill in mathematics, or reading ability. The goal of the ACT science test is to measure the

interpretation, analysis, evaluation, reasoning, and problem-solving skills required in the natural sciences (ACT, n.d.d).

The ACT reading test is based on a variety of reading selections from four different disciplines: social studies, natural sciences, literary narrative or prose fiction, and humanities. The Social Studies/Sciences sub score is based on the questions on the social studies and natural sciences passages, and the Arts/Literature sub score is based on the questions on the literary narrative or prose fiction passage, and the humanities passage. Ultimately, the ACT reading test is designed to measure reading comprehension (ACT, n.d.d). The English, mathematics, reading and science scores were the only ACT testing data used for the study. The writing prompt component of the test was not used in this study.

Plan Test

The Plan test is the second of three assessments that make up the ACT testing program known as the EPASTM. The Plan test is designed to evaluate a student's college readiness level at the midpoint of a high school career. Plan scores provide students with an understanding of their academic readiness for college or the workplace based on their post-high school educational and considered career options. Results can be used to help students identify their academic strengths and weaknesses as they consider decisions for high school and beyond (Office of Student Assessment Services, West Virginia Department of Education, 2005). Additionally, Plan results may be used to identify students with potential for success in Advanced Placement and other rigorous courses. *Understanding the Plan Test* (n.d.) noted that the Plan test includes four multiple-choice subtests: English, mathematics, reading, and science. The skills tested are those students

learn in first and second year high school courses. Most of the questions emphasize content presented before the second year of high school.

According to ACT, The Plan English test measures students' understanding of standard written English such as punctuation, grammar and usage, and sentence structure (Usage/Mechanics) and their understanding of the use of strategy, organization, and style in writing (Rhetorical Skills). The Plan Mathematics Test measures mathematical reasoning and focuses on the ability to reason in mathematics rather than on how well students have memorized formulas or can do complicated computations. In addition, the Plan reading test measures reading comprehension by focusing on skills such as referring to details in a passage drawing conclusions, and making comparisons and generalizations. The test consists of three prose passages: one in the social sciences, one in the humanities (literature, history, philosophy, etc.), and one in prose fiction. The content of the Plan science test includes topics in biology, chemistry, physics, geology, astronomy, and meteorology (ACT, n.d.e).

Similar to the ACT, the test provides students with an overall composite score ranging from 1 to 32. Additionally, a Plan score report lists scores for each subtest ranging from 1 to 32. For the English and mathematics tests, students receive sub scores in usage/mechanics, rhetorical skills, pre-algebra/algebra, and geometry with each ranging from 1 to 16. Students can see how they scored compared to other students taking the Plan at their school, in their state, and across the nation. Students are given their percentile performance overall and in each test (e.g., if a student scores in the 61st percentile, he/she scored at or above 61% of the students taking the Plan, and lower than 39%) (*Understanding the Plan Test*, n.d.). Plan composite scores were used in this study.

Data Collection Procedures

This quantitative study was based on collecting data from students that graduated from a Christian school in Arkansas in May of 2011. The researcher requested student information through the Office of Data and Evaluation of the private school involved in this study after the researcher provided documentation of Institutional Review Board approval and the university's Dissertation Approval Form. School personnel removed all identifiable student information and replaced it by a specific research number. The information was delivered via password protected secure document. Student data were exported to an Excel spreadsheet where duplicate student identifiers were eliminated, and each hypothesis was organized. Students with missing values were deleted. After exporting, cleaning, and deleting missing variables, the data were analyzed using SPSS to determine if any predictive effects existed. After data had been entered and analyzed by SPSS, student data were deleted from any and all computers.

Analytical Methods

Data from this study were subjected to statistical analysis. All students were classified according to gender, length of tenure at the school, number of times the ACT was taken, Plan composite scores, and ACT subtests (mathematics, English, reading and science). Variables were analyzed using descriptive techniques appropriate to the level of measurement for each variable. SPSS, version 22, was used to analyze the variables. Before conducting a regression analysis, the data were examined in order to determine that assumptions for hierarchical regression were met. A scatter plot was generated in order to determine if variables had a linear relationship. Residual plots were conducted to determine linearity, normality, and homoscedasticity. Possible outliers were determined

and deleted if necessary. Collinearity statistics were used to determine if variables met the necessary requirements for tolerance and VIF of less than .1 or greater than 10 (Mertler & Charles, 2010). Data analysis conclusions, findings, and discussions are reported in the results chapter.

Limitations

In most research studies, limitations need to be noted to assist the reader in determining how to interpret the results of the studies. The following limitations were associated with this study. First, the participants in the study came from only one school district. This limited the total participants eligible for the study. Second, another limitation of this study was that the student population sampled was not ethnically or economically diverse. The third limitation that must be reviewed is the caliber of students that took the ACT. The students included in this study were generally high achieving, college bound students that may not be representative of the entire population of ACT participants. The fourth limitation was that the researcher is an administrator at the school where data were used. Fifth, the research design for this study was non-experimental, which constituted a limitation in itself. The researcher was unable to manipulate the independent variables or randomly assign participants, which produced less conclusive evidence. However, this and the other limitations did not seem to exceed the typical circumstances encountered in using schools for research purposes. Finally, there might be other relevant factors that influence college readiness that were not identified and used in this study.

Regardless of the limitations, however, the researcher proposes that the results of this study might inform decisions regarding the development and design of programs that

foster college readiness. These results also provide educational leaders with an understanding of how key factors such as gender, mobility, and testing frequency affect, explain, and predict performance in entry-level college courses. Improving college readiness for all students is a goal for school systems across the nation. Results might be beneficial for similar schools across throughout the United States as they continue to devise programs that will meet the demands of federal accountability, improve student achievement, and close the college readiness gap.

CHAPTER IV

RESULTS

This study examined the predictive effects of program type (honors and regular) on mathematics, English, science, and reading performance measured by ACT scores for 12th grade students at a private Christian school in Arkansas over and above the predictive effects of gender, Plan test scores, numbers of times the ACT test was taken by an individual, and longevity in years. Prior to conducting a hierarchical regression analysis, the relevant assumptions of this statistical analysis were tested. A sample size of 80 was deemed adequate given five predictive variables to be included in the analysis (Tabachnick & Fidell, 2013). The data were examined in order to determine that assumptions were met. Initial screening was also conducted for normality. After further screening, seven cases were deleted due to missing data. The results of this analysis are contained within this chapter. Table 1 displays the descriptive statistics of some of the predictor variables by the different criterion variables measured by the ACT.

Table 1

Descriptive Statistics for Some of the Predictor Variables by the Criterion Variables Measuring Performance

		ACT Mathematics		ACT English		ACT Science		ACT Reading	
	n	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Gender									
Female	31	23.03	4.39	26.03	5.23	22.08	4.54	25.84	5.76
Male	49	23.94	5.50	24.65	5.93	24.24	5.09	25.12	5.93
Program Type									
Regular	34	20.12	3.32	20.94	3.21	20.26	2.87	22.06	4.14
Honors	46	26.15	4.65	28.33	5.03	26.85	4.07	27.87	5.71

Table 1 reveals the means were consistent across the groups by gender and program type.

Hypothesis 1

The first hypothesis stated no significant predictive effect of program type (honors or regular) will exist on mathematics performance measured by ACT mathematics scores for 12th grade students in a private Christian school in Arkansas over and above the predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years. Hierarchical multiple regression was conducted to determine if program type significantly predicted ACT mathematics performance beyond the covariates studied. Data screening revealed no cases with standardized residual that exceeded what would be expected given the sample size (Field, 2009). An evaluation of the residual plot indicated that the assumptions of linearity,

normality, and homoscedasticity were not markedly violated. An examination of scatterplots, in addition to the correlation coefficients (see Table 2), also confirmed that none of the predictor variables had a substantial nonlinear relationship with mathematics performance.

Table 2

Correlation Results for Hypothesis 1 Mathematics Performance

Pearson Correlation	ACT Mathematics	Years at School	Plan Score	Gender	Times Test Taken	Program Type
ACT Mathematics	1.000	-.122	.810	.117	.424	.587
Years at School	-.122	1.000	-.218	-.071	.129	-.101
Plan Score	.810	-.218	1.000	-.106	.310	.572
Gender	.117	-.071	-.106	1.000	-.044	-.196
Times Test Taken	.424	.129	.310	-.044	1.000	.323
Program Type	.587	-.101	.572	-.196	.323	1.000

VIF indicators for all other predictors were within the acceptable range (> 1- R^2) (Leech, Barrett, Morgan, & Leech, (2011). Regression results indicated that the overall model significantly predicted mathematics performance, $F(5, 67) = 41.74$, $p < .001$. A summary of the regression model is presented in Table 3.

Table 3

Models Predicting Mathematics Performance

Model 1	*SS*	*df*	*MS*	*F*	*p*
Regression	1426.76	4	356.69	46.52	.000
Residual	521.40	68	7.67		
Total	1948.16	72			
Model 2					
Regression	1474.75	5	294.95	41.74	.000
Residual	473.42	67	7.07		
Total	1948.16	72			

Table 4 presents a summary of stage 1 and stage 2 hierarchical regression coefficients.

Table 4

Predictors of ACT Mathematics Performance

	Mathematics Performance		
	Model 1	Model 2	
Variable	*B*	*B*	95% CI
Constant	-3.61	-1.70	[-6.31, 2.91]
Years at School	0.05	0.06	[-0.11, 0.22]
Plan Score	1.19***	1.04***	[0.81, 1.27]
Times Test Taken	0.48**	0.39*	[0.05, 0.73]
Gender	2.28***	2.57***	[1.24, 3.90]
Program Type		2.06*	[0.48, 3.63]
R^2	0.73	0.76	
F	46.52***	41.74***	
ΔR^2		0. 03	
ΔF		6.80	

Note. $N = 73$. CI = confidence interval. *$p < .05$, **$p < .01$, ***$p < .001$

These results indicate that model 1 accounted for approximately 73.0% (0.73) of mathematics performance. When program type was added at stage 2, the factor added approximately 3.0% (0.03) to the model explaining mathematics performance.

Hypothesis 2

The second hypothesis stated no significant predictive effect of program type (honors or regular) will exist on English performance measured by ACT English scores for 12th grade students in a private Christian school in Arkansas over and above the predictive effect of gender, Plan test scores, number of times the ACT was taken by

individuals, and longevity in years. Hierarchical multiple regression was conducted to determine if program type significantly predicted ACT English performance beyond the covariates studied. Data screening revealed no cases with standardized residual that exceeded what would be expected given the sample size (Field, 2009). An evaluation of the residual plot indicated that the assumptions of linearity, normality, and homoscedasticity were not markedly violated. An examination of scatterplots, in addition to the correlation coefficients (see Table 5), also confirmed that none of the predictor variables had a substantial nonlinear relationship with English performance.

Table 5

Correlation Results for Hypothesis 2 English Performance

Pearson Correlation	ACT English	Years at School	Plan Score	Gender	Times Test Taken	Program Type
ACT English	1.000	-.078	.870	-.118	.356	.649
Years at School	-.078	1.000	-.218	-.071	.129	-.101
Plan Score	.870	-.218	1.000	-.106	.310	.572
Gender	-.118	-.071	-.106	1.000	-.044	-.196
Times Test Taken	.356	.129	.310	-.044	1.000	.323
Program Type	.649	-.101	.572	-.196	.323	1.000

VIF indicators for all other predictors were within the acceptable range (> 1- R^2) (Leech et al., 2011). Regression results indicated that the overall model significantly predicted

English performance, $F(5, 67) = 55.28$, $p < .001$. A summary of the regression model is presented in Table 6.

Table 6

Models Predicting English Performance

Model 1	*SS*	*df*	*MS*	*F*	*p*
Regression	1841.64	4	460.41	58.77	.000
Residual	532.69	68	7.83		
Total	2374.33	72			
Model 2					
Regression	1911.10	5	382.22	55.28	.000
Residual	463.23	67	6.91		
Total	2374.33	72			

Table 7 presents a summary of stage 1 and stage 2 hierarchical regression coefficients.

Table 7

Predictors of ACT English Performance

	English Performance		
	Model 1	Model 2	
Variable	*B*	*B*	95% CI
Constant	-5.05*	-2.75	[-7.31, -0.44]
Years at School	0.15	0.15	[-0.01, 0.32]
Plan Score	1.45***	1.27***	[1.04, 1.50]
Gender	-0.18	0.17	[-1.15, 1.49]
Times Test Taken	0.21	0.11	[-0.23, 0.44]
Program Type		2.48**	[0.92, 4.04]
R^2	0.78	0.81	
F	58.77***	55.28***	
ΔR^2		0.03	
ΔF		10.05	

Note. $N = 73$. CI = confidence interval. *$p < .05$, **$p < .01$, ***$p < .001$

These results indicate that model 1 accounted for approximately 78.0% (0.78) of English performance. When program type was added at stage 2, the factor added approximately 3.0% (0.03) to the model explaining English performance.

Hypothesis 3

The third hypothesis stated no significant predictive effect of program type (honors or regular) will exist on science performance measured by ACT science scores for 12th grade students in a private Christian school in Arkansas over and above the

predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years. Hierarchical multiple regression was conducted to determine if program type significantly predicted ACT science performance beyond the covariates studied. Data screening revealed no cases with standardized residual that exceeded what would be expected given the sample size (Field, 2009). An evaluation of the residual plot indicated that the assumptions of linearity, normality, and homoscedasticity were not markedly violated. An examination of scatterplots, in addition to the correlation coefficients (see Table 8), also confirmed that none of the predictor variables had a substantial nonlinear relationship with science performance.

Table 8

Correlation Results for Hypothesis 3 Science Performance

Pearson Correlation	ACT Science	Years at School	Plan Score	Gender	Times Test Taken	Program Type
ACT Science	1.000	-.070	.794	.081	.413	.678
Years at School	-.070	1.000	-.218	-.071	.129	-.101
Plan Score	.794	-.218	1.000	-.106	.310	.572
Gender	.081	-.071	-.106	1.000	-.044	-.196
Times Test Taken	.413	.129	.310	-.044	1.000	.323
Program Type	.678	-.101	.572	-.196	.323	1.000

VIF indicators for all other predictors were within the acceptable range (> 1- R^2) (Leech et al., 2011). Regression results indicated that the overall model significantly predicted

reading performance, $F(5, 67) = 46.33$, $p < .001$. A summary of the regression model is presented in Table 9.

Table 9

Models Predicting Science Performance

Model 1	*SS*	*df*	*MS*	*F*	*P*
Regression	1196.29	4	299.07	39.29	.000
Residual	517.60	68	7.61		
Total	1713.89	72			
Model 2					
Regression	1329.40	5	265.88	46.33	.000
Residual	384.49	67	5.74		
Total	1713.89	72			

Table 10 presents a summary of stage 1 and stage 2 hierarchical regression coefficients.

Table 10

Predictors of ACT Science Performance

	Science Performance		
	Model 1	Model 2	
Variable	*B*	*B*	95% CI
Constant	-1.56	1.62	[-2.54, 5.78]
Years at School	0.11	0.12	[-0.03, 0.27]
Plan Score	1.11***	0.86***	[0.65, 1.07]
Times Test Taken	0.40*	0.26	[-0.04, 0.57]
Gender	1.80**	2.29***	[1.09, 3.49]
Program Type		3.43***	[2.01, 4.85]
R^2	0.70	0.78	
F	39.29***	46.33***	
ΔR^2		0.08	
ΔF		23.20	

Note. $N = 73$. CI = confidence interval. *$p < .05$, **$p < .01$, ***$p < .001$

These results indicate that model 1 accounted for approximately 70.0% (0.70) of science performance. When program type was added at stage 2, the factor added approximately 8.0% (0.08) to the model explaining science performance.

Hypothesis 4

The fourth hypothesis stated no significant predictive effect of program type (honors or regular) will exist on reading performance measured by ACT reading scores for 12th grade students in a private Christian school in Arkansas over and above the

predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years. Hierarchical multiple regression was conducted to determine if program type significantly predicted ACT reading performance beyond the covariates studied. Data screening revealed no cases with standardized residual that exceeded what would be expected given the sample size (Field, 2009). An evaluation of the residual plot indicated that the assumptions of linearity, normality, and homoscedasticity were not markedly violated. An examination of scatterplots, in addition to the correlation coefficients (see Table 11), also confirmed that none of the predictor variables had a substantial nonlinear relationship with reading performance.

Table 11

Correlation Results for Hypothesis 4 Reading Performance

Pearson Correlation	ACT Reading	Years at School	Plan Score	Gender	Times Test Taken	Program Type
ACT Reading	1.000	-.039	.798	-.039	.276	.486
Years at School	-.039	1.000	-.218	-.071	.129	-.101
Plan Score	.798	-.218	1.000	-.106	.310	.572
Gender	-.039	-.071	-.106	1.000	-.044	-.196
Times Test Taken	.276	.129	.310	-.044	1.000	.323
Program Type	.486	-.101	.572	-.196	.323	1.000

VIF indicators for all other predictors were within the acceptable range (> 1- R^2) (Leech et al., 2011). Regression results indicated that the overall model significantly predicted

reading performance, $F(5, 67) = 26.07$, $p < .001$. A summary of the regression model is presented in Table 12.

Table 12

Models Predicting Reading Performance

Model 1	*SS*	*df*	*MS*	*F*	*p*
Regression	1650.06	4	412.51	32.80	.000
Residual	855.26	68	12.58		
Total	2505.32	72			
Model 2					
Regression	1654.72	5	330.94	26.07	.000
Residual	850.60	67	12.70		
Total	2505.32	72			

Table 13 presents a summary of stage 1 and stage 2 hierarchical regression coefficients.

Table 13

Predictors of ACT Reading Performance

	Reading Performance		
	Model 1	Model 2	
Variable	*B*	*B*	95% CI
Constant	- 4.86	- 4.26	[-10.44, 1.92]
Years at School	0.22	0.22	[-0.00, 0.44]
Plan Score	1.44***	1.39***	[1.08, 1.70]
Times Test Taken	0.00	-0.03	[-0.48, 0.43]
Gender	0.74	0.83	[0.95, 2.61]
Program Type		0.64	[-1.47, 2.75]
R^2	0.66	0.66	
F	32.80***	26.07***	
ΔR^2		0.00	
ΔF		0.37	

Note. $N = 73$. CI = confidence interval. $*p < .05$, $**p < .01$, $***p < .001$

These results indicate that model 1 accounted for approximately 66.0% (0.66) of reading performance. When program type was added at stage 2, the factor added approximately 0.0% (0.00) to the model explaining reading performance.

CHAPTER V

DISCUSSION

College Readiness has become increasingly important among federal, state, and local education agencies as well as a number of foundations and professional organizations (Paulson, 2010). Being college ready means being prepared for any postsecondary education or training experience, including study at 2- and 4-year institutions leading to a postsecondary credential. Being ready for college means that a high school graduate has the mathematics and English knowledge and skills necessary to qualify for and succeed in entry-level, credit-bearing college courses without the need for remedial coursework (Achieve, 2009).

With much of the attention in education today focused on college readiness, it is critical for educational leaders to discover dependable pathways for readiness. To assist with this essential issue, the researcher developed a model for this study. The focus of this study was to determine how a model including gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years predict performance in four different ACT subject areas. Then, the researcher determined how much more the addition of participation in one of two types of preparatory programs (honors or regular) added to the predictive value of the overall model. The convenience sample included male and female 12th grade students in a private school in Arkansas. It was discovered that program type added significantly to the model in explaining mathematics, English,

and science performance; however, program type did not add to the model's explanation of reading performance.

In this chapter, the researcher's conclusions of the findings are presented. Next, the implications of the study are discussed and interpreted from the context of the literature review. Subsequently, in the recommendations, potential practices and policies are outlined, and considerations for future research are addressed.

Conclusions

Hypothesis 1

The first hypothesis stated that no significant predictive effect of program type (honors or regular) will exist on mathematics performance measured by ACT mathematics scores for 12th grade students in a private Christian school in Arkansas over and above the predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years. An analysis of this hypothesis using a hierarchical regression model indicated that the overall model significantly explained ACT mathematics performance. Model 1 explained approximately 73 % of ACT mathematics performance. Individually, the Plan score, gender, and times the test was taken were the most significant predictors; years at school was not significant. When program type was added to the model, program type was found to be significant in addition to Plan score, gender, and times the test was taken. However, the addition of the program type explained only an additional 3% of ACT mathematics performance. Thus, the overall model explained 76% of ACT mathematics performance. Because statistical significance was found, the null hypothesis was rejected. Nevertheless, statistical significance, in this case, did not translate to practical significance. Program type served

only to add very little to the overall model in predicting mathematics performance. Because 24% of the variance is left unexplained by this model, it is very likely that other predictors, or a combination of predictors, may provide a more complete explanation of what might predict ACT mathematics performance.

Hypothesis 2

The second hypothesis stated that no significant predictive effect of program type (honors or regular) will exist on English performance measured by ACT English scores for 12th grade students in a private Christian school in Arkansas over and above the predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years. An analysis of this hypothesis using a hierarchical regression model indicated that the overall model significantly explained ACT English performance. Model 1 explained approximately 78 % of ACT English performance. Individually, the Plan score was the only statistically significant factor; years at school, gender, and times the test were significant. When program type was added to the model, program type was found to be significant in addition to Plan score. However, the addition of the program type explained only an additional 3% of ACT English performance. Thus, the overall model explained approximately 81% of ACT English performance. Because statistical significance was found, the null hypothesis was rejected. Nevertheless, statistical significance, in this case, did not translate to practical significance. Program type served only to add very little to the overall model in predicting English performance. Because 19% of the variance is left unexplained by this model, it is very likely that other predictors, or a combination of predictors, may provide a more complete explanation of what might predict ACT English performance.

Hypothesis 3

The third hypothesis stated that no significant predictive effect of program type (honors or regular) will exist on science performance measured by ACT science scores for 12th grade students in a private Christian school in Arkansas over and above the predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years. An analysis of this hypothesis using a hierarchical regression model indicated that the overall model significantly explained ACT science performance. Model 1 explained approximately 70 % of ACT science performance. Individually, the Plan score, gender, and times the test was taken were the most significant predictors; years at school was not significant. When program type was added to the model, program type was found to be significant in addition to Plan score and gender; times the test was taken was not significant. However, the addition of the program type explained only an additional 8% of ACT science performance. Thus, the overall model explained 78% of ACT science performance. Because statistical significance was found, the null hypothesis was rejected. Nevertheless, statistical significance, in this case, did not translate to practical significance. Program type served only to add very little to the overall model in predicting science performance. Because 22% of the variance is left unexplained by this model, it is very likely that other predictors, or a combination of predictors, may provide a better explanation of what might predict ACT science performance.

Hypothesis 4

The fourth hypothesis stated that no significant predictive effect of program type (honors or regular) will exist on reading performance measured by ACT reading scores

for 12th grade students in a private Christian school in Arkansas over and above the predictive effect of gender, Plan test scores, number of times the ACT was taken by individuals, and longevity in years. An analysis of this hypothesis using a hierarchical regression model indicated that the overall model significantly explained ACT reading performance. Model 1 explained approximately 66% of ACT reading performance. Individually, the Plan score was the only significant predictor. When program type was added to the model, program type was not found to be significant; therefore, the Plan score remained the only significant predictor. The addition of program type explained only an additional 0.0 % of ACT reading performance. Thus, the overall model explained 66% of ACT reading performance. In this model, program type was not statistically significant and added nothing to the predictive model. Because 44% of the variance is left unexplained by this model, it is very likely that other predictors, or a combination of predictors, may provide a better explanation of what might predict ACT reading performance.

Implications

The findings of this study revealed that several factors could have an influence on college readiness. The research in this study was conducted in a unique setting of a private Christian school in Arkansas. The interpretation of these results requires a comparison to the larger context of the review of related literature. The model constructed for this study included variables that explained college readiness via performance on the ACT subject area tests of mathematics, English, science, and reading.

The stage 1 model in all four hypotheses explained a significant portion of the performance on the ACT test. Results ranged from 66 % in Hypothesis 4 to 78% in

Hypothesis 2. Therefore, collectively, the factors included in stage 1 provide evidence to explain ACT testing performance and college readiness. Of the factors included, the Plan test score was the most robust covariate in all four hypotheses. These results are consistent with the review of related literature. The Plan test can forecast a student's college readiness at the midpoint in high school (*Understanding the Plan Test*, n.d.). The strong correlation between the Plan test and ACT performance in this study adds to the validation that the Plan test is an effective predictor of ACT performance.

Many interventions have been used to improve the level of college readiness and ultimately the number of college graduates. The rigor of high school curriculum is a key indicator for whether a student will graduate from high school and earn a college degree. Adelman (1999, 2006) communicated that the rigor of high school coursework is more important than parent education level, family income, or race/ethnicity in predicting whether a student will earn a post-secondary degree. However, in this study, although being statistically significant, academic program type did not add any practical significance to the model (Schmitz, 2007). These results do not correlate with many of the studies reviewed that showed students, exposed to programs or approaches that place an importance on college readiness by dedicating time, training, and priority to the instruction of curriculum embedded with readiness content, perform at levels that indicate college readiness on standardized tests (Roderick et al., 2009). Evidence indicates that students who earn dual enrollment credits have slightly higher outcomes (4% to 5 %) in postsecondary education compared to those that do not earn dual enrollment credit (Lewis & Overman, 2008). One possible reason for the difference between the findings of this study and other research reports could be related to the

sample size. Because the research was conducted in one school, the sample size was smaller than originally expected. Another reason for the difference could have been the homogenous population of students. All the students came from families that largely expected college attendance and played an active role in the students' education. Increasing the diversity of the population would provide a broader understanding of the variables in a larger context.

Recommendations

Potential for Practice/Policy

This study was designed to obtain information on the effectiveness of two different academic program types (Honors or Regular) on college readiness. The study was conducted in a private school in Arkansas and was limited to the 2011 graduating class. The study evaluated the ability of academic program type to explain college readiness over and above a set of covariates. The findings of the study might have direct implications on practices and policies in private schools in Arkansas. Schools must determine whether college readiness is proving effective among their students. Moreover, given that numerous schools throughout Arkansas and the nation are faced with the challenges to increase college readiness among students, this study might have further implications on educational policies and practices related to readiness in at least four different ways.

First, teacher development should address the effective teaching of college readiness standards. The achievement of a readiness agenda depends on effective teaching of readiness standards. Teachers can be effective only if they understand the standards, if they know the standards are featured in assessments, and if they are trained

appropriately to use the standards. Accordingly, in-service and pre-service teacher development should focus specifically on the readiness standards and how to use available data to develop interventions that will improve readiness.

Second, school leaders should take an integrative approach to design and develop frameworks, programs, and policies that address both the academic and non-academic factors that relate to college readiness. The most successful strategies often use an early alert, assessment, and monitoring system based on academic factors such as GPA, test scores (ACT assessments, tests in college courses), and other performance indicators such as completed assignments and class attendance (Lotkowski, Robbins, & Noeth, 2004).

Third, schools should intentionally address the needs of both genders in college readiness. Although the results of this study indicated no significant differences between means of males and females in the academic performance, females generally have higher mean scores in reading than males on standardized tests, and some research indicated that certain standardized mathematics tests favor males (Nankervis, 2011; Pope, 2012).

Fourth, districts should intentionally seek to close the gap in college readiness testing, most specifically the ACT, that exists with certain minority groups. Districts must ensure that all students have access to the preparation that provides students with the needed college readiness skills (Gewertz, 2012).

Future Research Considerations

The findings from this study support the use of curriculum and standardized tests to improve college readiness for students. To further understand the factors that explain college readiness, the researcher recommends that the following studies be considered:

1. Additional research should be completed on other ACT subsections in order to obtain a better understanding of the extent program type plays on ACT performance.
2. In all four hypotheses, Plan test scores had the strongest correlation with ACT performance. This particular variable demonstrates the effectiveness of the ACT's Educational Planning and Assessment System (EPASTM). Additional research should be conducted in order to determine the effectiveness of the recently released ACT Aspire program. This program is designed to explain the student's progress towards college readiness beginning in the third grade.
3. Further research should be conducted to determine if the ACT's EPASTM and Aspire program could replace any/all state mandated testing. Additional research should also be conducted to determine if all state mandated exams, including those conducted at earlier points in a student's academic career setting, provide the same predictive effects.
4. Further research should compile a larger sample of students or a cross-section of students. This will provide data to understand the significance of program type in a broader context.
5. A study should be constructed that includes a group of variables that provide predictions of college readiness with the inclusion of a survey that aids in

> determining a student's level of knowledge related to college such as: postsecondary program selection, admissions requirements, and college financing options (Conley, 2007).

According to many, the future of young people is paramount in this world. Readiness of 21st century skills, including college and career readiness, is a foundational piece that every school district and students will need in order to mold their positive trajectory in life. Despite the recognition of the importance of preparing students to be college ready, the research suggested that the nation's education system is failing to meet these demands (US Department of Education, 2010). This study sought to assist with discovering solutions to the need for college ready high school graduates.

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Appendix

Appendix A

HARDING UNIVERSITY
INSTITUTIONAL REVIEW BOARD

Status of Request for Exemption from IRB Review

(For Board Use Only)

Date: 5/6/14
Proposal Number: 2014-042
Title of Project: Honors Program as a Predictor of College Readiness of Private School Students in Arkansas
Principal Investigator(s) and Co-Investigator(s): Jonathan Jones jjones17@harding.edu

- [x] Research exempted from IRB review.
- [ ] Research requires IRB review.
- [ ] More information is needed before a determination can be made. (See attachment.)

I have reviewed the proposal referenced above and have rendered the decision noted above.
This study has been found to fall under the following exemption(s):

1 ☐ 2 ☐ 3 ☐ 4 ☒ 5 ☐ 6 ☐

In the event that, after this exemption is granted, this research proposal is changed, it may require a review by the full IRB. In such case, a ***Request for Amendment to Approved Research*** form must be completed and submitted.
This exemption is granted for one year from the date of this letter. Renewals will need to be reviewed and granted before expiration.
The IRB reserves the right to observe, review and evaluate this study and its procedures during the course of the study.

Rebecca O. Weaver

Chair
Harding University Institutional Review Board