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HIGH SCHOOL CONTEXTUAL VARIABLES AND ACT SCORES

A dissertation  
presented in partial fulfillment of requirements  
for the degree of Doctorate of Philosophy  
in the Department of Educational Leadership and Counseling  
The University of Mississippi

by

JOHN-MARK CAIN

May 2017

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## ABSTRACT

This quantitative study analyzed findings from the 2015 Crepe Myrtle High School (CMHS) graduates and determined if statistically significant relationships exist between student demographic and school participation variables with ACT composite scores. Utilizing both a Pearson product-moment statistical correlation and *t* test for continuous variables and a 1-way analysis of variance (ANOVA) for categorical variables, the researcher identified and presented significant relationships or differences in means between the academic achievement of 2015 CMHS graduates and ACT composite scores. The variables analyzed consisted of (a) the number of completed core classes, (b) high school grade points averages, (c) extracurricular activities, (d) gender, (e) socioeconomic status, and (f) race/ethnicity. The significant relationships produced validity concerns with the Mississippi school accountability system and the current metric measuring the college and career readiness of CMHS graduates. Furthermore, the findings may provide educators a better understanding of student academic activities and academic decisions that may have a relationship with ACT composite scores at the local level.

## DEDICATION

This dissertation is the product of so many. Many encouraged me, many assisted me, and many doubted me. I am and will be forever grateful. To my beautiful family, wife Denae, and children, Kinley and Breelyn, you have always been the motivation for me to continue. This is for you.

I would be remiss if I did not dedicate this document to my late mother Debra and father Murray, who in their own individual way, taught me to strive, persevere, and excel.

## ACKNOWLEDGMENTS

I extend my thanks to Dr. Douglas Davis, who guided and directed me throughout this entire process. I thank you for encouraging me. I also thank the other members of my committee for your patience and encouragement: Dr. Ryan Niemeyer, Dr. Dennis Bunch, Dr. Ann Monroe, and Dr. Denver J. Fowler.

Special thanks go to Dr. Tony W. McGee, an outstanding leader, who encouraged me to continue my education and offered me multiple opportunities to do what I love. Your belief in me will always be cherished and remembered. To the “legends” who helped me throughout, I sincerely thank you.

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## CHAPTER 1: INTRODUCTION

More than 1.8 million high school students complete the ACT college admission and placement test every year (ACT, 2015b). The ACT is accepted by every 4-year university in the United States and is mandated for high school students in 17 states, including Mississippi. It is critical for educators to understand the relationships between contextual factors such as a school setting and ACT performance. Educational institutions rely on the assessment for multiple purposes. At the high school level, test results are used to tailor individualized academic programs, meet institution accountability standards, and often provide a political talking point for school officials and policy makers. In addition, ACT scores provide the data for scholarship applications, loans, or various types of grants and financial assistance for millions of students who attend college (ACT, 2015b).

In 1959, Dr. E. F. Lindquist created an assessment aimed at aiding colleges in selecting students to admit (ACT, 2015b). This burgeoning assessment later became what we now recognize as the ACT, the signature product of the eponymous organization. Lindquist's pioneering approach provided an assessment focusing not on cognitive reasoning, but instead on the information taught in schools. Professor Lindquist's creation has provided the catalysts for over 60 years of continuous research and specialization of measuring student preparedness for college-level work and predicting potential success within various college programs (ACT, 2015b).

The ACT consists of four primary subject areas: (a) English; (b) mathematics; (c) science; and (d) reading. In 2005, the ACT included an optional writing section. The test does not serve as an aptitude test, nor does it provide an accurate IQ assessment. The test consists of 215 multiple-choice questions and is administered for 2 hours and 55 minutes. The ACT does allow certain accommodations to students with disabilities or other documented learning disabilities. In 2014, the ACT offered a digital version for the first time, allowing both students and testing locations an option over the paper-pencil version (ACT, 2015b). The test is scored using a standard scale ranging from one to 36. The mean of the four subtests provides the ACT composite score. According to ACT (2015b), the ACT is a valuable tool for students who complete it for several reasons:

- Every university accepts the ACT for the college admission process.
- The ACT is based on high school curriculum and learning objectives.
- The ACT provides various information for career and educational planning information.
- Students may earn tuition scholarships and other incentives by scoring in a particular range on the assessment. (ACT, 2015b)

In recent years, many high school students have taken the ACT twice, once as a junior and again as a senior (ACT, 2015b). There is no limit to the number of times a student may take the exam, but ACT does provide windows of time the test is offered. Nationally, the test is administered six times throughout the months of September, October, December, February, April, and June (ACT, 2015b). Beginning in the spring of 2015, Mississippi joined other states requiring high school students to take the test. Mississippi agreed to fund the purchase and administer a test to each classified 11th grader in the state. The decision requiring schools to

administer the test to all juniors stems from the change in the Mississippi school accountability system (MSAS), placing emphasis on college and career readiness (CCR) as a scored metric of measuring the success and rating of the school (Mississippi Department of Education [MDE], 2015).

### **Statement of the Problem**

Today, the ACT is one of the most recognized college entrance exams available. Student performance on the ACT continues to be examined on multiple levels among various groups. Schiel, Pommerich, and Noble (1996) examined influencing factors on student ACT scores across multiple contextual factors including, race, gender, socioeconomic status (SES), and course selection, to name a few. Nevertheless, many current studies (Noble & McNabb, 1989) have focused only on data at the national level. More research needs to be conducted at the local level to help school leaders and educators better prepare students for the ACT test. Therefore, the central issue of concern for this research focused on understanding how to prepare students for improved ACT performance.

The established benchmark scores of the test are regarded as a readiness metric for entering first-year students taking entry-level courses (ACT, 2015b). Scores from the ACT assist colleges in determining in which classes to place enrolling students and if remedial classes are required. In Mississippi, students scoring less than a sub-score of 17 on the ACT English section and 19 on the math section must enroll in developmental education courses at both community colleges and institutions of higher learning (MDE, 2015). ACT scores also play a role in the current Mississippi school accountability model under the CCR metric. The metric measures the number of students scoring proficient in both English and math section of the ACT by meeting the benchmark scores prior to the senior snapshot taken by the MDE during the student's senior

year. The school does not easily control many contextual variables, but schools are held accountable for these variables under the state accountability model.

Factors such as socioeconomics have repeatedly been shown to have a direct relationship with academic performance, which may have led to some districts to have an advantage over others on state assessments (Zeisler, 2012). The results from other national studies (Roberts & Noble, 2004) indicate more advanced coursework can help raise ACT scores; this indicator places smaller schools with fewer certified available personnel at a disadvantage to larger, more affluent districts able to attract more certified educators. Schools with less local resources or lack of federal dollars received may not have the financial luxury to attract and hire certified science and mathematics teachers. These factors present concerns with the validity of the state accountability model. These concerns may prove the model unfair and punitive toward districts with a greater number of students on federal free and reduced-price lunch and with a smaller number of staff. These variables may limit the number of courses available for students to gain the knowledge needed to score at acceptable ACT benchmark levels.

### **Studies that Addressed the Problem**

Previous studies on ACT performance have focused on results on the national scale or among sectorized geographic regions across the United States. A study performed by Noble and McNabb (1989) suggested increased ACT-recommended core course completion resulted in higher ACT scores, regardless of the end course grade. The study further indicated gender had minimal impact on ACT performance. Research conducted by Jones (2008) examined course selection, grades in high school, and gender with ACT performance at the local high school level. The results of Jones's study indicated students who complete recommended ACT core coursework demonstrate higher ACT scores. Jones's research demonstrated no significant

relationship with gender and ACT performance. More national-level research compiled by Fredricks (2012) revealed the positive relationship between secondary extracurricular participation and higher student academic achievement.

### **Significance of the Study**

Additional analysis at the local level needs to be performed to provide educators a more precise understanding of what factors influence better ACT performance. This information may help offer curriculum design plans for students and help academic counselors justify to both students and parents a choice of core courses to complete. The data may provide school leaders justification for the addition of higher level coursework and additional staff members to provide more opportunities within the local high school curriculum. If schools can identify variables over which schools have control and have a positive relationship with ACT scores, then limited resources, which may be used in weak areas, may be diverted to more significantly impactful areas of ACT improvement.

### **Purpose of Study**

The purpose of this study was to determine if any relationship exists between the students' coursework completed, GPA, SES, gender, and race/ethnicity, extracurricular involvement with the overall ACT composite score. The sample was drawn from 111 of the 123 students who completed Crepe Myrtle High School (CMHS), located in central Mississippi, during the 2014–2015 school year. Eleven students did not take the ACT prior to graduating from CMHS, including one student who did not graduate with a traditional Mississippi high school diploma. This study used correlation analysis to determine the strength of these contextual factors and the relationship with composite ACT scores.



## Research Questions

The aim of this study was to assess the relationship between contextual variables at the local high school level and ACT composite scores. This research was conducted using an explanatory design (Creswell, 2014). This form of research examines the relationship between two or more variables. Previous research by E. Anderson (2015) suggested, causal relationships are not necessarily inferred in this type of study, but the researcher may assume variables outside the control of the school, such as a student's SES, race, or gender will influence a student's ACT composite score. Depending on the demographics of the students who comprise the school, ACT composite scores may be adversely impacted by these variables. If these variables prove to have a relationship with ACT composite scores, school districts may be at a disadvantage on some points earned under the CCR metric found within the new MSAS.

The current model rewards schools a maximum of 50 points on a 1,000-point model for having every graduating student meet predetermined scores in the areas of math-22, reading-22, or English-18 on sections of the ACT at the time of the student's senior snapshot. The senior snapshot is collected electronically by the MDE in the spring of the student's senior year through the Mississippi Student Information System (MSIS) program of the local district. This potentially indicates validity issues may exist within the model if any of these uncontrolled student demographics negatively relate to ACT composite scores. A lower CCR indicator of a high school on the MSAS due to these demographics may negatively reflect the work and progress of the school. This negative reflection may, in turn, raise questions about the quality education a school is providing its students. The following hypotheses were used:

H<sub>01</sub>: There is no significant relationship between the number of core classes 2015 CMHS graduates complete and ACT composite scores.

H<sub>0</sub>2: There is no significant relationship between 2015 CMHS graduates' high school GPA and ACT composite scores.

H<sub>0</sub>3: There is no significant relationship between the number of extracurricular activities in which 2015 CMHS graduates participated while attending high school and ACT composite scores.

H<sub>0</sub>4: There is no significant difference between mean male and mean female 2015 CMHS graduates' ACT composite scores.

H<sub>0</sub>5: There is no significant difference between 2015 CMHS graduates' SES, as measured by participation in the federal free or reduced-price lunch program, and ACT composite scores.

H<sub>0</sub>6: There is no significant difference between 2015 CMHS graduates' student race/ethnicity and ACT composite scores.

### **Summary of Study**

Chapter 1 presented the need to examine contextual variables relationships with ACT composite scores at the local high school level and provided an introduction, statement of the problem, prior research examining the problem, significance of the study, the purpose of the study, and research questions. Chapter 2 presents previous studies on contextual variables and the potential relationships that may occur with ACT composite scores. Chapter 3 describes the research design, the population, methods of data collecting, and the procedures to analyze the data. Chapter 4 presents the findings from the research. Chapter 5 summarizes the findings, includes discussions of the potential implications, and presents how the results add to the current scholarship on school contextual variables and ACT scores and recommendations for additional research on the subject.



## CHAPTER 2: LITERATURE REVIEW

Chapter 2 examines research and literature on some contextual variables influencing composite ACT scores. This chapter presents the theoretical framework, along with the research on ACT assessment and its background. The second section reviews studies focusing on the effect variables have on the academic achievement of high school students, such as completing core classes, high school GPAs, gender, SES, race/ethnicity, and extracurricular participation. The third section discusses the potential relationship of these contextual variables and the relationship with a student's composite ACT scores. The chapter concludes with a brief summary of the research presented.

### **Contextual Variables Influencing Academic Achievement**

There have been numerous studies examining various contextual variables relating to student success and academic performance (e.g., E. Anderson, 2015; Coleman, 1988; Darling, Caldwell, & Smith, 2005; Noble, Davenport, Schiel, & Pommerich, 1999; Rothstein, 2004; Woodruff & Ziomek, 2004). Many previous studies have focused on gender, course grades, core class participation, extracurricular activities, high school GPA, race, SES, and a host of other variables. An examination of current research studies provided the content for review in Chapter 2. The literature is extensive when examining many of these variables on the effect on student ACT composite scores. Findings suggest students who have taken or plan to take the core curriculum tend to achieve higher ACT scores than those who have not completed the core

curriculum (ACT, 2013). Other studies indicated a direct relationship between a student's SES and performance on the ACT (Briggs, 2004; Powers & Rock, 1999; Zwick, 2004). The *ACT Technical Manual* (ACT, 2014b) presented research performed by Schiel et al. (1996) indicating male students averaged higher mean ACT mathematics, science, and composite scores than female students. There are studies from Fredricks (2012) and Marsh and Kleitman (2002) that examined the relationship between student extracurricular participation and high school academic achievement; however, the research regarding students participating in extracurricular activities and ACT scores appears lacking or nonexistent.

### **Coursework Selection and High School Grade Inflation**

Over recent years, high schools across the country have come under increased political scrutiny over graduation rates, the achievement gap between various gender and ethnic groups, and national platforms demanding better performance and preparedness for college and career goals. Scholars have questioned how some measurements of student academic success seem to be rising in one domain but are not equally progressing in another. For example, if school grades do not correlate with measures of postsecondary academic readiness, grade inflation may be an issue. Godfrey (2011) suggested grade inflation is problematic and harms the predictive nature of high school GPAs use as a valid predictor of college success. However, Zhang and Sanchez (2013) examined this perceived phenomenon using hierarchical linear modeling and found little to no evidence of overall grade inflation in recent years.

Nevertheless, Zhang and Sanchez's (2013) study did indicate grade inflation among some high schools, but failed to uncover valid reasons for these findings. The authors concluded the variation is not the result of school poverty or demographics. Zhang and Sanchez's findings contradict a previous study by Woodruff and Ziomek (2004), arguing significant grade inflation

was evident from 1991 to 2003 in U.S. public high schools. Collins (2002) cited the need for more citizens to have more academic credentials such as a high school diploma, forcing public schools to inflate grades and allowing more students to graduate and potentially enter the workforce. Zhang and Sanchez's findings may ease the concerns of some postsecondary admission offices who may be concerned with incorporating high school GPAs and academic placement. Initial academic placement has several potential consequences for entering students. These initial placements may result in remedial class placement, causing additional tuition costs, delaying graduation and degree completion, and perhaps unknowingly influencing student career path selection.

Many students and parents are more preoccupied with grades due to the opportunities for scholarships and the prestige of graduating at the top of the senior class. The pitfalls of such thinking may limit the academic tracks some students choose to take in high school, regardless of the beneficial prep they may offer for success at the postsecondary level. Students who are more inclined to take less demanding and academically challenging courses in high school ensure higher GPAs but may miss the beneficial exposure to advanced math and science courses. Research by Roth, Crans, Carter, Ariet, and Resnick (2000) suggested students who did poorly in advanced high school math classes performed much better on math placement tests when entering postsecondary institutions than those students who did not complete advanced courses. The results indicated a more rigorous curriculum may have negative high school GPA repercussions, but provide more preparation for postsecondary degree attainment and success.

### **Gender and Academic Achievement**

Gender plays a major role in society. The contribution and increased rights of women in the United States are well heralded and documented. Traditional occupational roles and

postsecondary programs once reserved for one gender are now blurred in U.S. society (Wang, Parker, & Taylor, 2013). Voyer and Voyer (2014) sought understanding of the role gender plays in academic achievement and, if it does, how the high school academic program influences postsecondary academic and career choices. In an exhaustive meta-analysis on gender differences in scholastic achievement, Voyer and Voyer offered a comprehensive examination of the literature regarding gender and academic achievement according to course grades. The authors aimed research at the perceived advantage females students have in academic achievement. The study was extensively researched based on 502 effect sizes and 369 samples. The researchers utilized a mixed-effects meta-analytic model.

Results from Voyer and Voyer's (2014) study examined data retrieved from 1914 to 2011 and indicated female students have an advantage across various subject areas, including language arts, math, and science. Although the authors conclude a relatively small effect size of 0.225, Voyer and Voyer argued the significance was found within the cumulative effect on male students' academic achievement. The significance was less in math and science classes for female students over male students. The authors suggested the differences may be linked to less participation by female students in advanced science and math classes, and the advantage may be reduced in male-dominated fields. The analysis provided some suggestions to why female students may have such an advantage, as indicated by course grades in public school. One explanation was found in the work of Eccles et al. (1983), who pointed to the expectation value model as a factor. This model argues students who do not see the connection with success and future achievement fail to invest time and energy in the area. The same may hold true for teachers, who may have fewer expectations for a student to benefit from the material and who may not invest the time and resources needed for mastery.

Parental expectations for female students versus male students in math performance may play a role as well (Eccles, Jacobs, & Harold, 1990). The perception may produce more encouragement from parents to encourage female students. This gender skew may be due to the stereotypical belief by some claiming male students have more innate math talent and need less parental motivation. Another factor offered by Hartley and Sutton (2013) is the stereotype threat. The threat argues certain groups can be influenced to believe they are expected to achieve better or worse simply based on gender and the type of encouragement offered in the classroom. A brief study by Dweck (1986) suggested female students may have a different motivation for learning than male students, claiming academically inclined male students will often seek more challenging tasks compared to equally inclined female students. The female students' need for mastery of content, rather than grades alone, as compared to male students' need, produces better grades in all coursework. Other scholars have looked at the biological differences in female students and male students and have attempted to explain the difference in academic success. Male students tend to be more active in the classroom than female students, and this biological need to be active may place male students at an academic disadvantage, causing a lack concentration and more discipline issues for male students in primary grades (Bennett, Gottesman, Rock, & Cerullo, 1993).

According to Voyer and Voyer (2014), the female advantage over male peers appears to widen as students progress from elementary school to the secondary level, but fails to offer any available studies providing why the grade gap widens. Nevertheless, the authors acknowledged previous studies indicating a contradiction between the higher grades female students earn in public schools versus male students, even though male students tend to outperform female students slightly on academic achievement tests. Citing the previous scholarship of Kenney-



Benson, Pomerantz, Ryan, and Patrick, Voyer and Voyer offered setting, time requirements, anxiety, and confidence as reasons for the female advantage to dissipate on these assessments. The elimination of the female advantage on standardized tests presents some questions regarding student college admissions and reflection on the level of success of the public school, as measured by some metrics.

### **Socioeconomic Status and Academic Achievement**

SES is one of the most researched variables in public education. The effects of SES have been examined countless times at multiple levels in how it relates to the academic achievement of students. One of the first meta-analyses of the effect SES has on academic performance was produced by White (1982). In White's work, the research found a strong correlation between students' SES and academic performance. White's research also suggested the relationship decreased as students advanced through middle and high school levels. White's study provided two possible explanations for the diminishing SES effect on academic achievement. The first possible explanation was schools provide equalizing experiences for all students. Second, White acknowledged the more students from lower SES backgrounds may drop out of school at a higher rate and reduce the significance of the correlation at higher grade levels.

Following White (1982), many more have attempted to analyze the relationship, with mixed results. Lamdin (1996) produced evidence of a significant relationship between student academic achievements in 97 schools in the Baltimore, Maryland, school district. Using a regression model, Lamdin examined students' results on the California Achievement Test and identified student SES with those who did not qualify to receive free lunch. Lamdin's results indicated a positive coefficient between SES measures and were positive and significant at the 1% level across all specifications. Seyfried's (1998) study suggested a weak correlation between

SES and academic achievement and argued teacher expectation bias versus student intelligence as the main hindrance to academic achievement in primary grades. A meta-analytic review by Sirin (2005) followed up White's (1982) contribution. Sirin examined studies published between 1990 and 2000. The findings differ from White's previous review, which drew on literature from 1918 and 1975. Sirin's analysis demonstrated a correlation of .299, less than the relationship from White's findings of .343 average. A correlation of .299 reveals a medium relationship between SES and academic achievement. Income was indicated as the strongest correlate in both meta-analyses (Sirin, 2005; White, 1982). Therefore, students who attend public schools in low-income areas with other low-income students may be subject to schools with lower expectations, less than adequate facilities, and less rigorous course selections. These studies suggest students living in school districts serving students with a low SES may receive less opportunity for academic achievement. As noted by Wilson (1996), students living in poor school districts, as compared with those in wealthy districts, face limited social services and often more crime.

This seeming academic entrapment may produce lasting effects, such as deciding where to attend college, scholarship availability, and what academic track or profession students may pursue. As E. Anderson (2015) found, the larger number of minority students who live in low-SES neighborhoods typically correspond with schools with a majority number of minorities. Therefore, it is reasonable to conclude a majority of schools consisting of predominantly minority students may be much more inclined to represent a low-SES community and potentially have more limited local resources.

## **Extracurricular Activities and Academic Achievement**

There have been many studies indicating a positive relationship between student extracurricular participation and improved academic performance. In a brief study performed by Fox, Barr-Anderson, Neumark-Sztainer, & Wall (2010) examining the impact of participating on sports teams and academic achievement, the results were positive. The study examined over 4,500 Minnesota students who self-reported the number of hours spent being physically active, on a sports team, and letter grades associated with each student. The study failed to identify if athletic eligibility requirements had any effect on the outcome. An in-depth analysis provided by Broh (2002) argued some significant results within math and English grades among upperclassmen, as compared to students who did not participate. Larson (2000) argued students report more positive mental well-being in organized activities because they experience the challenge and perceive being active, feeling empowered, and feeling competent in these settings.

Participation in organized activities may provide unique opportunities for learning and development. Students who participate in school-based extracurricular activities may have stronger relationships with positive role models and have more academically inclined peers than students who are not involved (Fredricks & Eccles, 2005). Through participation, students develop a wide range of skills that may be foreign to the traditional classroom setting. Other studies have found students learned emotional, cognitive, physical, interpersonal, and social skills by participating in organized out-of-school activities (Hansen, Larson, & Dworkin, 2003). Participating in extracurricular activities may aid students in life skills such as problem-solving, time management, academic and career goal setting, decision making, and leadership skills, all of which may positively affect academic achievement.

In a comprehensive review of available research, Feldman and Matjasko (2005) cited a study performed by Mahoney (2000), which concluded a student's participation in at least one extracurricular activity produces a decline in antisocial patterns. Feldman and Matjasko found a threshold on the number of activities and positive developmental outcomes, as cited in the work of Zill, Nord, and Loomis (2005). Zill et al.'s report indicated students who spent 5 to 19 hours per week in activities were less likely to be involved in riskier behaviors than those who participated in only 1 to 4 hours of weekly activities. The study by Zill et al. found students who took part in activities for more than 20 hours per week did not benefit from the deterrent effects of extracurricular participation. Fredricks (2012), investigated this theme further, aiming to examine the concerns of overscheduling in extracurricular activities among contemporary high school students. Fredricks presented a new approach at labeling extracurricular activities as breadth, or a number of activities, intensity, and time in extracurricular activities. Fredricks found high levels of participation in either five to seven activities or more than 14 hours per week spent on extracurricular activities would negatively affect the academic well-being of students. As presented in the study Fredricks (2012), these concerns are based on media reports claiming student extracurricular activity involvement:

- robs students of much-needed relaxation time with family members;
- introduces too much stress, requiring a balancing act with academics; and
- may produce overzealous parents' pressure to compete.

Nevertheless, the study revealed the fear of negative academic consequences of students who participated in a high number of activities was only found in a few extreme cases. As noted by Fredricks (2012), only a small proportion of students, 3.3% of the sample, reported spending more than 20 hours per week on extracurricular participation and only 7.2% participated in seven

or more activities per week. This number is far less than the percentage of the sample, 21.3% who responded not involved in any extracurricular activities during the week, a group Fredricks argued deserves more attention.

The overwhelming bulk of the research indicates positive correlations with student participation and academic achievement. Nevertheless, as schools face more pressure to raise achievement levels and shrink budgets, extracurricular activities remain one of the prime targets for the number crunchers to cut. Researchers and policy makers need a broader understanding of the positive correlation between student involvement in extracurricular activities and the relationships between academic performance and the potential future opportunities associated with the academic gains. These academic gains often appear in the form of improved high school GPAs, dropout prevention, and a more positive outlook from students planning to attend a postsecondary institution (Mahoney & Cairns, 1997).

### **ACT Description**

Most summative assessments are organized into two categories: norm-referenced and criterion-referenced. Each assessment design has different purposes. Norm-referenced tests rank students based on achievement performance among the various students (Anastasi, 1988). A student's ACT score is a norm-referenced measure based on students who have previously completed the assessment (ACT, 2014b).

Most other assessments are considered criterion-referenced tests (CRTs) with an intended goal demonstrating what participants know and can do. Therefore, CRTs are not designed to compare one participant to another, as in rank, but convey what content has been mastered (Anastasi, 1988). Most end-of-year tests given in public schools, like those in the state of Mississippi, are designed to measure a student's academic ability against a predetermined

performance level established by the school district or state curriculum standards. A student's ACT scores demonstrate knowledge acquired and mastered based on high school curriculum, which identifies with a criterion-referenced test (ACT, 2014b).

The ACT (2014b) is constructed using various methods and input sources. High school curricula from the United States, textbooks, high school educators, and collegiate professors, all contributed to the ACT content specifications. With the various input, the necessary skills were identified as what first-year college students needed to have mastered to be successful.

The ACT is continuously updated for validity. Two national ACT studies used sample data from 1988 and another in 1995. The 1988 study consisted of more than 100,000 high school students, and the 1995 study involved more than 20,000 high school students. These studies aided in scaling and norming the current version of the test. The 1995 study updated the national representative norms and determined the effect of allowing calculators to be used on the ACT math section. Few changes have been made to the structure of the test since 1995 (ACT, 2014b).

The students involved in the 1988 study were selected from the various public and private schools and were classified as in the 10th, 11th, or 12th grade. Overall, 147 schools were selected and participated in the study (ACT, 2014b). The design of the assessment aims to determine problem-solving skills and mastery of subject area content, and serves as a foundation regarding validity of the ACT for various uses. Relying on a student's ACT results for success in college is the crux of the assessment (ACT, 2014b).

Research by Noble (1991) argued the predictive nature of ACT scores and grades obtained in high school are more accurate predictors of future academic success than ACT results alone. Noble cited the research of Lenning (1975) and Maxey (1979) as supporting the

combination of high school grades and ACT scores in predicting successful GPAs in college. Interpreting high school grades is problematic due to the difference in high school curricula and various grading policies found in high schools throughout the nation. Therefore, the variety of high school grade results provides less standardization than ACT scores, which is why combining the use of high school grades and ACT scores may provide a more accurate indicator of student success in postsecondary institutions (ACT, 2014b).

Allen and Scoring (2005) conducted a study establishing readiness benchmarks for first-year college courses based on ACT scores. Benchmarks were developed for four courses—English composition, college algebra, social science courses, and biology—using corresponding ACT scores. These benchmarks, known as, the ACT college readiness benchmarks, were updated in 2013 using data from more recent high school graduates (Allen, 2015). The scores of 18 for English, 22 for algebra, 22 for social science, and 23 for biology represented benchmark scores of a first-year college student with a reasonable chance of success. These scores predicted a student has at least a 50% chance of earning a B or higher grade. Additionally, these scores indicated a 73–78% chance of a student earning at least a C in the course (ACT, 2014b).

Although the scores were useful predictors of success in first-year college courses, higher ACT scores above the cutoffs provided no additional guarantee of success because factors such as motivation and study skills play important roles in academic success in college (Robbins et al., 2004). Nevertheless, ACT scores will not measure all aspects of a student’s readiness entering college. Therefore, postsecondary institutions may need to consider other indicators, such as high school coursework, grades, and scores on locally developed placement tests in addition to ACT scores when making placement decisions (ACT, 2014b).

## **Contextual Variables and ACT Outcome**

### **Coursework and ACT Composite Scores**

The ACT is oriented toward the general content areas of high school and college curricula. Students' performance on the ACT relates to the high school courses students have taken and how well students achieved in these courses. The Course Grade Information section of the ACT collects information on high school courses in English, mathematics, social studies, natural sciences, languages, and arts. Many of these courses form the basis of a high school college-preparatory curriculum and are frequently required for college admission or placement. For each course, students indicate if the course has been taken, enrolled, in future plans, or not needed. If they have taken the course, students indicate the grade received. Self-reported coursework and grades collected with the Course Grade Information section have been found to be accurate based on the information provided on student transcripts (Sawyer, Laing, & Houston, 1988). The ACT recommends a core curriculum of at least 4 years of English and at least 3 years each of mathematics, social studies, and natural sciences. Students who have taken or plan to take the core curriculum tend to achieve higher ACT scores than those who have not completed the core curriculum (ACT, 2013).

From 2008 to 2013, the ACT composite scores of students who completed the core curriculum averaged between 2 to 3 scale score points higher than the scores of students who did not complete the core curriculum (ACT, 2013). In addition, ACT longitudinal studies conveyed students who had higher course grades also tended to achieve higher ACT scores. A study by Noble et al. (1999) presented findings that coursework and high school grades are strongly associated with ACT performance. In this study, the researchers investigated the relationships



between the noncognitive contextual variables, high school coursework and grades, and students' ACT scores.

ACT research has shown taking rigorous, college-preparatory mathematics courses is associated with higher ACT mathematics and composite scores. Noble and Schnelker (2007) examined data for 403,381 students representing 10,792 high schools and analyzed the effects of taking specific high school course sequences on students' ACT performance in English, mathematics, and science. The researchers utilized hierarchical regression modeling to examine the effects of completing specific high school course sequences on students' ACT scores. The results indicated students taking one or more foreign languages over and above English 9–11 increased students' ACT English score by more than 1 score point. Completing algebra 1, algebra 2, and geometry demonstrated an average ACT mathematics score increase of about 1.1 score points. Completing advanced math courses over and above these three classes resulted in an average increase in ACT Mathematics score of 1.0 to 1.5 score points. Taking other advanced math courses and trigonometry, or trigonometry and calculus, increased ACT mathematics scores, on average, by more than 2.0 score points. The greatest score gains were associated with mathematics coursework and resulted from taking other advanced courses, trigonometry, and calculus, in addition to algebra 1, geometry, and algebra 2, providing a gain of 3.2 score points. Students who completed general science only, versus taking general science and biology or simply biology resulted in an average ACT science score improvement of about 0.5 points. Students who took biology and chemistry or a combination biology, chemistry, and physics averaged ACT science score increase of 1.3 and 2.4 score points, compared to students who only completed biology. Results indicate a typical high school student who completes upper level mathematics or science courses can expect, on average, to earn meaningfully higher ACT

mathematics and science scores, as compared to students who do not complete these courses (ACT, 2014b).

### **Gender and ACT Composite Scores**

An extensive study produced by ACT presented the difference in scoring on the ACT between genders. The *ACT Technical Manual* (ACT, 2014b) cited research performed by Schiel et al. (1996) that indicated male students averaged higher mean ACT mathematics, science, and composite scores than their female peers. Median average score differences ranged from 0.60 to 1.51 scale score points for composite science scores. Male students' ACT reading scores were higher than those of female students. Female students performed better and achieved a higher average ACT English score than male students, with an average score difference of 0.53, respectively.

Gender performance differences reduced when other backgrounds and coursework variables were statistically controlled. When gender was included as the only independent variable in the ACT mathematics model, accounting for background variables and coursework variables, the median regression coefficient associated with this variable was relatively large (1.58 versus 0.64). Therefore, the typical ACT mathematics mean for male students was 1.58 scale score points higher than scores for female students when contextual variables and coursework variables were not statistically controlled. Controlling these variables produced a decreased difference of 0.64 scale score points. The findings for gender were clear. Over and above coursework, the academic culture within the school, and other variables, 2% or less of the variance in ACT scores was related to gender. The authors concluded the possibility that if more variables were accounted for, the mean differences might decrease more.

## **SES and ACT Composite Scores**

A study by Schiel et al. (1996) found that ACT score differences for selected population groups were reduced when family income was statistically controlled. This study focused on student achievement and specific course-taking patterns. Data for 73,818 students representing 1,174 high schools were analyzed. Each student record contained ACT scores earned during the student's junior or senior year, prior to graduating in 1994. Regression models corresponded to ACT English, mathematics, reading, and science scores. English and social studies coursework demonstrated little relation to ACT English and reading scores. The correlation between family income and the ACT scores ranged from .34 to .41. Therefore, family income was associated with less than 1% of the explained variance in the ACT scores when coursework taken, grades, high school attended, and background characteristics were accounted for. These results supported the variation in scores by family income reflect differences in the quality of education, type of school, and other related variables.

Jaschik (2005) revealed the stark reality of the difference between families with various incomes. The study concluded students of families with incomes of \$18,000 or less had an ACT composite score of 17.9, while students with families with an income above \$100,000 had an average 23.5 composite score. Some researchers pointed to the benefits and access to coaching to explain the difference in scores. Powers and Rock (1999) noted students with family incomes of \$80,000 or more were nearly twice as likely to receive ACT test-taking coaching, as compared to students with family incomes of \$40,000 or less. A follow-up study by Briggs (2004) refuted the substantial gains from coaching, but acknowledged the increase usually comes from only retaking the exam. Other researchers, such as Zwick (2004), argued the inequalities in the home and school environments are more likely the cause for the gap in scores. Zwick noted that

parents from low-SES households are less likely to read to their children, and wealthier schools may simply have better educators and resources.

Many states have added mandatory testing of all high school students prior to graduation. The ACT results from these tests are used in accountability models attempting to measure the success of high schools in preparing graduates for postsecondary, entry-level courses. The implementation of mandatory testing of high school students may increase the number of students who consider attending college, increase awareness of educational planning, and provide feedback on school performance (ACT, 2015b). E. Anderson (2015) suggested validity issues associated with SES and the use of test scores in measuring the success of a school under state accountability models. The current research adds to E. Anderson's concern and questions the validity of judging the success of Mississippi public schools using ACT scores as a metric. Districts that serve mostly low-SES students may be at a disadvantage on some points potentially earned under the CCR metric found in the new MSAS. The current model rewards schools a maximum of 50 points on a 1,000-point model for having every graduating student meet predetermined scores in the areas of math-22, reading-22, and English-18 on sections of the ACT at the time of the student's senior snapshot. The senior snapshot is collected electronically by the MDE in the spring of the student's senior year through the MSIS program of the local district. This snapshot potentially indicates validity issues may exist within the model if any of these uncontrolled student demographics negatively relate to ACT composite scores. A lower CCR indicator of a high school on the MSAS due to these demographics may negatively reflect the work and progress of the school. This negative reflection may, in turn, raise questions about the quality of education a school is providing its students.

## Summary

In Chapter 2, the literature on contextual variables relating to student achievement was examined on a national and state level. Emphasis was applied to the correlation between high school GPAs, courses, gender, SES, and extracurricular activities. Woodruff and Ziomek (2004) presented evidence about the importance of student course selection having a significant impact on higher ACT composite score. Noble and McNabb (1989) suggested increased math and science courses completed by students would result in higher ACT scores. Gender was associated with female students having higher school course grades but overall lower scores on the ACT than male students. Student SES is often used as a contextual variable in educational research, but has many definitions. When the results of student SES are accounted for statistically, there is less than a 1% variance in ACT scores with students from other SES levels. The research suggested a positive relationship exist between extracurricular activities on high school students' academic performance, while the impact on ACT scores appears absent. This study examined these variables and the potential relationship they may have on the ACT composite scores of the 2015 graduating class at CMHS.

## CHAPTER 3: METHODOLOGY

### **Introduction**

Chapter 3 offers details of the research method, including the population, sample selection and size, the research design, measurement of dependent and independent variables, the hypothesis questions, and methods of data analysis. The methods in Chapter 3 examine the central issue of concern for the research, which is understanding how to improve students' performance on ACT composite scores. Using both a Pearson product moment statistical correlation and *t* test for continuous variables and a one-way analysis of variance (ANOVA) for categorical variables, the researcher identified and presents any significant relationships or differences in means between the academic achievement of 2015 CMHS graduates and ACT composite scores. The variables analyzed consisted of the number of completed core classes, high school GPAs, gender, SES, race/ethnicity, and extracurricular participation. The findings may provide educators a better understanding of student academic activities and decisions that may have a relationship with ACT composite scores at the local level.

### **Research Design**

The research methods used to answer the research questions are an explanatory correlation design (Creswell, 2014) to determine if a significant relationship exists between various contextual variables to ACT composite scores of 2015 CMHS graduates. The purpose of the design was to identify the statistically significant relationships between these independent variables on ACT composite scores and the understanding as to how to improve students' ACT

composite score performance. The decision to use a small cross-sectional sample from one high school might magnify influence from teacher quality or school curriculum covariates, which may introduce additional reliability issues. Use of a single school might limit the exposure to teacher background and curriculum differences found in larger cross-sectional studies. The design features the ACT composite scores as the dependent variable and various contextual variables as independent variables. Student academic achievement was examined, including the number of core classes completed and high school GPA.

The study examined demographic information including gender, ethnicity, and SES. In addition to these variables, this research measured the students' participation in extracurricular activities. Studies performed by ACT (2014b) attempted to analyze ACT scores and predict the postsecondary success of students during their first years of college. Nevertheless, the research was limited on how to improve student ACT scores at the local level, based on Noble and McNabb's (1989) examination on a national level. The research conducted by Noble and McNabb concluded course grades and students who completed additional courses in mathematics and science had higher ACT composite scores, regardless of the students' academic ability. In addition to the previous study, the results of this study might provide valuable insight to educators and school leaders about any significant relationship, either positive or negative, of these independent variables and ACT results.

#### Population, Sample, Subjects

The results of the ACT tests are presented annually by ACT to individual high schools. All data pertaining to ACT scores were obtained from the ACT Profile Report (ACT, 2015a) provided to CMHS in the summer of 2015 and from student transcripts. The data were collected from student transcripts and the MSIS accessed by the researcher, upon approval of the

Institutional Review Board Committee and the CMHS Board. Data sources offered detailed information about the 111 of the 123 CMHS students who completed CMHS during the 2014-2015 school year. The sample consisted of

- 45 African American students (40.5% of the sample);
- 61 White students (55% of the sample);
- five Asian students (4.5% of the sample); and
- 53 male students (48% of the sample) and 58 female graduates (52% of the sample).

### **Limitations**

The study might have limited transferability because the sample was selected solely from CMHS, a small rural high school in central Mississippi. All data collected were ex-post facto and served as a historical review of student records on file. The sample consisted of students who voluntarily selected to take the ACT assessment prior to graduating at CMHS in 2015. Other limitations could have result from the curriculum and extracurricular options offered to the sample group, as compared to other high schools. Factors might differ significantly from other school districts in Mississippi and different parts of the country. The method of curriculum delivery might differ and limit the transferability of the results. High schools throughout the state of Mississippi utilize various grading scales, thereby altering high school GPAs from one school to another. Nevertheless, the study indicated relationships exist between ACT composite scores, coursework, and high school GPAs. The findings might provide students, parents, educators, and policy makers with valuable information that might improve ACT performance at the local level and perhaps in other similar Mississippi high schools.

Not all 2015 CMHS graduates completed the ACT during their high school career. Prior to the 2014-2015 school year, neither the Crepe Myrtle School District nor the MDE required



high school students to complete the ACT, as now required by state mandate. The new school year 2014-2015 mandate required all Mississippi 11th graders to participate in a state-funded ACT assessment during the spring semester. Some students might have completed the ACT more than once, but the highest scores obtained were used for this study. While the sample restricts generalizability to larger populations, similar districts might have similar outcomes.

Located in the geographic center of Mississippi, CMHS currently serves 620 students consisting of grades 9 through 12. Nearly 73% of the students who attend CMHS receive federal free or reduced-price lunch. The school employs 56 full-time and part-time staff members. CMHS currently holds a C-level rating from the MDE; this rating stems from other student performance on other required assessments and metrics carried over from the 2012 state school accountability model (MDE, 2015). The current study utilized student and ACT data for the 2014-2015 school year, comparing contextual school variables and 2015 CMHS graduates' ACT composite scores as the dependent variables. Two categories of independent variables were used: student academic and school engagement variables and student demographic characteristics (see Table 1).

Table 1

*Data for Correlations*

Independent variable category	Independent variable	Variable type	Range/identifiers	Source
Student academic and school engagement characteristics	Number of core classes	Continuous	13–20	Student academic record
	High school GPA	Continuous	1.95–4.34	Student academic record
	Student extracurricular participation	Continuous	0–14	Student academic record
Student demographic variables	Student gender	Categorical	M = 1, F = 2	(MSIS)
	Student SES	Categorical	Yes = 1, No = 2	MSIS
	Student race/ethnicity	Categorical	W = 1, B = 2, A = 3	MSIS

*Note.* SES is reflected by students who received free or reduced lunch benefits.

These variables were selected due to their availability to the researcher and the assumption building level academic advisors or parents might have limited control over them due to current school policy. For example, some students might not be allowed to participate in extracurricular activities due to course grade average prerequisites, failed drug tests, misconduct, not securing medical clearance, not paying required fees, and therefore, failing to meet requirements for extracurricular participation under school policy. Examples provided insight that teachers and other school level academic advisors might encourage some variables in a student’s school experience, but lacked power over other areas. For example, academic counselors might influence some students toward completing more remedial coursework or more core classes, as recommended by ACT research. Sometimes, students might be limited to

courses due to the unintentional result of school master schedule conflicts. Each case might influence how a student performed on ACT tests.

As suggested by Noble and McNabb (1989) and even recently by Allen (2015), student participation in high school core classes has a direct positive impact on student ACT scores. A student's high school GPA may present some indication of student ACT performance. The different grading policies from instructor to instructor, or between separate institutions, need to be carefully considered when evaluating student high school GPA as a comparative metric. Gender achievement gaps on the ACT do seemingly exist, and the theories ranging from attention span to course selection are some of the possible explanations researchers have offered (Jones, 2008; Woodruff & Ziomek, 2004). Another important variable surrounding student academic achievement is the socioeconomic conditions in which a student finds himself or herself (Zeisler, 2012). Therefore, one may presume the compacted effect of years of academic disadvantage due to poverty conditions are ultimately reflected in a student's ACT results.

Many rural high schools in Mississippi are predominately composed of students of color who live in a higher rate of poverty in the state, as do their White peers (MDE, 2015; Southern Echo, 2015). Based on this correlation, the research might reveal CMHS enrollment might have a direct relationship with the academic achievement demonstrated by the ACT composite scores of students in the school. A recent study indicated the positive influence on student academic achievement and participation in extracurricular activities (Fox et al., 2010). However, the need exists to see if there is any relationship between student participation in extracurricular activities and ACT performance. A moderate to strong relationship between any of these variables and ACT composite scores might offer educators a better understanding of how student academic activities and decisions might have a relationship with ACT composite scores at the local level.

## Data Analyses

This research sought to determine if any significant relationship exists between contextual variables and ACT composite scores at CMHS. The research aimed to find if the independent variables are strongly related to ACT composite score results and reveal possible circumstances over which schools have little to no control. These conditions might create concerns of validity with the MSAS and the current metric, measuring the CCR of Mississippi graduates. This 50-point metric is used to measure the academic performance of Mississippi high schools. Of the six contextual variables this research examined, three existed prior to the ACT assessment without school control: (a) student race/ethnicity, (b) student gender, (c) and student SES. If any significant relationship exists between these demographic variables and ACT composite scores of 2015 CMHS graduates, the results of the accountability model might reflect validity issues within the metric. In hypotheses 1, 2, and 3, the study utilized a Pearson product-moment correlation to measure the relationship and strength of the variable relationship (Creswell, 2014). Academic and school engagement variables were analyzed in hypotheses 4, 5, and 6. Hypotheses 4 and 5 utilized an individual *t*-test analysis. In Hypothesis 6, an ANOVA measured differences in means to determine whether there are any statistically significant differences between the means of two or more independent groups (Laerd Statistics, n.d.). The following null hypotheses were examined using a Pearson product-moment correlation:

H<sub>01</sub>: There is no significant relationship between the number of core classes 2015 CMHS graduates complete and ACT composite scores.

H<sub>02</sub>: There is no significant relationship between 2015 CMHS graduates' high school GPAs and ACT composite scores.

H<sub>03</sub>: There is no significant relationship between the number of extracurricular activities 2015 CMHS graduates' participated in while attending high school, and ACT composite scores.

This research utilized a statistical *t* test. This type of statistical test yields a comparison of two groups regarding outcomes. The following null hypotheses were examined using a statistical *t* test:

H<sub>04</sub>: There is no significant difference between mean male and mean female 2015 CMHS graduates' ACT composite scores.

H<sub>05</sub>: There is no significant difference between 2015 CMHS graduates' SES, as measured by participation in the federal free or reduced-price lunch program, and ACT composite scores.

This research utilized an ANOVA to compare more than two groups regarding the outcome. The following null hypothesis were examined using an ANOVA statistical test:

H<sub>06</sub>: There is no significant difference between 2015 CMHS graduates' student race/ethnicity and ACT composite scores.

The results were measured with the Salkind (2000) correlation chart. For this CMHS study, a confidence interval of 95% and above was considered statistically significant to accept the hypothesis and reject the null hypothesis (See Table 2).

Table 2

*General Interpretation Rating Done by Salkind*

Size of the correlation	General interpretation
.8–1.0	Very strong relationship
.6–.8	Strong relationship
.4–.6	Moderate relationship
.2–.4	Weak relationship
.0–.2	Weak or no relationship

**Procedures**

The data were collected using students’ high school academic record for the 2014–2015 school year. Additional data were collected from the MSIS and compiled into a computerized statistical program. A statistical analysis using SPSS Version 23 was used to conduct (a) a Pearson product-moment correlation for hypotheses 1, 2, and 3; (b) an independent *t* test to measure for differences in group means; and (c) an ANOVA to measure for differences in group means in Hypothesis 6. Each student was numerically coded by a randomly assigned four-digit number while independent and dependent variables were identified with a numerical or letter character.

Data collected reflected students’ academic and school engagement variables, such as a number of core classes completed, high school GPA, and participation in extracurricular activities. Demographic variables analyzed in the study were gender, SES, and race/ethnicity. Each category was analyzed with the relationship these variables had on overall ACT composite scores.

## Summary

Chapter 3 presented the methods used to collect and analyze the data. Composite ACT scores for the 111 of the 123 CMHS 2014-2015 graduates were collected and served as the dependent variable. Data on six separate independent variables were collected on each ACT participating student. The six variables were divided into two categories: student academic and school engagement variables, and student demographic variables. A brief discussion of each independent variable was discussed in the chapter to justify its use in the study. With the data collected, a Pearson product-moment correlation analyzed the continuous variables in hypotheses 1, 2, and 3. An independent samples *t* test compared differences between group means in hypotheses 4 and 5.

An ANOVA was used to determine whether there are any statistically significant differences between the means of two or more groups and their ACT composite score results in Hypothesis 6. The findings might provide students, parents, educators, and policy makers with valuable information about academic and activity selection for high school students that might improve future ACT performance. The summarized data generated by design in alignment to the null hypotheses and statistical tests are presented in Chapter 4. Chapter 5 summarizes the findings, discusses the potential implications, and presents how the results add to the current scholarship on school contextual variables and ACT scores, and includes recommendations for additional research on the subject.

## CHAPTER 4: DATA ANALYSIS

Mississippi public schools are held accountable for student achievement. The ACT is one such assessment aimed at completing this task and, beginning in SY 2015-2016, was mandated to be given to each Mississippi junior. The results of these state-funded ACT tests and those completed by the same cohort during their senior year are factored into the overall accountability ratings of Mississippi high schools. Chapter 4 presents data in response to the contextual variables over which CMHS has little or no control and the potential relationships between these contextual variables and ACT composite scores.

The purpose of this study was to determine if any relationship or comparison exists between the students' coursework completed, GPA, SES, gender, race/ethnicity, and extracurricular involvement with the overall ACT composite score. The sample was drawn from 111 of the 123 students who completed CMHS, located in central Mississippi, during the 2014–2015 school year. Eleven students did not take the ACT prior to graduating from CMHS, including one student who did not graduate with a traditional Mississippi high school diploma. This study used correlation analysis to determine the strength of these variables and the relationship with ACT composite scores. A Pearson product-moment correlation was used for hypotheses 1, 2, and 3. An individual *t* test was used to determine differences between group means in hypotheses 4 and 5. The study utilized an ANOVA for Hypothesis 6 to analyze the difference in group means.



The ACT composite scores of the 2015 CMHS students served as the dependent variable. The data analyzed identified relationships between student demographic variables and ACT composite scores. In addition, the study examined student academic and school engagement variables and the group differences versus ACT composite scores. The purpose was to examine the relationships or group differences among these independent variables and student ACT composite score outcomes. While ACT composite scores were the dependent variable, the research examined relationships and comparisons among variables and assumed no causation.

### **Null Hypotheses and Statistical Tests**

The central question for this research was, do variables over which CMHS has little to no control have a direct relationship with 2015 CMHS graduates' ACT composite scores? The following null hypotheses were used to identify these potential relationships:

H<sub>0</sub>1: There is no significant relationship between the number of core classes 2015 CMHS graduates complete and ACT composite scores.

H<sub>0</sub>2: There is no significant relationship between 2015 CMHS graduates' high school GPA and ACT composite scores.

H<sub>0</sub>3: There is no significant relationship between the number of extracurricular activities in which 2015 CMHS graduates participated while attending high school and ACT composite scores.

H<sub>0</sub>4: There is no significant difference between mean male and mean female 2015 CMHS graduates' ACT composite scores.

H<sub>0</sub>5: There is no significant difference between 2015 CMHS graduates' SES, as measured by participation in the federal free or reduced-price lunch program, and ACT composite scores.

H<sub>06</sub>: There is no significant difference between 2015 CMHS graduates' student race/ethnicity and ACT composite scores.

The results indicated a statistically significant positive relationship between 2015 CMHS graduates' demographics and academic and school engagement variables with ACT composite scores. The correlations ranged from weak to strong relationships. Significant mean differences existed between 2015 CMHS graduates' race and SES on ACT composite scores, while gender provided no significant mean difference.

### **Student Academic and School Engagement Variables**

The first three hypotheses tested the relationship between student academic, athletic, and arts participation and the measured relationship with ACT composite scores. Student academic and school engagement variable descriptive data are provided in Table 3.

Table 3

*Descriptive Statistics for ACT Composite Scores and Student Academic and School Engagement*

Variable	<i>M</i>	<i>SD</i>	<i>N</i>
ACT composite scores	19.28	4.31	111
Core classes completed	16.38	1.31	111
High school GPA	3.42	.625	111
Extracurricular activities	3.14	2.95	111

H<sub>01</sub> assumed there is no significant relationship between the number of core classes 2015 CMHS graduates completed and ACT composite scores. Table 4 provides results of the correlation used to test this hypothesis. The research used the total number of core subject classes (i.e., mathematics, science, social studies, and English) during 4 years of high school.

The classes ranged from entry level to honors classes. Dual credit and dual enrollment classes that satisfy high school graduation requirements and provide college credits were included as well. Both face-to-face and online classes were counted toward student core class totals. The total number of core classes completed within the sample ranged from 13 to 20. The ACT composite scores of the sample ranged from nine to 31. The data for the ACT composite score of the sample were obtained from each student’s digital academic record and transcript. The results of the correlation between the total number of core classes completed and ACT composite scores resulted in Pearson  $r = .553$ , Sig. (2-tailed) at  $p < .0005$ . Thus, the null hypothesis was rejected. There is a statistically significant positive correlation between core classes completed and ACT composite scores. According to Salkind (2000), a correlation between .4 and .6 is a moderate relationship, indicating a moderate positive relationship exists between variables.

Table 4

*Correlation Between ACT Composite Score and Core Classes (N = 111,  $\alpha = .05$ )*

Variable	Measurement/test	ACT	Core classes
ACT	Pearson $r$	1	.553*
	Sig. (2-tailed)		.001
	$N$	111	111
Core classes	Pearson $r$	.553*	1
	Sig. (2-tailed)	.001	
	$N$	111	111

*Note.* \*  $p \leq .001$ .

H<sub>02</sub> assumed there is no significant relationship between 2015 CMHS graduates’ high school GPA and ACT composite scores. The high school GPA at CMHS was based on a 5-point

scale. Entry-level courses along with required courses needed to graduate with a Mississippi high school diploma were calculated using a range of 1–4, with a corresponding representation of A–F letter grades earned in the course. Dual-credit, AP, and honors courses were factored with a 1–5 numerical range, allowing students who participated in these more challenging and rigorous courses to earn more credit. The high school GPAs from the sample ranged from 1.96 to 4.34, respectively. The data were obtained by analyzing each student’s digital records and transcripts. Table 5 provides the results of the correlation between high school GPA and ACT composite scores used to test this hypothesis. The research used the high school GPA 2015 CMHS graduates earned during their high school career. The results of the correlation between core classes completed and ACT composite scores resulted in a Pearson  $r = .774$ , Sig. (2-tailed) at  $p < .0005$ . Thus, the null hypothesis is rejected. There is a statistically significant positive correlation between core classes completed and ACT composite scores. According to Salkind (2000), a correlation between .6 and .8 is a strong relationship, indicating considerable interconnectivity between variables high school GPA and ACT composite scores.

Table 5

*Correlation Between ACT Composite Score and High School GPA (N = 111,  $\alpha = .05$ )*

Variable	Measure/test	ACT	High school GPA
ACT	Pearson <i>r</i>	1	.774*
	Sig. (2-tailed)		.001
	<i>N</i>	111	111
High school GPA	Pearson <i>r</i>	.774*	1
	Sig. (2-tailed)	.001	
	<i>N</i>	111	111

*Note.* \*  $p \leq .001$ .

H<sub>03</sub> asserted there is no significant relationship between the number of extracurricular activities in which 2015 CMHS graduates participated and ACT composite scores. For this study, the following extracurricular activities were considered and totaled over a 4-year period to produce the extracurricular activity independent variable:

- boys' basketball,
- girls' basketball,
- slowpitch softball,
- fastpitch softball,
- baseball,
- band,
- girls' soccer,
- boys' soccer,
- golf,

- tennis,
- power lifting,
- cheerleading,
- track and field, and
- football.

The sample ranged from a participation of zero to 14 activities, respectively. The number of activities in which students participated was obtained from CMHS athletic records from the athletic director of the school. Table 6 provides the results of the correlation between extracurricular activity participation and ACT composite scores. The total number of 111 graduates was used in the correlation. The results of the correlation between core classes completed and ACT composite scores resulted in Pearson  $r = .188$ , Sig. (2-tailed) at  $p = .048$ . Thus, the null hypothesis is rejected. There is a statistically significant positive correlation between core classes completed and ACT composite scores. According to Salkind (2000), a correlation between .0 and .2 is weak or represents no relationship, indicating a limited relationship between variables.

Table 6

*Correlation Between ACT and Extracurricular Participation (N = 111,  $\alpha = .05$ )*

Variable	Measure/test	ACT	Extracurricular participation
ACT	Pearson $r$	1	.188*
	Sig. (2-tailed)		.048
	$N$	111	
Extracurricular participation	Pearson $r$	.188*	1
	Sig. (2-tailed)	.048	
	$N$	111	111

*Note.* \* =  $p \leq .05$ .

H<sub>04</sub> and H<sub>05</sub> were analyzed using an independent samples  $t$  test. H<sub>04</sub> tested if any differences in group mean existed between gender and ACT composite scores. H<sub>05</sub> measured if any difference in group means existed between students' SES, as measured by federal free and reduced-price lunch program participation and ACT composite scores. H<sub>06</sub> tested if any differences in mean groups existed between a student's race/gender and ACT composite scores. Table 7 and Table 8 provide descriptive statistics for student demographic variables of H<sub>04</sub> and H<sub>05</sub>, respectively.

Table 7

*Descriptive Statistics for ACT Composite Scores and Student Gender (N = 111,  $\alpha = .05$ )*

Dependent variable	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	<i>SE mean</i>
ACT composite	Male	53	19.08	4.665	.641
ACT composite	Female	58	19.47	3.992	.524

Table 8

*Descriptive Statistics for ACT Composite Scores and Student SES Status*

Dependent variable	SES status	<i>N</i>	<i>M</i>	<i>SD</i>	<i>SE mean</i>
ACT composite	Receives federal free or reduced-price lunch	58	18.03	3.95	.515
ACT composite	Does not receive federal free or reduced- price lunch	53	20.64	4.337	.596

H<sub>04</sub> asserted there is no significant difference between mean male and mean female 2015 CMHS graduate's ACT composite score. Table 9 provides the results of the independent samples *t* test between the mean male student and mean female student ACT composite scores. The total number of graduates (*N* = 111) was used in the group comparison. There were 53 male participants and 58 female participants. An independent sample *t* test was run to determine if



there were differences in ACT composite scores between male students and female students. Data contained one male student outlier, as assessed by inspection of a boxplot. The outlier was kept in the analysis because the researcher did not believe the decision to include the outlier significantly impacted the results. The male student scores ranged from 13 to 31. The female student scores ranged from nine to 25. The data for this analysis were obtained from each student's digital academic record and transcript. The ACT composite scores for each level of gender were normally distributed, as assessed by using a normal Q-Q plot, and there was homogeneity of variances, as assessed by Levene's test for equality of variances ( $p = .286$ ). The ACT composite scores were lower for male students ( $M = 19.08$ ,  $SD = 4.65$ ) than female students ( $M = 19.47$ ,  $SD = 3.992$ ), but were not statistically significant different,  $M = 0.39$ , 95% CI [-2.019, 1.24],  $t(109) = -.474$ ,  $p = .636$ . There is insufficient evidence to reject the null hypothesis.

Table 9

*Independent Samples Test of ACT Composite and Gender (N = 111,  $\alpha = .05$ )*

Levene's test for equality of variances											
								95 % confidence interval of the difference			
								Mean diff.	SE diff	Lower	Upper
	<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean diff.	SE diff	Lower	Upper		
Equal variances assumed	1.152	.286	-.474	109	.636	-.390	.822	-2.019	1.239		
ACT Comp.											
Equal variances not assumed			-.471	102.86	.639	-.390	.828	-2.032	1.252		

H<sub>05</sub> assumed there is no significant difference between 2015 CMHS graduates' SES, as measured by the participation in the federal free or reduced-price lunch program, and ACT composite scores. Table 10 provides the results of the independent-sample *t* test between CMHS graduates' federal free and reduced-price lunch status and ACT composite scores. There were 58 participants receiving federal free or reduced-price lunch benefits and 53 who did not receive federal free or reduced-price lunch benefits. There were three outliers in the federal free or

reduced-price lunch sample, as assessed by inspection of a boxplot. The outliers were kept in the analysis because the researcher did not believe the decision to include the outliers significantly impacted the results. The range of the composite scores varied by group. The students who received federal free or reduced-price lunch benefits had an ACT composite score range of nine to 31, while those who did not receive these subsidies had a score range of 13 to 30.

The data for this analysis were obtained from the MSIS and student transcripts. The ACT composite scores for each gender were normally distributed, as assessed by using a normal Q-Q plot, and there was homogeneity of variances, as assessed by Levene's test for equality of variances ( $p = .281$ ). The ACT composite scores were lower for students receiving federal free or reduced-price lunch benefits ( $M = 18.03, SD = 3.925$ ) than for students who did not receive federal free or reduced-price lunch benefits ( $M = 20.64, SD = 4.337$ ), and the means of were statistically significant different,  $M = -2.607, 95\% CI [-4.16, -1.05], t(109) = -3.325, p = .001$ . Thus, the null hypothesis is rejected. There is a significant and statistical difference between ACT composite scores and students who received federal free and reduced-price lunch benefits versus those who did not receive federal free and reduced-price lunch benefits.

Table 10

*Independent Samples Test of ACT Composite and Student SES Category*

Levene's Test for Equality of Variances									
								95% confidence interval of the difference	
	<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean diff.	SE diff.	Lower	Upper
Equal variances assumed	1.175	.281	-3.32	109	.001	-2.607	.784	-4.161	-1.05
ACT composite									
Equal variances not assumed			-3.31	105	.001	-2.607	.788	-4.169	-1.04

H<sub>06</sub> tested if any difference in group means exist between a student's race/gender and ACT composite scores. Table 11 provides descriptive statistics for student demographic variables of H<sub>06</sub>.

Table 11

*Descriptive Statistics for ACT Composite and Race/Ethnicity*

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	95% confidence interval for mean			
					Lower	Upper	Min.	Max
					Caucasian	61	21.18	4.048
African American	45	16.42	2.607	.389	15.64	17.21	9	22
Asian	5	21.80	5.975	2.672	14.38	29.22	15	30
Total	111	19.28	4.311	.409	18.47	20.09	9	31

H<sub>0</sub> assumed there is no significant difference between 2015 CMHS graduates' race/ethnicity and ACT composite scores. The total number of 111 graduating test takers was used in the analysis. The sample consisted of three race/ethnic groups: 61 Caucasians, 45 African Americans, and five Asian students, respectively. Table 12 provides the results of the ANOVA between 2015 CMHS graduates' race/ethnicity and ACT composite score. The ACT composite scores for each gender were normally distributed, as assessed by using a normal Q-Q plot, and there was a violation of homogeneity of variances, as assessed by Levene's test for equality of variances ( $p = .002$ ). Due to this violation, the Welch ANOVA was utilized. The ACT composite scores were statistically and significantly different between the three race/ethnic groups, Welch's  $F(2, 10.524) = 26.244, p < .0005$ . With this statistical significance, the results were further analyzed using the Games-Howell post-hoc test.

There was one outlier in the African American group. The outlier was kept in the analysis because the researcher did not believe the decision to include the outlier significantly impacted the results and the data were normally distributed for each group, as assessed by boxplot, respectively. Homogeneity of variances was violated, as assessed by Levene's test of homogeneity of variance ( $p = .002$ ). The ACT composite score was statistically and significantly different between the various race/ethnic groups, Welch's  $F(3, 14.574) = 14.821, p < .0005$ . The ACT composite scores differed among the three groups, from the African American group ( $M = 16.42, SD = 2.607$ ) to the Caucasian group ( $M = 21.18, SD = 4.048$ ) and to the Asian ( $M = 21.80, SD = 5.975$ ), in that order.

Games-Howell post-hoc analysis revealed the mean difference between the African American group and the Caucasian group (4.758, 95% CI [3.22, 6.30]) was statistically significant ( $p = .0005$ ). The Games-Howell post-hoc analysis revealed the mean difference between the African American group and the Asian group (-5.378, 95% CI [-14.82, 4.07]), which was not statistically significant with a ( $p = .225$ ). The Games-Howell post-hoc analysis revealed the mean difference between the Caucasian group and the Asian group (-.620, 95% CI [-10.01, 8.77]), which was not statistically significant with a ( $p = .972$ ). The group means were statistically and significantly different ( $p < .05$ ); therefore, the null hypothesis is rejected. Table 12 identifies the ANOVA results.

Table 12

*ANOVA ACT Composite and Race/Ethnicity*

	Sum of squares	<i>df</i>	Mean square	<i>F</i>	Sig.
Between groups	619.548	2	309.774	23.481*	.001
Within groups	1424.794	108	13.193		
Total	2044.342	110			

*Note.* \*  $p \leq .001$ .

### Summary of Results

Research results are based on data analyzed using three tests: (a) Pearson product-moment correlation to test H<sub>01</sub>, H<sub>02</sub>, and H<sub>03</sub>; (b) an independent *t* test to test H<sub>04</sub> and H<sub>05</sub>; and (c) an ANOVA used to test H<sub>06</sub>. All null hypotheses assumed no relationship or differences among groups between contextual variables found within the CMHS 2015 graduates and ACT composite scores. The Pearson coefficient measures the strength and direction of the linear association between two variables. A Pearson correlation indicates how well individual data points adhere to a regression line of best fit (Hinkle, Wiersma, & Jurs, 2003). An independent *t* test is used to determine if a difference exists between the means of two independent groups on a continuous dependent variable (Laerd Statistics, n.d.). An ANOVA determines whether there are any statistically significant differences between the means of two or more independent groups (Laerd Statistics, n.d.). The research used the statistical package SPSS 23 to calculate a Pearson *r*, independent *t* test, and ANOVA to test all independent variables within the null hypotheses for relationships and differences in 2015 CMHS graduates' ACT composite scores. The independent variables were grouped into two groups: student academic and school engagement variables, and student demographic variables.

The research rejected five of the six null hypotheses. Table 13 summarizes the results from H<sub>01</sub>, H<sub>02</sub>, and H<sub>03</sub>, as analyzed with the Pearson product-moment test. These tests analyzed independent variables analyzed the Pearson *r* with the independent variables within the student academic and school engagement variables, and 2015 CMHS ACT composite scores. In this category, there was a strong positive relationship found between students' high school GPA and ACT composite scores. The data suggest a moderate positive relationship between the number of core classes completed and ACT composite scores. A weak relationship or no relationship was found between the number of extracurricular activities in which students participated and ACT composite scores.

Table 13

*Summary Results of H<sub>01</sub>, H<sub>02</sub>, and H<sub>03</sub> Tested in the Research*

Category of variable	Independent variable	Pearson <i>r</i>	Sig. (2-tailed)	<i>N</i>
Student academic and school engagement variables	Corc classes completed	.553*	.001	111
	HS GPA	.774*	.001	111
	Extracurricular activities	.188**	.048	111

*Note.* \*  $p \leq .001$ , \*\*  $p \leq .05$



Table 14 summarizes the results from H<sub>04</sub> and H<sub>05</sub>. Gender and SES groups were measured against each other to detect a mean difference using an independent *t* test. These tests analyzed the variables found in the student demographic variables. The results indicated no statistically significant difference between mean male student and mean female student ACT composite scores. Additional tests suggested there is a statistical and significant difference between students who participate in the federal free and reduced-price lunch program and those who do not, as measured by ACT composite scores.

Table 14

*Descriptive Statistics for ACT Composite and Student Demographics*

Dependent variable	Independent				
	variable	<i>N</i>	<i>M</i>	<i>SD</i>	<i>SE</i> mean
ACT composite	Male	53	19.08	4.665	.641
ACT composite	Female	58	19.47	3.992	.524
ACT composite	Receives federal free or reduced- price lunch	58	18.03	3.95	.515
ACT composite	Does not receive federal free or reduced-price lunch	53	20.64	4.337	.596

Table 15 summarizes the results from H<sub>06</sub>, as found with the student demographic category. An ANOVA and Games-Howell post-hoc analysis were conducted to determine a

mean difference between groups. The results indicate a statistically significant difference exists between 2015 CMHS graduates' race/ethnicity and ACT composite scores.

Table 15

*ANOVA ACT Composite and Race/Ethnicity*

	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.
Between groups	619.548	2	309.774	23.481*	.001
Within groups	1424.794	108	13.193		
Total	2044.342	110			

*Note.* \*  $p \leq .001$ .

Table 16 provides a comparison of ACT composite scores with race/ethnicity individual variables.

Table 16

*Multiple Comparisons of ACT Composite Scores and Race/Ethnicity*

Post-hoc tests	(I) Race/ethnicity	(J) Race/ethnicity	Mean diff.		Sig.	95% confidence interval	
			(I - J)	SE		Lower	Upper
Tukey HSD	Caucasian	African	4.758	.714	.001*	3.06	6.45
		American					
	African American	Asian	-.620	1.690	.929	-4.63	3.40
		Caucasian	-4.758	.714	.001*	-6.45	-3.06
	Asian	Asian	-5.378	1.712	.006**	-9.45	-1.31
		Caucasian	.620	1.690	.929	-3.40	4.63
		African American	5.378	1.712	.006**	1.31	9.45
		American					
Games-Howell	Caucasian	African	4.758	.648	.001*	3.22	6.30
		American					
	African American	Asian	-.620	2.722	.972	-10.01	8.77
		Caucasian	-4.758	.648	.001*	-6.30	-3.22
	Asian	Asian	-5.378	2.700	.225	-14.82	4.07
		Caucasian	.620	2.722	.972	-8.77	10.01
		African American	5.378	2.700	.225	-4.07	14.82
		American					

*Note.* \*  $p \leq .001$ , \*\*  $p \leq .05$ .

Table 17 summarizes the results the correlation strength of the independent variables and ACT composite scores analyzed in H<sub>01</sub>, H<sub>02</sub>, and H<sub>03</sub>.

Table 17

*Summary of Results of the Three Independent Variables in Order of Strength*

Correlation strength	Independent variable	Pearson $r$	Sig. (2-tailed)	$N$
Strong	HS GPA	.774*	.001	111
Moderate	Core classes completed	.553*	.001	111
Weak or none	Extracurricular activities	.188**	.050	111

*Note.* \*  $p \leq .001$ , \*\*  $p \leq .05$ .

Table 18 provides the independent samples test results for H<sub>04</sub>, measuring the difference in group means between ACT composite scores and gender.

Table 18

*Independent Samples Test of ACT Composite and Gender*

Levene's Test for Equality of Variances									
								95% confidence interval of the difference	
					Sig. (2-tailed)	Mean diff	SE diff	Lower	Upper
Equal variances assumed	1.152	.286	-474	109	.636	-.390	.822	-2.019	1.239
ACT composite									
Equal variances not assumed			-471	102.86	.639	-.390	.828	-2.032	1.252

Table 19 provides the independent samples test results for H<sub>04</sub>, measuring the difference in group means between ACT composite scores and SES.

Table 19

*Independent Samples Test of ACT Composite and Student SES Category*

Levene's Test for Equality of Variances									
95% confidence interval of the difference									
					Sig. (2-tailed)	Mean diff	SE diff	Lower	Upper
Equal variances assumed	1.175	.281	-3.32	109	.001	-2.607	.784	-4.161	-1.05
ACT comp									
Equal variances not assumed			-3.31	105	.001	-2.607	.788	-4.169	-1.04

Table 20 provides the results of the test of between-subjects effects comparing ACT composite scores with race/ethnicity.

Table 20

*Tests of Between-Subjects Effects ACT Composite and Race/Ethnicity*

Source	Type III sum				Sig.	Partial eta squared
	of squares	<i>df</i>	Mean square	<i>F</i>		
Corrected model	619.548 <sup>a</sup>	2	309.774	23.481	.001	.303
Intercept	14788.061	1	14788.061	1120.941	.001	.912
Race/ethnicity	619.548	2	309.774	23.481	.001	.303
Error	1424.794	108	13.193			
Total	43302	111				
Corrected total	2044.342	110				

*Note.* <sup>a</sup>  $R^2 = .303$  (adjusted  $R^2 = .290$ ).

This study produced evidence to suggest statistically significant relationships or differences do, in fact, exist between variables and ACT composite scores of 2015 CMHS graduates. The relationships between demographic variables such as students' race and ethnicity and free or reduced-price lunch status with student ACT composite scores are statistically significant. Caucasian students and Asian students performed better and scored higher on the ACT than did African American students. Students who received federal free or reduced-price lunch benefits scored lower than did students who did not receive benefits. The results did not indicate any statistically significant differences between student gender and ACT composite scores.

In addition, the findings support student academic and school engagement variables such as high school GPA produced a strong relationship, while the number of core classes completed presented a moderate relationship between 2015 CMHS graduates and ACT composite scores.

Therefore, students who completed more core classes scored higher, as did students with higher GPAs during their high school career. However, the number of school activities in which students participated demonstrated a weak relationship with ACT composite scores. Therefore, CMHS ACT composite scores have a potential relationship with changing student demographics and student academic choices and performance. Chapter 5 provides an interpretation of the meaning of the results, a discussion for school leaders to create opportunities and policy, and recommendations for future research.



## CHAPTER 5: DISCUSSION

### **Introduction**

The rise of accountability in public education has increased steadily over the last two decades. With the passage of the No Child Left Behind Law (2002) under President G. W. Bush, emphasis has been to find ways to measure academic achievement in U.S. public schools. A plethora of mandated testing systems has been implemented and assembled in attempts to define the success of public education in the individual states, districts, and schools. To compare state achievement more easily, the Common Core State Standards were created and various testing consortiums were charged with creating new ways to assess students to match the level of rigor found in the standards. The process continued with President Obama's Every Student Succeeds Act of 2015, which aimed to decentralize the federal grip on accountability measures and provide state education agencies more flexibility designing accountability models.

The changes come during a time when political fervor is calling for more privatization of the public education system through the creation of charter schools and the use of school vouchers to allow students in poorly performing schools to have education options away from the local schoolhouse. Many states have created accountability mechanisms to identify schools that are performing successfully and those that are failing, based on nationally required testing. In Mississippi, the MDE identifies public schools using an A–F rating system. The current rating system is based on earning various numbers of points for student proficiency and growth.

In addition, at the high school level, CCR is used in calculating the accountability level of a high school (MDE, 2016).

If schools are labeled as successful or not with the ACT used as a measuring metric, does this metric accurately reflect the success of a school, or are other contextual variables outside the control of the school having an impact on ACT results and the MSAS? Therefore, the concern is that variables outside the control of school, such as a student's SES, race, or gender, may have a relationship with a student's future ACT composite score. Depending on the demographics of the students who comprise the school, ACT composite scores may be significantly influenced by the composition of those who attend. If these variables prove to have a relationship with ACT composite scores, school districts might be at a disadvantage on a number of points earned under the CCR metric found within the new MSAS.

The current model rewards schools a maximum of 50 points on a 1000-point model for having every graduating student meet predetermined scores in the areas of math-22, reading-22, or English-18 on sections of the ACT at the time of the student's senior snapshot (MDE, 2016). The senior snapshot is collected electronically by the MDE in the spring of the student's senior year through the MSIS program of the local district. These data potentially indicate validity issues might exist within the model if any of these uncontrolled student demographics negatively relate to ACT composite scores. A lower CCR indicator of a high school on the MSAS due to these demographics might negatively reflect the work and progress of the school. This reflection might, in turn, raise questions about the quality of education a school is offering its students.

Student academic and activity choices made within the school have a significant relationship with ACT outcomes. The current study produced evidence of significant statistical group differences between ACT composite scores of students with various demographic

variables such as student race and SES. In addition, this study produced evidence of significant statistical relationships between students with diverse academic and school engagement variables, and ACT composite scores. If school officials are aware of these relationships and differences, perhaps policies might be shaped to encourage increased ACT performance for future high school students. Armed with a greater awareness of these potential relationships, school officials and academic leaders might provide students and parents with improved and informed decisions regarding academic tracks and student success based on ACT scores. In turn, by improving ACT scores, students and schools might be rewarded. For students, ACT scores are used for college admissions, scholarships, and athletic eligibility. For schools, ACT scores are viewed as a metric of student success and academic achievement and are made public. Therefore, it is essential for the schools, students, and parents to be informed about what high school academic and activity choices—variables that may be controlled by the student, parent, or academic school leaders—might be related to ACT performance.

The current study focused on analyzing contextual variables beyond the control of a school that might have a relationship with ACT performance. In addition, the research examined the relationship between potential variables and ACT performance influenced by student academic and extracurricular activities. This research did not seek to repudiate the results of the ACT as an assessment to accurately reflect a student's academic achievement or predictive abilities of success in postsecondary institutions. Rather, this research aimed to question the use of the ACT as an accurate performance metric to hold school officials accountable for the results, as indicated in the CCR section of the MSAS used to identify A-F schools in Mississippi. Accountability in U.S. public education is the norm and is aimed to ensure schools and educators are providing students a quality education. The research examined if the current use of CCR

benchmark scores is a valid indicator of school performance under MSAS and not a measure CMHS and potentially other Mississippi public schools have limited ability to control. With the current model, CMHS might lose points on the CCR component on the MSAS and hurt the overall accreditation level of the school.

The current results might produce an adverse public perception of the school and negatively influence the ability of the school to attract and retain quality educators and simultaneously risk the loss of some students who have means to attend other schools. Quality educators are primarily responsible for producing improved academic achievement in CMHS students. The ability to recruit and retain quality educators is directly tied to the available core courses at a school and how well students learn the materials. A decline in either may produce a lasting adverse effect on future CMHS ACT composite scores. Depending on the other variables, a low score might contribute to a lower MDE ranking, which might force the school to follow additional mandates and regulations. Regulations often lead to higher administrative costs and school-level bureaucracy. With the current school choice climate gaining political attention, schools with lower MDE ratings might face unpredictable student transfers, which would dramatically slash funds to operate and strategically plan.

The research analyzed the relationship between 2015 CMHS ACT composite scores and six independent variables. The six variables were divided into two categories. Category 1 was student demographic information while Category 2 was academic and school engaged variables.

The current study assessed 2015 CMHS graduates ACT composite scores from the MSIS and school contextual data. The sample was drawn from 111 of the 123 students who completed CMHS, located in central Mississippi, during the 2014–2015 school year. Eleven students did

not take the ACT prior to graduating from CMHS, including one student who did not graduate with a traditional Mississippi high school diploma.

The current research used correlation analysis and group mean tests to determine the strength of these variables and the relationship with ACT composite scores. A Pearson product-moment was used for H<sub>01</sub>, H<sub>02</sub>, and H<sub>03</sub>. An individual *t* test was used to determine differences between group means in H<sub>04</sub> and H<sub>05</sub>. The study utilized an ANOVA for H<sub>06</sub> to analyze the difference in group means.

As with other correlation research designs, this study made no assumption of causation (Creswell, 2009). Therefore, the following results should be interpreted with the plausibility of relationships based on the results of the statistical tests using school demographic variables, student academic and school engagement variables, and the researcher's professional understanding of the current educational landscape.

### **Summary of Results**

The current study identified statistically significant relationships and differences between 2015 CMHS ACT composite scores and contextual variables. With five of the six null hypotheses being rejected, the study provides strong evidence school contextual variables do have a statistically significant relationship with student ACT composite scores. The factors suggest there is a relationship between both demographic and academic and school engagement variables of CMHS ACT composite scores. Significant relationships raise concerns over how the current MSAS measures the effectiveness of schools and educators to be held accountable for ACT results. The results provide evidence school leaders must take a proactive approach to addressing these findings by allocating resources and focus on addressing obstacles to improve future ACT composite scores.

The results indicate evidence for an affirmative for three of the four variables involving student demographics and noticeable differences in group means for two of the three variables related to student academic and school engagement variables. Levels of strength of the significant correlations for H<sub>01</sub>, H<sub>02</sub>, and H<sub>03</sub> ranged from a Pearson's  $r = .188$ , Sig. (2-tailed) at  $.048$  for extracurricular activity participation and ACT composite scores and a Pearson's  $r = .774$ , Sig. (2-tailed) at  $p < .0005$  for high school GPA and ACT composite scores. In performing an individual  $t$  test for H<sub>04</sub>, the results indicated no significant difference existed based on gender. The ACT composite scores were lower for male students ( $M = 19.08$ ,  $SD = 4.65$ ) than for female students ( $M = 19.47$ ,  $SD = 3.992$ ), but were not statistically significant different,  $M = 0.39$ , 95% CI [-2.019, 1.24],  $t(109) = -.474$ ,  $p = .636$ . There was insufficient evidence to reject the null hypothesis.

In total, two of the six hypotheses were rejected, resulting in statistically significant evidence of a relationship between four variables and 2015 CMHS graduates' ACT composite scores. The strongest relationship was found between high school GPA and ACT composite scores; the Pearson's  $r = .774$  supports the strong relationship between these two variables. A strong relationship was found between high school GPA and ACT composite scores. A moderate relationship was found between core class completion and ACT composite scores. A weak or no relationship was found between extracurricular activity participation and ACT composite scores. There was no statistically significant difference between the group means based on gender and ACT composite scores. There was a significant statistical difference between group means based on SES and ACT composite scores. There was a statistically significant difference group means based on race/ethnicity and ACT composite scores.

## Context Analysis

The student academic and school engagement variables of the student body of CMHS have a relationship with ACT performance. Additionally, this study suggests student demographic variables have a statistically significant relationship with ACT composite scores. Although these variables may not be exactly duplicated by any other high school in Mississippi, the characteristics may be used to draw a comparison. Nevertheless, the results might help the school leadership of CMHS develop methods, designate resources, and promote course tracks to attempt to increase future ACT performance proactively.

As indicated by the statistical analysis, student academic decisions, as in the number of core classes completed, as well as how they academically perform in these classes, might have a relationship with ACT performance. These findings add to the previous research by Jones (2008), which examined ACT results from a small Midwestern high school and indicated core class completion for students was statistically significant as related to ACT composite scores. In the same study, Jones's research suggested high school GPA was statistically significant as related to overall student ACT performance as well. As the current study produced, the SES, along with student race/ethnicity suggests a statistically significant relationship between these variables and ACT performance.

A study performed by Noble and McNabb (1989) suggested increased ACT-recommended core course completion resulted in higher ACT scores, regardless of the end course grade. Research by Roth et al. (2000) suggested students who did poorly in advanced high school math classes performed much better on math placement tests when entering postsecondary institutions than those students who did not complete advanced courses. These

studies suggest the findings of this study are valid; the number of core courses completed do, in fact, have a statistically significant relationship with overall ACT composite performance.

This study identified extracurricular activities to be one of the weakest correlates at CMHS with ACT composite performance. Although previous research is lacking in this area, other studies have indicated a strong positive relationship with positive academic achievement and participation in school-sponsored extracurricular activities. Fredricks (2012), using data from the Educational Longitudinal Study of 2002, investigated this theme, and except for a few students who overextended their participation times, as the study produced a non-linear function, a positive association with academic achievement was significant. The academic requirements of some institutions might require more commitment than others and might produce relevant non-linear results from site to site.

The current study found the strongest relationship between student high school GPA and ACT composite scores. As the statistical analysis of this study produced, a Pearson's  $r = .774$ , Sig. (2-tailed) with  $p < .0005$  for high school GPA and ACT composite scores. Numerous studies have linked high school GPA with ACT performance (D. Anderson, 2010). Research from Godfrey (2011) suggested grade inflation is problematic and harms the predictive nature of high school GPAs use as a valid predictor of college success. Nevertheless, some studies indicated students with low high school GPAs might have performed well on the ACT and then performed poorly in college, as compared to students who performed better in college with higher high school GPAs and lower ACT scores (Hiss & Franks, 2014). The results of the current study produced evidence higher high school GPAs at CMHS did have a statistically significant relationship with higher ACT composite scores.



This study found no statistically significant difference in gender group means in regard to ACT composite scores. These findings coincide with the research from Jones (2008), who found no statistical significance between student gender and ACT composite performance. Other resources such as the *ACT Technical Manual* (ACT, 2014b) presented research performed by Schiel et al. (1996) that indicated male students averaged higher mean ACT mathematics, science, and composite scores than did female students. Median average score differences ranged from 0.60 to 1.51 scale score points for composite science scores. Male students' ACT reading scores were higher than those of female students. Female students did perform better and achieved a higher average ACT English score than did male students, with an average score difference of 0.53, respectively. However, Schiel et al. did speculate, if other variables were accounted for, the difference would be less significant. These findings differed slightly from the current study, which produced a .390 mean difference between male and female students. However, the results were not statistically significant.

This study analyzed data that identified a statistically significant difference among students of different SESs and ACT composite performance. The results of this study suggest a mean difference of 2.6 points between students who participated in the federal free and reduced-price lunch program versus students who did not participate in the program. This significant difference mirrors prior findings linking SESs with student academic performance. A meta-analytic review by Sirin (2005) followed White's (1982) contribution. Sirin examined studies published between 1990 and 2000. The findings differed from White's earlier review, which drew on literature from 1918 and 1975. Sirin's review demonstrated a correlation of .299, less than the relationship from White's findings of .343 average. A correlation of .299 reveals a

medium relationship between SES and academic achievement. Income was indicated as the strongest correlate in both meta-analyses (Sirin, 2005; White, 1982).

As E. Anderson's (2015) research revealed, validity concerns with the current MSAS are based on the statistically significant relationships between outcome measures, such as in this study, the ACT, and student demographic variables outside the control of the school. The current MSAS instrument should demonstrate little to no relationship between these independent demographic variables and the outcome, or dependent variable, and that of student achievement on criterion assessments. E. Anderson's research provided the basis for the various concerns regarding construct validity and the MSAS process. These concerns reflect the complex social issues and high levels of poverty in Mississippi.

This study analyzed data that identified a statistically significant difference among students of different races and ACT composite performance. These findings coincide with previous research performed by D. Anderson (2010), which concluded Caucasian students have higher ACT scores across all areas, as compared to African Americans, Hispanics, and Asian Americans, except for Asian students scoring higher on mathematics than Caucasian students. However, ACT (2007) studies suggested the variability of scores between races was no more than 2%, after accounting for other student academic characteristics such as high school GPA, coursework, and academic preparation. Research from Ma and Xu (2004) concluded student characteristics—not race—were the most direct determinants of student achievement gaps.

A major study performed by Berliner (2009) examined the results of poverty and other out-of-school factors and the effects on student academic success. The study conveyed that in schools in the United States, which are highly segregated by income, race, and ethnicity, problems related to poverty occur simultaneously, with greater frequency, and act cumulatively

in schools serving disadvantaged communities. Berliner asserted schools serving high-poverty students face significantly greater challenges than schools serving more affluent students, and their limited resources are often rapidly depleted. The author noted efforts to improve educational outcomes in these schools, attempting to drive change through test-based accountability, are thus unlikely to succeed unless accompanied by policies to address the out-of-school factors negatively affecting large numbers of public school students. The study maintained poverty limits student potential; inputs to schools affect outputs from them.

Research from Bolon (2001) reinforced the notion of community income as a strongly correlated variable with high school mathematics test scores and associated more than 80% of the variance in school-averaged 1999 scores for a sample of Boston-area communities. The influence of community income was robust against several sets of model variables and cases. The study suggested incomes surpassed the influence of the other social and school factors examined. Once community income was included in models, all other variables failed to associate substantial additional variance. Significant uncertainties in residuals of school-averaged scores, after subtracting predictions based on community income, made the scores ineffective for rating performance of schools and inefficient for measuring performance trends. Instead, Bolon concluded the tests appeared to provide a complicated and expensive method to estimate community income.

A study performed by Carnoy (2015), writing for the National Education Policy Center on accountability, echoed the findings of previous studies citing students' family and community characteristics significantly influence their school performance. Children whose parents read to them at home, whose health is good and can attend school regularly, who do not live in fear of crime, on average perform at higher academic levels than children who lead very different lives.

In addition, students who maintain stable housing, consistent school attendance, are exposed to the arts, and who are surrounded by adults who model high regard for educational achievement will typically achieve greater educational outcomes.

As the current research suggests, the student academic and school engagement variables of CMHS students have a statistically significant relationship with ACT performance.

Furthermore, the evidence between core class completion and student high school GPA produced statistically significant relationships with ACT composite scores. Additionally, this study suggests student demographic variables, most notably student race and SES factors, produce statistically significant differences in 2015 CMHS graduates and ACT composite scores. These findings concur with most other studies and present substantial evidence of validity concerns regarding the current MSAS instrument for measuring school success. Although demographic variables might be considered out of the control of CMHS and other Mississippi high schools, student educational choices and guidance might be more focused on and controlled by school leaders to foster an academic environment that might be more conducive to improving variables related to ACT performance.

### **Interpretation**

This interpretation focuses on two main areas of concern: student academics and demographics having a relationship with ACT composite scores. While conducting a Pearson product-moment statistical analysis, the strongest relationship existed with high school GPA and ACT composite scores with a  $p = .774$ ,  $\alpha = .05$ , indicating 59.9% of differences in ACT composite scores are related to high school GPA as an independent variable. In conducting independent  $t$  test and ANOVA testing between independent variables, the difference in group means was statistically significant between students who were identified as African American

versus Caucasian and Asian. The ACT composite scores differed among the three groups, from the African American group ( $M = 16.42$ ,  $SD = 2.607$ ) to the Caucasian group ( $M = 21.18$ ,  $SD = 4.048$ ) and to the Asian ( $M = 21.80$ ,  $SD = 5.975$ ), in that order. A statistically significant difference was also identified between students who were receiving federal free or reduced-price lunch benefits versus students who were not. The ACT composite scores were lower for students receiving federal free or reduced-price lunch benefits ( $M = 18.03$ ,  $SD = 3.925$ ) than students who did not receive federal free or reduced-price lunch benefits ( $M = 20.64$ ,  $SD = 4.337$ ).

Interpretation of what of this study indicates in regard to local practice and policy implementation requires acknowledgment of demographic and student academic and school engagement variables along with an in-depth strategic planning process.

In conclusion, the results remain far from complete or definitive due to the limits of explanatory research models and small sample size. The study presents data supporting the notion internal and external factors at CMHS indicate a relationship with ACT composite scores, as indicated by four of the six null hypotheses being accepted.

### **Recommendations**

The following recommendations are based on increasing school capacity in understanding the current MSAS model as it relates to measuring the academic success of CMHS ACT performance and increasing schoolwide focus and resources to improve CMHS ACT composite scores.

There are limitations to the validity of any accountability system based solely on assessment. Models in use as of the 2015 MSAS have attempted to label schools as effective based on these results. The current model rewards schools a maximum of 50 points on a 1,000-point model for having every graduating student meet predetermined scores in the areas of math-

22, reading-22, or English-18 on sections of the ACT at the time of the student's senior snapshot. The senior snapshot is collected electronically by the MDE in the spring of the student's senior year through the MSIS program of the local district. This metric potentially indicates validity issues might exist within the model if any of these uncontrolled student demographics negatively relate to ACT composite scores. A lower CCR indicator of a high school on the MSAS due to these demographics might negatively reflect the work and progress of the school. This reflection might, in turn, raise questions about the quality of education a school is providing its students. This research does not make the argument students and teachers should not be held accountable for performance, but the current MSAS model inclusion of the ACT component may not be an ideal metric to accomplish this goal.

The current study produced evidence suggesting statistically significant negative differences between student demographic variables, such as race and SES, and ACT composite scores. In addition, the study indicated the positive statistical relationships between student academic and school engagement variables, such as high school GPA and core course completion, and ACT composite scores. In acknowledging the results, this study suggests the primary aim of CMHS school leaders is to improve ACT performance by focusing on high school GPA and the academic measures that comprise it. This emphasis, along with increasing the number of core courses completed before administering the ACT, might prove beneficial for future scores results.

As indicated from the analysis, 2015 CMHS graduates who are African American scored lower on the ACT than their Caucasian or Asian classmates. Additionally, students who were receiving federal free or reduced-price lunch benefits scored statistically and significantly lower than students who did not receive these benefits. As indicated in previous research, a higher

proportion of African American students receive federal free and reduced-price lunch benefits than do students of other ethnic groups. The results suggest African American students at CMHS may experience more difficulty in scoring at benchmark levels without additional proactive approaches from policy makers and school officials. As previous studies indicate, African American male students are even more likely to suffer academic struggles than their classmates of different ethnic groups. Researchers have suggested the absence of father figures in the African American family as a potential cause of this phenomenon. African American boys and young men are often subject to more discipline issues and potentially more severe consequences.

Suspensions are more prevalent among African American students versus students of other races by an overwhelming margin (Smith & Harper, 2015). These consequences often lead to time away from school and cause a loss of academic class time. In fact, research from Toldson (2012) found the average high school GPA for African American students is 2.7, compared to 3.1 for Caucasian students. Schools should examine their policies regarding student discipline and for certain nonviolent behavior that might not require removal from the educational setting (Farmer, 2016). The incorporation and use of adult mentors might build relationships between African American students without father figures and create an additional level of accountability. A student from these circumstances might benefit from some form of academic relationship with an adult figure in the school setting who helps monitor and guide academic progress (Marzano & Pickering, 2005). This action might, in turn, help African American students and students living in poverty to decrease their time out of school, become more engaged in the educational process, and increase academic success. Book studies such as Payne's (1996) *A Framework for Understanding Poverty* might allow faculty and staff a better

understanding of how to culturally reach students living in poverty and nontraditional households.

High schools should collaborate with pre-K, elementary, and middle school personnel in helping create more motivated readers with stronger vocabularies by combining insight into the vertical alignment of needed reading skills and creating a library program catered to student interest to promote literacy. Schools with joint-effort reading fairs and recognition programs might foster an appreciation for continued improved literacy. Additionally, district budgeting needs to align with the end in mind; by focusing on early literacy promotion, students might gain a valuable academic foundation. To combat gaps in high school GPAs, investments must be made at the earliest academic levels, starting at preschool and even earlier (D. Anderson, 2010).

CMHS needs to work with district officials and introduce the ACT Aspire program (ACT, 2014a) early in the primary grades. Exposing students early to the ACT Aspire summative assessments, as early as third grade, students and parents will be exposed to the rigor and expectations of future ACT assessments and a predicted score path. The ACT Aspire maps student progress from Grade 3 through high school on a vertical scale, anchored to the scoring system of the ACT (ACT, 2014a). In addition to these summative assessments, periodical benchmarking with other assessment tools might help educators to monitor student academic growth. This approach provides the basis for monitoring the progress of each student within a given expectation range. From these indicators and feedback mechanisms, teachers can effectively evaluate instruction and areas needing improvement. Therefore, on an annual basis and multiple times per year, students, educators, and parents might become more aware of academic progress and academic areas needing to be addressed (ACT, 2014a).



The school needs to invest in before- and afterschool tutorial sessions catered to academics in addition to ACT performance. Within this group, a team of teachers can become ACT specialists for the school, with continuous capacity building and ongoing professional development. Weekend study sessions might also provide students with busy afterschool schedules additional flexibility in gaining expertise in test-taking strategies.

School-wide pep rallies might bring more attention and focus on the importance of the ACT tests. By incorporating as many facets of the school as possible, schools can foster a culture of high expectations, ACT importance, and ACT awareness. This promotion is an opportunity for schools to partner with local businesses and stakeholders in helping fund and promote these types of culture-building events.

Each year, seniors are met with end-of-year celebratory events and recognition. By incorporating ACT achievement of students publicly, and the amount of scholarship monies earned, a culture may be created. Importance can be placed on the ACT by peers, mentors, and family members alike. Creation of “30-point clubs” offer ways for schools to create lasting marks of student achievement with visual plaques and public press releases.

Summer camps are another option to bring insight and focus on ACT importance. Schools could sponsor week-long summer camps for students looking to be exposed to test-taking strategies or prepare for a summer ACT administration.

The MDE mandates each student have an individual career and academic plan (ICAP) plan upon completion of the eighth grade. The ICAP serves as an education plan detailing the courses necessary for a high school student to successfully prepare for graduation and transition into a profession or postsecondary educational experience. Each student in Mississippi schools must have a personalized ICAP to meet each learner’s educational and career goals. These plans

serve as another level of accountability between student, parents, and school personnel.

However, many schools meet the creation mandate, but fail to oversee or monitor these plans in action during the high school years. These plans help students create plans of study based on an interest inventory identifying potential careers and postsecondary programs. Therefore, an ICAP specialist who oversees these plans on a continual basis might produce a more individualized approach to school interest and ACT performance (MDE, n.d.).

Some high schools fund an additional ACT test during the student's senior year. This additional test is of merit because students are not required to complete the test again after the state-mandated test during the junior year. Therefore, students may improve their test results by taking the test again, with familiarity or academic gains from exposure to additional classes. This approach may allow students the opportunity to complete more core courses taken after the spring of their junior campaign, and being better prepared for the test. In the Madison County school district, a prominent Mississippi school district, Superintendent Dr. McGehee, shared these thoughts:

We have an enrollment consisting of 33% federal free and reduced lunch participants and 38% minority students. Our data showed us most of those students were only taking the ACT one time, as the state required. As a district, we felt providing our students accessibility to another testing opportunity would be beneficial and help improve our district's ACT scores. (McGehee, personal communication, January 1, 2017)

Requiring challenging courses proves to increase ACT performance during the senior year. Some new math courses have recently developed, such as Southern Regional Education Board (SREB) literacy ready and math ready courses designed to introduce and review rigorous content, allowing students to be more successful at entry-level college literacy and math courses.

The courses were a joint effort with the Bill and Melinda Gates Foundation to ensure needed skills were taught at the high school level prior to college for all leveled students. In recent studies published by SREB, students who completed the literacy ready and math ready courses substantially increase their readiness, with typical increases of 3 points in English, 4 points in science, and more than 2 points increase on the ACT composite score. Students who completed the math readiness course made gains of 2.14 points in math sub-scores, 3.41 points in science, and 2.09 points on the ACT composite score (Squires, 2016).

The MDE has provided schools with options on offering ACT prep classes. Schools have discretion on how to administer these classes and which students are eligible. By incorporating these classes into the normal schedule, beginning as early as 10th grade, the school provides a focus on the importance of ACT success. Policies related to student eligibility regarding these classes need careful consideration and ongoing review. The aim needs to be a focus on as many students as possible with as much fidelity and purpose as possible.

Schools need to invite local college representatives and nonprofit organizations, such as Get2College, to have valuable conversations about the necessity of ACT scores for scholarship opportunities, athletic eligibility, and program admission requirements for upper level high school students. These student informational sessions might provide students with additional references and contacts for attending the college and program of choice. Get2College has piloted a new program in Mississippi. The program was created in a unique partnership to enhance the college-going rate of students through intensive, onsite support of the current efforts of the school to help students graduate and continue their education. Get2College counselors assist school counselors, teachers, and administrators in giving students the time, tools, and professional advice to improve their high school academic experience and enroll in college. The

comprehensive program begins with students as they enter the ninth grade and follows them through high school and college.

Student ACT performance may increase with higher district graduation requirements consisting of more earned credits and core courses. Currently, most Mississippi school districts operate with a 24-credit diploma and have a local 21-credit option for graduation. The CMHS district might consider altering the current diploma requirements or the current academic schedule to offer more courses available to a student to complete prior to graduation. Currently, CMHS operates under a traditional seven-period day. By moving to a modified block or 4x4 block schedule, students would be eligible to earn additional credits and complete more during their CMHS careers prior to graduation. As this study indicated, there was a statistically significant relationship between the number of core classes completed by students and ACT composite scores. The 2016 Mississippi high school accountability results requested by the researcher from MDE revealed a considerable number of A- and B-rated high schools were operating on a block system (MDE, personal communication, December 7, 2016). A letter grade of A or B might be related to increased ACT performance.

The availability of more core courses for students to complete might help improve student ACT performance. Addressing the flexibility of scheduling and delivery methods might allow students exposure to some classes otherwise not available. Schools might consider creating online platforms for some classes to be administered and completed, thereby allowing students to take part in classes otherwise not available due to scheduling conflicts. Third-party vendors such as Odysseyware are now becoming more popular and available. These online agents provide students who are academically behind credit recovery benefits to “catch up” with peers in a shorter amount of completion time. Schools may grant students identified as at risk

the option to gain Carnegie units or complete graduation requirements online. Offering multiple opportunities beyond the traditional classroom for struggling or alternative students and tailoring their learning experience to their unique needs creates a positive learning choice. This flexibility not only empowers credit recovery students, but also equips them to better to succeed moving forward (Kreick, 2016).

Teaching and learning represent two of the most important dimensions of school climate. School leaders should strive to define the sets of norms, goals, and values that shape the learning environment. Research supports the notion positive school climate promotes students' ability to learn. Therefore, the implementation of a school climate survey might help school officials shape policies and address concerns identified from such surveys and foster better academic achievement. From these results, character education programs might be implemented to help students learn to engage and handle various social situations that might lead to school discipline and removal from the educational setting. These programs might be even more beneficial to students from low-SES households.

Research suggests evidence-based character education programs lead to higher achievement scores in elementary school students (Benninga, Berkowitz, Kuehn, & Smith, 2003). Also, evidence-based social and emotional learning programs have resulted in impressive gains in achievement test scores and in increasing the academic emphasis of elementary and middle school students. A recent meta-analysis of more than 700 positive youth development, social-emotional learning (SEL), and character education studies revealed evidence-based SEL programs had many significant benefits, including improving students' achievement test scores by 11 to 17 percentile points (Payton et al., 2008). Furthermore, school climate influences how educators feel about being in school and how they teach (Cohen & Geier, 2010). Therefore, a

byproduct of teachers feeling good is better instructional practice, which might lead to overall better academic achievement throughout the grade levels.

Schools need to consider the creation of ACT clubs. Student-led clubs can foster relationships among peers, creating an extra level of peer-induced accountability. Clubs might provide an organic growth of ACT culture within a school setting.

Each year, graduating students enjoy end-of-year recognition and ceremonies to mark their academic accomplishments. These events need to highlight ACT performance and scholarships students earn during their high school career. Monetary awards earned via ACT testing need to be made public and sent to various media outlets both online and in print.

College recruitment fairs and information sessions need to be held on the high school campus. This access to college representatives allows students and parents to gain general knowledge about college program choices and scholarship opportunities available based on ACT scores.

The school needs to create a culture celebrating ACT success. Student rewards and benefits assist in creating excitement about the ACT within a school about meeting or exceeding CCR benchmark levels. Incentives for scores could include (a) exam exemption, (b) late arrival privileges, (c) early dismissal privileges, (d) designated parking, (e) athletic event passes, (f) more college trip days, (g) celebratory banquets, (h) names on a displayed plaques and banners, and (i) an additional district funded ACT test.

### **Limitations**

A correlational research design presents limitations. This design offers no causality. This research was conducted in a single rural high school in central Mississippi, and the results are not generalizable to other schools with culturally and economically different student

enrollment. Nonetheless, the research might suggest other schools with similar populations might produce similar results and challenges.

### **Opportunities for Further Research**

The data set in the study needs further analysis. A regression analysis might provide additional detail of the collinear relationships among the variables. The additional variable analysis might provide more valuable information; focus might include the following:

- specific classes completed and value-added effect,
- grades earned in classes completed,
- performance on ACT sub-areas,
- discipline infractions and ACT outcomes,
- student engagement,
- number of ACT testing attempts,
- teacher experience,
- staff racial composition,
- expand the study of activities to beyond school sponsored,
- student ACT review session participation,
- family structure,
- student absenteeism,
- teacher absenteeism,
- teacher/leadership turnover,
- special education identification under IDEA,
- 504 rulings,
- preschool attended (private or public),

- compare digital administering to conventional paper/pencil results, and
- Internet access away from school.

The results of this study present the need to examine CMHS demographic trends.

Further, there is a need to examine school discipline policies, current course graduation requirements, and budget allocations to prioritize future ACT performance.

A study of enrollment trend data might help school leaders better plan and allocate funding for greater academic focus in areas related to ACT performance. A study analyzing Mississippi school ratings and ACT performance might produce much more needed insight on the relationship between independent variables. An examination of the ACT scores from districts that have made the digital transition in content delivery and classroom instruction might be informative. Such digital initiatives are known as 1:M (one-to-many) or 1:1 (one-to-one) and provide laptops or other electronic devices for home use or classroom access. A mixed method study incorporating a qualitative analysis of social perceptions and school climate might provide valuable insight surrounding the relationship of psychological variables on ACT performance.

### **Conclusion**

This research provides evidence contextual variables outside the control of CMHS have a relationship with ACT results. These results are related to the academic decisions of CMHS students and school policies. Based on results, recommendations were made to create school policies fostering early exposure to higher academic achievement, new ACT practice, build educator capacity, and culturally promote improved ACT performance.



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VITA

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	<p>President’s Scholar</p> <hr/> <p>Holmes Community College, Goodman, MS</p> <p>August 1998–May 2000</p> <p>Associate of Arts in Elementary Education</p> <p>Phi Theta Kappa Honor Society</p> <p>Member of HCC Baseball Team</p>
<p>Administrator experience</p>	<p>Principal Supervisor, Walden University, 2016–Current</p> <p>Deputy Superintendent, Scott County School District, 2016–Current</p> <p>Principal, Kosciusko High School, Kosciusko City Schools, Kosciusko, MS, July 2014–July 2016</p> <p>Mississippi School Board Association Prospective Superintendent Leadership Academy Graduate, 2016</p> <p>Helped the Kosciusko Foundation for Excellence in Education obtain a \$15k AT&amp;T Grant (Providing Resources, Education, and Preparation for Those at Risk Through Excellence)</p> <p>Millsaps’ Principal Institute Graduate/Current District Recruiter</p> <p>Founding member of The University of Mississippi Educational Leadership Advisory Council</p> <p>Mentoring administrator for the University of Mississippi Principal Corps Program</p> <p>Contributed to and featured in “The Power of Experience: Principals Talk About School Improvement,” By Dr. Linda K. Wagner, 2012</p>

	<p>Principal, Kosciusko Middle Elementary, Kosciusko City Schools, Kosciusko, MS, July 2010–July 2014</p> <ul style="list-style-type: none"><li>• National Blue Ribbon School, 2010</li><li>• Exceeded the Mississippi Department of Education Quality of Distribution Index score of 200 for 4 years</li><li>• Successfully oversaw and implemented new Common Core math, reading, and language art programs</li><li>• Received the Mississippi Department of Education Title I Champions of</li><li>• Change Honor in 2012 and 2013</li><li>• Raised over \$50k in fundraising helping to pay for new landscaping, outside seating area, pavilion, and building painting</li></ul> <p>Assistant Principal, Kosciusko Junior High School, Kosciusko City Schools, Kosciusko, MS, July 2008–June 2010</p> <ul style="list-style-type: none"><li>• Revamped and improved staff duty schedules</li><li>• Revitalized the campus with the addition of new paint and landscaping</li><li>• Designed and helped implement remediation program for academic at-risk students</li><li>• Helped raise money to aid city police department purchase drug dog</li><li>• Oversaw implementation of school safety plan</li></ul>
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Classroom experience	<p>Holmes Community College, Goodman, MS</p> <p>HCC Attala-Educational Center, Kosciusko, MS, July 2015, Adjunct Professor, HIS 2223-American History II (Hybrid)</p> <p>KJHS Teacher/KHS Head Soccer /Asst. Baseball Coach, Kosciusko City Schools, Kosciusko, MS, August 2002–May 2008,</p> <ul style="list-style-type: none"> <li>• Taught mathematics and various history courses</li> <li>• Coordinated and participated in fundraisers raising thousands for the both the baseball and soccer programs</li> <li>• Coordinated and participated in fundraisers raising thousands for the both the baseball and soccer programs</li> <li>• As Head Soccer Coach, I oversaw athletic event scheduling, budgeting, and practice planning</li> <li>• Coordinated and participated in fundraisers, raising thousands of dollars for the both the baseball and soccer programs</li> <li>• Teacher Support Team School Coordinator</li> <li>• Assisted in obtaining a Level 5 school rating for 5 consecutive years</li> </ul>
Service to community	<ul style="list-style-type: none"> <li>• City of Morton Mayor’s Youth Council Steering Committee</li> <li>• City of Morton Healthy Hometown Committee</li> <li>• Catch A Dream Foundation Volunteer Member</li> <li>• Helping Hands Ministry Volunteer</li> </ul>

Interests	<ul style="list-style-type: none"><li>• Founded Central Mississippi Investment Group, LLC in 2007; This partnership of 4 individuals invests in stocks, real estate, and land.</li><li>• Coaching the USSSA MS '06 softball team</li><li>• Member of First Baptist Church, Kosciusko, MS</li><li>• Occasionally play classic rock and blues music</li><li>• Enjoy watching college football</li></ul>
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