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Nathan Ray Oakley

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Dual enrollment and dual credit as predictors of community college graduation, grade point average, and credit hour accumulation

By

Nathan Oakley

A Dissertation
Submitted to the Faculty of
Mississippi State University
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy
in Community College Leadership
in the Department of Leadership and Foundations

Mississippi State, Mississippi

December 2015

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2015

Dual enrollment and dual credit as predictors of community college graduation, grade
point average, and credit hour accumulation

By

Nathan Oakley

Approved:

Stephanie B. King
(Director of Dissertation)

William M. Wiseman
(Committee Member)

Arthur D. Stumpf
(Committee Member)

James E. Davis
(Committee Member/Graduate Coordinator)

Richard L. Blackburn
Dean
College of Education

Name: Nathan Oakley

Date of Degree: December 11, 2015

Institution: Mississippi State University

Major Field: Community College Leadership

Major Professor: Stephanie B. King

Title of Study: Dual enrollment and dual credit as predictors of community college graduation, grade point average, and credit hour accumulation

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Candidate for Degree of Doctor of Philosophy

A growing trend in high schools across the state is the use of dual credit and dual enrollment courses to better prepare high school students for college or the work force. Given the increase in dual credit and dual enrollment participation and the goal of creating a more seamless transition from high school to college, the effectiveness of these programs needs to be researched.

The research hypothesis for this study states that students who participate in a dual credit and dual enrollment program during high school are more likely to complete an associate degree within 3 years than students who do not participate in dual credit and dual enrollment, when accounting for covariates such as gender, race, and socioeconomic status. This study examined the effectiveness of dual credit and dual enrollment programs, particularly with regard to associate degree completion, credit hour accumulation, and college GPA.

The participants in this study were 1st-time, full-time students enrolled during Academic Year 2007 at 5 of the 15 community and junior colleges in state of Mississippi.

The sample included 6,029 students, of which 255 had previously participated in a dual enrollment or dual credit program.

This study revealed that dual credit and dual enrollment participation positively affects postsecondary outcomes for students enrolling in community colleges in the areas of associate degree completion and college GPA. Students who started college with prior experience in a dual credit or dual enrollment program were 2.51 times more likely to complete an associate degree within 3 years of first-time, full-time college enrollment than individuals who did not participate.

Additionally, the study revealed that factors such as SES, gender, and race had an effect on college GPA; and that SES and race affected the number of credit hours earned by community college students.

Given the positive outcomes resulting from participation in dual credit and dual enrollment programs, these programs certainly bear consideration for expansion and further study in the future, particularly given the growing availability of longitudinal data within statewide longitudinal data systems that have launched in recent years across the United States.

DEDICATION

I would like to dedicate this research to the glory of God, with heartfelt thanks to my wife Deborah, who has encouraged me to persevere since first we met; to Sanders, Wynn, Rebekah, and Harris, who have been patient with their dad; and to Lathem, whom I will meet again.

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CHAPTER I

INTRODUCTION

In an attempt to address concerns with educational attainment in Mississippi, this study examines whether dual credit and dual enrollment programs have an effect on community college graduation rates, college grade point average (GPA), and credit hour accumulation, as specifically outlined in the research questions. For the purposes of this study, dual credit programs and dual enrollment programs were not considered separately, but rather students who participated in either a dual credit or dual enrollment program were included in the research sample.

Robertson, Chapman, and Gaskin (2001) identified the terms *concurrent enrollment*, *dual enrollment*, *dual credit*, *postsecondary enrollment*, and *co-enrollment* as interchangeable terms to identify these specific programs designed to offer a seamless transition from high school to college. The concept of a seamless educational transition is not new, as community colleges initially served as extensions of local high schools in the early 20th Century (Cohen & Brawer, 2014). A more modern trend in the seamless educational process is the concept of a Pre-K to Baccalaureate seamless system, which has gained ground in recent years; dual credit and dual enrollment fit nicely into this framework, serving as a bridge between high school and the full college experience (Cohen & Brawer, 2014). A seamless system ideally allows for students to readily matriculate from one institution to another – such as from elementary school to middle

school or from high school to college – without difficulty or the need for academic remediation.

Additional definitions for *dual credit* and *dual enrollment* were laid forth by Barnett and Andrews (2002). Barnett and Andrews defined dual enrollment as situations where students are concurrently enrolled and taking classes in high school and college simultaneously. Further, when students receive both high school and college credit for a college-level class successfully completed, the definition of dual credit is met (Barnett & Andrews, 2002). These classes may be offered in a number of settings, depending on the personnel and facilities available. Classes may meet on a high school campus, at a local community college, or via the Internet (Barnett & Andrews, 2002). There is a broad array of course offerings available to dual enrollment students, ranging from academic classes such as math and history to career-technical courses. The presentation of the content varies as widely as the content itself (Barnett & Andrews, 2002).

Ganzert (2014) conducted a study of dual credit and dual enrollment in North Carolina and found that dual credit and dual enrollment programs had a positive effect on graduation rates and GPA. Other advantages to dual credit and dual enrollment programs include increased academic rigor of high school course offerings (Boswell, 2001; Klein, 2007; O'Brien & Nelson, 2004), increased high school retention rates (Peterson, 2003), and reduced cost of tuition for a 4-year postsecondary degree (Karp, Bailey, Hughes, & Fermin, 2004).

For years, Mississippi has lagged behind the nation in the area of educational attainment, affecting personal finances and the state economy as a whole. While Mississippi's high school graduation rate was stable at 75% during both the 2010-2011

school term and the 2011-2012 school term, this remained less than the national average of 79% in 2010-2011 and 80% in 2011-2012 (National Center for Education Statistics [NCES], 2014). College completion rates fall short of the national average as well. According to a report based on United States Census information, the 2- or 4-year degree completion rate for Mississippi residents age 25-64 was 29.9% in 2010 and was 30.5% in 2013 (Lumina Foundation, 2015). While the high school graduation rate has hovered around 75% in recent years, only 30% of Mississippi's working-age adults have an associate degree or higher. To address the problem of disconnections between high school and postsecondary attainment, Andrews (2004) argued for improved relationships and more communication between high schools and college systems.

Two theories provide the foundation for this study. Tinto's (1993) theory on student retention describes student behavior as it relates to persistence in college. Tinto (1993) describes definite relationships between student persistence and academic and social factors. According to Tinto (1993), a social connection with peers positively affects persistence for first- and second-year college students, while third- and fourth-year students are more concerned about the quality of teaching, advising, and faculty interaction. Academic success achieved through dual credit and dual enrollment courses might motivate students to persistence through completion of a college degree. This academic success is ultimately the driving force, according to theoretical research by Deci, Koestner, and Ryan (2001). Deci et al. (2001) reviewed the undermining effects of extrinsic rewards on student behavior and found that teachers needed to "exercise great care when using reward-based incentive systems" (p. 3). While Deci et al. (2001) recommend caution when implementing extrinsic reward systems, the incentive for dual

credit and dual enrollment students is intrinsic – potential for accelerated academic achievement through participation in the program. Theory describes behavior, in that participation in a dual credit or dual enrollment program potentially generates academic success that is expected to advance students toward graduation from college.

A growing trend across the county is the use of dual credit and dual enrollment programs to improve connections between high school and college and to provide opportunities for students to enter college having already earned some college credit. Existing research on the long term benefit of dual credit and dual enrollment programs, particularly with regard to improved educational outcomes for students participating in such programs, is limited in nature.

For many years, little coordination has taken place between high schools and their postsecondary counterparts (Andrews, 2004). The senior year of high school can often provide an academic challenge – one in which students do not find meaningful academic engagement (Andrews, 2004). The National Commission on the High School Senior Year (2001) reported the following.

For a variety of reasons, student motivation drops in the senior year. Short of a miserable failure in the senior year, practically every college-bound student knows that what they have accomplished through Grade 11 will largely determine whether or not they attend college, and if so, which college. As a result, serious preparation for college ends at Grade 11 (p. 6).

Improved relationships with colleges need to be in place (Andrews, 2004). A dual credit or dual enrollment program may be one method of improving college

completion rates if students are not lost academically during their senior year of high school.

Statement of the Problem

The problem is the question of whether dual enrollment or dual credit participation during high school improves community college graduation rates, increases college credit hour accumulation, and raises college GPA.

Purpose of the Study

This research study examined the effectiveness of dual credit and dual enrollment programs, particularly with regard to associate degree completion, credit hour accumulation, and college GPA. These outcomes were selected based upon potential availability of data and because the outcomes would be considered outcomes associated with a successful college experience. Consideration was given to factors that might also influence these outcomes. Factors such as gender, race, and socioeconomic status are often used in educational studies examining differences in subgroup outcomes of a student population; as such, the above factors were included in this study. Essentially, this research examined the success rate of students who completed dual credit or dual enrollment courses as a measure of program effectiveness.

This ex-post-facto research study focused on data gathered from 5 of the 15 community and junior colleges (CJCs) in the state of Mississippi, examining graduation rates, college grade point averages, and accumulated college credit hours of students who were involved in dual credit or dual enrollment programs as high school students and those who were not involved in dual credit or dual enrollment programs. An ex-post-

facto design was appropriate in this study, as the independent variable of participation in a dual credit or dual enrollment program occurred prior to the study and was not manipulated as a part of the research. The research was conducted using a logistic regression as well as a linear regression model, allowing for control over several factors that might have an effect on the dependent variable. The covariates that were controlled included gender, race, and socioeconomic status, as these could play a role in a student's success at a postsecondary institution.

Research Questions

The research hypothesis for this study states that students who participate in a dual credit or dual enrollment program during high school are more likely to complete an associate degree within three years than students who do not participate in dual credit or dual enrollment, when accounting for covariates such as gender, race, and socioeconomic status (SES). The following research questions were addressed in the study.

1. Controlling for gender, race, and socioeconomic status, were students who participated in a dual credit or dual enrollment program significantly more likely to complete an associate degree within three years of first-time, full-time college enrollment than students who did not participate?
2. Controlling for gender, race, and socioeconomic status, is there a significant difference in college GPA in three years of first-time, full-time college enrollment for students who participated in a dual credit or dual enrollment program as compared to students who did not participate?
3. Controlling for gender, race, and socioeconomic status, is there a significant difference in the number of accumulated credit hours in three years of first-time,

full-time college enrollment for students who participated in a dual credit or dual enrollment program as compared to students who did not participate?

Definition of Key Terms

For the purpose of this research study, the following definitions are provided to clarify unique terms. These terms are used throughout the study.

1. Dual credit and dual enrollment are defined as concurrent or simultaneous enrollment in high school courses and college credit courses (Barnett & Andrews, 2002). For this study, dual credit programs were not considered separately from dual enrollment programs.
2. Gender shall include male and female (D. West, personal communication, March 25, 2011).
3. Race shall include black, white, Asian, Hispanic, and other non-Hispanic (D. West, personal communication, March 25, 2011).
4. High Socioeconomic Status shall include all students not receiving a Pell Grant (D. West, personal communication, March 25, 2011).
5. Low Socioeconomic Status shall include all students receiving a Pell Grant (D. West, personal communication, March 25, 2011).
6. The Academic Year (AY) shall include a sequential fall semester and spring semester, as well as the subsequent summer term (D. West, personal communication, March 25, 2011).
7. Accumulated credit hours shall include credit hours earned by students during the three years of enrollment at a postsecondary institution.

8. Graduation is defined as the completion of an associate degree at a postsecondary institution selected for the study.

Limitations of the Study

Time did limit this study to some extent. As the research project unfolded, the possibility of studying a broader group of students across the 15 community colleges in the state was presented as an option to the researcher. Given the process by which permission was granted from the five institutions and the time required to gain permission from additional institutions and access to student-level data needed to complete this study, no additional institutions were included. While it is not clear whether inclusion of those institutions would have affected the results, this limitation does actually lend itself to an opportunity for future research.

When the research study was originally being designed, the intent was to control for high school GPA in each of the research questions. Due to the lack of availability of this data in a format that could be connected at the student level with data from the community college sample, high school GPA could not be factored into the study. As mentioned in the recommendations for future research, state longitudinal data systems are becoming more robust, possibly allowing for such research in the future.

Delimitations of the Study

This research study was confined to a non-random student sample using existing data from five selected Mississippi community colleges. The community colleges with the largest number of students participating a dual credit or dual enrollment program

were selected for the study, as this group of colleges provided a sample size sufficient for the research.

Students in the study were not randomly assigned to control or treatment groups, but were categorized with other students based on prior participation in a dual credit or dual enrollment program as a matter of comparison. In order to gather a current usable data set, this study only focused on students participating in dual credit or dual enrollment programs during AY 2005 and AY 2006, then matriculating toward an associate degree through the 2-year public community college system in Mississippi beginning in AY 2007 and continuing through AY 2009. The research study did not address students' college success beyond the two-year associate degree offered by the public Mississippi community colleges selected for the study. The research study also did not address success of college students at community colleges outside of the sample selected for research.

Significance of the Study

Given that the study revealed widespread success in dual credit and dual enrollment programs, the recommendation is to expand these programs to other schools and grow the programs in existing locations. At the present, a number of schools do not offer dual credit or dual enrollment courses. According to a report from the NCES (2005), approximately 1.2 million students participated nationally in dual credit or dual enrollment programs during the 2002-03 academic year. During this same time, about 71% of public high schools offered dual credit or dual enrollment courses. In comparison to large schools, fewer small schools offered dual enrollment programs; only 63% of small schools offered programs, in comparison to 82% of large schools (NCES, 2005).

With nearly one-third of public high schools not offering dual credit or dual enrollment in 2003, further expansion of programs could potentially reach many more students.

CHAPTER II

LITERATURE REVIEW

Chapter Organization

The following research review is organized by major topic, specifically related to the research being conducted in this study. Reviewed literature includes research on dual credit and dual enrollment program expansion, factors affecting dual credit and dual enrollment programs, issues with dual credit and dual enrollment programs, and support for dual credit and dual enrollment programs. Additionally a review of research on associate degree completion rates, college GPA, and college credit-hour accumulation rates is included in this chapter, as these outcomes are all being considered as measures of dual credit and dual enrollment program success as a part of this research study.

Dual Credit and Dual Enrollment

Expansion of Programs

Marshall and Andrews (2002) noted that high school students' participation in community college dual credit and dual enrollment programs was the fastest growing higher education movement of the 21st Century. Andrews' (2001, 2004) research indicated an increase in dual credit and dual enrollment participation across the nation. While the federal government had not added anything of significance to the dual credit and dual enrollment movement in 2004, Andrews (2004) found "some movement in dual

credit in all 50 states” (p. 422). This movement could be seen in schools where dual credit and dual enrollment programs were replacing honors programs and replacing or supplementing Advanced Placement programs (Andrews, 2004). McCauley (2007) suggested that what appeared to be lacking in the system was a uniform data collection process that linked indicators of dual credit and dual enrollment participation with eventual outcomes from postsecondary institutions. Specifically, McCauley (2007) noted that information had to be matched from secondary to postsecondary institutions, which often operate under independent systems. McCauley found that systems such as the Texas Schools Microdata Panel compiled student data, but factors tracking academic ability were not always available (2007).

According to a report from the NCES (2005), approximately 1.2 million students participated nationally in dual credit or dual enrollment programs during the 2002-03 academic year. During this same time, about 71% of public high schools offered dual credit or dual enrollment courses. In comparison to large schools, fewer small schools offered dual credit or dual enrollment programs. Only 63% of small schools offered programs in comparison to 82% of large schools (NCES, 2005). With nearly one-third of public high schools not offering dual credit or dual enrollment in 2003, further expansion of programs could potentially reach many more students. Further research into the effectiveness of dual credit and dual enrollment programs is needed in order to further validate their effectiveness and increase the potential for program expansion

Factors Affecting Dual Credit and Dual Enrollment Programs

Gertge (2008) examined factors that affect the development of dual credit and dual enrollment programs, particularly in rural areas. Gertge’s study focused on rural

Colorado, and her research findings noted differences in enrollment trends and course offerings for schools, depending on the school size and proximity to community college centers. The two largest high schools in the study both offered vocational dual credit or dual enrollment courses, but smaller schools were more likely to only offer general academic dual credit or dual enrollment courses. Gertge's study showed an upward trend in participation over 9 years, from 17% in 1995 to 29% in 2003. Network access between high schools and community college centers in the study allowed for participation in programs that would have otherwise been geographically inaccessible. Furthermore, Gertge found that high school administrators affect dual credit participation through their influences on school schedules. In one instance, participation dropped from 67% to 34% in a single year when the school administration changed (Gertge, 2008).

Additionally, state and local policies can affect the development of programs within states or regions as well as the participation by students in these programs. Bailey, Hughes, and Karp (2002) noted that tuition costs are handled differently from state to state. Bailey et al. (2002) found that in some states,

legislation requires the state or local school district to pay students' tuition at the college they are enrolled in, while others compel students to pay their own tuition and fees, and still others allow funding decisions to be made at the local level (p. 9).

Furthermore, Bailey et al. (2002) indicated that, for the purposes of full time equivalent funding calculations, states also differ in their approach. Some states allow for students to be counted at both the high school and the college, while other states only allow for a fractional count of students in dual credit or dual enrollment programs.

Issues with Dual Credit and Dual Enrollment Programs

Farrell and Seifert (2007) identified several issues with dual credit and dual enrollment programs. One issue was the concern over comparability in course content offered at high schools as compared to similar course offered on college campuses. Some four-year institutions expressed concern that high school teachers did not meet the same standards as college instructors. Farrell and Seifert (2007) recommended that to alleviate this concern, faculty standards require professional development of high school teachers serving as instructors in dual credit and dual enrollment courses. Another key issue is a coordinated effort to align standards for students through collaborative discussion and articulation agreements between institutions (Farrell & Seifert, 2007). Blankenberger (2008) also noted the issue of comparability of course experiences at colleges and high schools, as well as issues with course credit transfers, the lack of oversight of course rigor, program costs, limited access for minority and low-income students, and a lack of quantitative data available to support claims of dual credit or dual enrollment program benefits. Many of the issues raised by Blankenberger have been supported by other literature (Andrews, 2000; Bailey et al., 2003; Catron, 2001; Clark, 2001; Hale, 2001; Hébert, 2001; Karp, Calcagno, Hughes, Jeong, & Bailey, 2007).

Support for Dual Credit and Dual Enrollment Programs

While some researchers have argued that dual credit and dual enrollment courses might not offer the depth of content found in a typical college course, Hébert (2001) found the contrary to be the case. Hébert's research study findings indicated that students who took mathematics courses through dual credit or dual enrollment programs taught by qualified high school teachers working as adjunct college instructors often had more time

(often twice as much) to study the subject matter and had a higher level of mastery than their counterparts enrolled in the same course being taught by true full-time college instructors. Hébert attributed the success of high school teachers in dual credit and dual enrollment classroom roles to the education background that some college instructors might not have. While high school teachers typically have pedagogical training, some college instructors come into the field with more of a pure content background. As a result of the success of the high school teachers in this setting, Hébert's research study indicated the need for equitable transfer policies for students who earned credit through high school dual credit and dual enrollment programs. In other words, dual credit and dual enrollment credit-bearing courses taught by high school teachers should be on equal footing with those taught by college instructors. O'Brien and Nelson (2004) made similar claims regarding transfer credits, as the students take dual credit and dual enrollment courses complete the same coursework and tests as traditional college students in order to earn course credit. Furthermore, O'Brien and Nelson (2004) noted an advantage of dual credit and dual enrollment courses over AP courses, in that earning a "C" or better in a dual credit or dual enrollment course typically allows for the transfer of credit to a university after high school; a passing score on the AP exam is required for credit in addition to a passing mark in the AP course.

Marshall and Andrews (2002) stated the following.

The challenge of keeping juniors and seniors engaged in meaningful work has been, and continues to be, one of the outstanding outcomes from these dual credit programs. Improving relationships between community colleges and secondary schools is one of the most valuable outcomes. Follow-up research needs to be

conducted by program directors and administrators in each of the states where these programs are being developed. The quality of the program as well as the human impact on students needs to be assessed through such research (p. 242).

Bailey et al. (2002) noted a possible solution to the challenge of high school seniors and engagement with challenging coursework. Bailey et al. (2002) observed that dual credit and dual enrollment programs provide somewhat of a motivation for students to stay engaged in demanding coursework during their senior year of high school.

McCauley (2007) performed a study looking at the success of AP and dual enrollment students in relation to their non-participating counterparts. McCauley (2007) stated, “AP and dual enrollment courses increased the odds of a student graduating from a four-year university within six years by a factor of 2.05, when controlling for race, socioeconomic status, and gender” (p. 32). McCauley’s study was limited in that it did not control for academic ability or student motivation. McCauley concluded that one might expect students who are “typically bright and highly motivated” to perform well, regardless of enrollment in an AP or dual enrollment programs (McCauley, 2007). McCauley recommended further study in the area of dual enrollment as an indicator of college success, but noted that data collection controlling for academic ability would be difficult to obtain, since it must come from multiple data sources (high schools and colleges), and must be able to link student data between the two sources while still maintaining confidentiality of student records.

Marshall and Andrews (2002) examined a group of 200 dual credit and dual enrollment high school graduates at Marquette High School in Illinois, and they found that dual credit and dual enrollment students perceived the image of the participating

college as better than they did before they were enrolled. All but one of the respondents indicated that the program should continue. Marshall and Andrews saw a need for a human impact study in the area of dual credit and dual enrollment to assess program effectiveness.

Jordan, Cavalluzzo, and Corallo (2006) completed five case studies in four states, looking at different implementation practices for dual credit and dual enrollment programs. The researchers found two sites that operated at capacity and that merited further study. One of these sites, Santa Fe Community College located in Gainesville, Florida, served as a community college offering dual credit and dual enrollment courses. The other site, Contra Costa Community College in San Pablo, California, was a middle college high school – a college with a 9-12 high school embedded on campus. Students in this environment took courses for high school and college credit. The middle college high school structure appeared to be the most seamless in the effort to eliminate abrupt transitions between high school and college. As other researchers have done, Jordan et al. (2006) called for further research “to analyze the effectiveness of these alternative models” (p. 748).

Associate Degree Research

Investigation related to the effects of dual credit and dual enrollment was conducted to determine what effect dual credit and dual enrollment has had on college graduation rates. O’Brien and Nelson (2004) noted that participation in dual credit or dual enrollment programs increased the likelihood of earning a degree sooner, particularly when compared to students who did not participate in a dual credit or dual enrollment program.

Research by McCormick (2010) on dual credit, dual enrollment, and college persistence in Southeast Tennessee revealed a predominantly Caucasian female student population matriculating from high school into college. Research by Swanson (2008) indicated that students who earned dual credit or dual enrollment credits were more likely to transition immediately into post-secondary institutions and to persist into a second year of college.

Several researchers have noted the lack of extensive research on the effect of dual credit and dual enrollment programs on college success (Jones, 2014; Young, Joyner, & Slate, 2013). Jones (2014) noted benefits of participation in dual credit and dual enrollment programs with regard to college success, particularly in the area of persistence. Jones found that persistence rates at the end of one year of full-time enrollment were 2.51% higher for community college students who had previously participated in dual credit or dual enrollment programs and 11% higher for university students who had previously participated in dual credit or dual enrollment programs. While simply persisting in college studies does not in and of itself guarantee completion of a degree, one must persist if one is going to graduate. Jones (2014) stated the following.

Dual enrollment appear to be a good investment for both colleges and high schools. Students that enroll in these programs are better prepared for the academic rigors of college coursework and appear to be able to navigate the college environment better; or perhaps they are able to develop more resiliencies to traditional issues that lead to student attrition during their first semester and year of college. This indicates secondary and postsecondary institutions should

establish collaborative partnerships to help ensure student access to dual enrollment programs. This appears to be a win-win situation for high schools, students, parents, and colleges (p. 35).

Jones (2014) also found that while there is a growing body of literature in the area of dual credit, dual enrollment, and postsecondary academic success, current literature “does not show sound evidence that dual enrollment has an impact on the future academic success of students once they enroll as full-time college students” (p. 36). Jones (2014) further stated that “such evidence does exist when comparing cumulative college GPA and first year persistence rates between those students with prior dual enrollment credits and those without” (p. 36).

College GPA Research

Research in the area of dual credit, dual enrollment, and college GPA is limited, and what research is available is divided with regard to claims of effectiveness. Jones (2014) found that students who earned dual credit or dual enrollment credits prior to college entry finished their first year of full-time college enrollment with significantly higher college GPAs than students lacking dual credit or dual enrollment credit. In this study, Jones noted that community college students who had previously earned dual credit or dual enrollment credits had a cumulative GPA of 2.91 after one year, while non-dual credit and non-dual enrollment students had a cumulative GPA of 2.65. A similar outcome was noted for students enrolled in a research university, as the dual credit and dual enrollment group had an average cumulative GPA of 3.10 as compared to a 2.91 cumulative GPA for research university students without dual credit or dual enrollment course credits.

Research by Young et al. (2013) noted that “dual credit students had higher GPAs than did nondual credit students” (p. 1) at the end of their first term of college enrollment, and that both male and female students who completed dual credit or dual enrollment classes prior to college had higher GPAs at the end of one term. While a difference in GPA was noted at the end of one term for most students, “dual enrollment did not have a statistically significant influence on GPAs for Asian students or for students after two years at the community college” (Young et al., 2013, p. 1).

The Community College Research Center (2012) conducted research in California, Florida, and New York City regarding the effect of dual credit and dual enrollment participation on college outcomes. The research conducted in Florida yielded statistically significant results in the area of GPA. On average, dual credit and dual enrollment students had a first year GPA of 2.62, as compared to a 2.40 for students not in a dual credit or dual enrollment program; the 3-year GPA for dual credit and dual enrollment students was 2.60, as compared to a 2.40 for students not in a dual credit or dual enrollment program.

College Credit-Hour Accumulation Research

Research by Andres, Adamuti-Trache, Yoon, Pidgeon, and Thomsen (2007) called for the need to monitor the effects of social class on educational attainment. Additionally, Andres et al. (2001) noted that the initial educational expectations of a graduating high school class were actualized after one year, and that the attainment after 5 and 10 years was remarkably consistent with the initial expectations. Because existing research surrounding gender and socioeconomics revealed that these factors affect

educational attainment, the current research study on the effect of dual credit or dual enrollment participation controls for these factors.

The Community College Research Center (2012) noted statistically significant differences in credit hours earned over a 3-year period of time, as dual credit and dual enrollment students earned an average of 55.7 credits – more than 15 credits more than students not participating in a dual credit or dual enrollment program.

As Jones (2014) noted, “much of the literature concerning dual enrollment focuses on the development and growth of programs and the designs of various course delivery methods”, rather than “the academic benefits of dual enrollment participation and course completion once students enter college full time” (p. 24).

Summary of Research Meaning and Relationship to Current Research

While a growing body of research does exist around dual credit and dual enrollment programs, little research has been conducted on Mississippi’s dual credit and dual enrollment efforts. The existing research does show some promise for positive program outcomes, but more research is needed to confirm the effectiveness of programs and to further examine concerns such as program comparability and credit transfers. As noted in the literature, many researchers have called for the need to conduct additional research, specifically with regard to dual credit and dual enrollment program effectiveness and benefits (Jones, 2014; Jordan et al., 2006; Young et al., 2013).

The current research study adds to the body of existing research and provides valuable insight into the use of dual credit and dual enrollment programs within the context of Mississippi’s K-12 education system and community college system.

Educators, policy makers, and business leaders across the state can use quantitative data

specific to Mississippi students and schools to make more informed decisions regarding the future of these programs, specifically as the state is working in improve college- and career-readiness of high school graduates, increase the state's graduation rate, and provide potential businesses and industries with an attractive work force.

CHAPTER III

METHOD

Chapter Organization

This chapter outlines the design of this dual credit and dual enrollment research. It is ordered to include the overall design of the study, the research questions, the context of the research, the research subjects, research instruments, data collection procedures, and data analysis procedures.

Research Design

This ex-post-facto research study focused on data gathered from 5 of the 15 CJC's in the state of Mississippi, examining graduation rates, college grade point averages, and accumulated college credit hours of students who were involved in dual credit or dual enrollment programs as high school students and those who were not involved in dual credit or dual enrollment programs. The 15 community colleges within the state were ranked in order of greatest to least participation in dual credit and dual enrollment programs during the fall of 2008. From this list, the five community colleges with the greatest participation were selected for the study, and data managers for each of these colleges were contacted to initiate data collection. Upon approval by each of the colleges, the researcher worked with the National Strategic Planning and Research Center (nSPARC) at Mississippi State University to complete the research.

An ex-post-facto design was appropriate in this study, as the independent variable of participation in a dual credit or dual enrollment program occurred prior to the study and was not manipulated as a part of the research. The research was conducted using a logistic regression as well as a linear regression model, allowing for control over several factors that might have an effect on the dependent variable. The covariates that were controlled include gender, race, and socioeconomic status, as these may also play a role in a student's success at a postsecondary institution.

Research Questions

The research hypothesis for this study states that students who participate in a dual credit or dual enrollment program during high school are more likely to complete an associate degree within three years than students who do not participate in dual credit or dual enrollment, when accounting for covariates such as gender, race, and SES. The following research questions were addressed in the study.

1. Controlling for gender, race, and socioeconomic status, were students who participated in a dual credit or dual enrollment program significantly more likely to complete an associate degree within three years of first-time, full-time college enrollment than students who did not participate?
2. Controlling for gender, race, and socioeconomic status, is there a significant difference in college GPA in three years of first-time, full-time college enrollment for students who participated in a dual credit or dual enrollment program as compared to students who did not participate?
3. Controlling for gender, race, and socioeconomic status, is there a significant difference in the number of accumulated credit hours in three years of first-time,

full-time college enrollment for students who participated in a dual credit or dual enrollment program as compared to students who did not participate?

Research Context

The research conducted through this study was conducted using an existing data set from a group of five public Mississippi community colleges. No on-site data collection was required, as each of the colleges granted permission to use a data set from nSPARC at Mississippi State University.

Research Subjects

The population in this study was comprised of a cohort of individuals who enrolled first-time, full-time in the fall of 2007 in pursuit of an associate degree at five selected Mississippi community colleges. The sample for this study, as shown in Table 1, was collected from the fall 2007 cohort of first-time, full-time enrolled students across the five selected community colleges ($n = 6,029$). The community colleges included in the study had the largest population of dual credit or dual enrollment students for the period of time being studied. Of the students included in the sample, 5,774 students (95.77%) did not begin their first-time, full-time enrollment having previously participated in a dual credit or dual enrollment program, while 255 students (4.23%) had participated in such a program.

Table 1

Descriptive Statistics of Fall 2007 Cohort

Variables	Number	Percent/Mean
Dual Credit or Dual Enrollment		
No	5,774	95.77
Yes	255	4.23
SES / Pell Grant Status		
High SES (Did not receive Pell Grant)	2,511	41.65
Low SES (Received Pell Grant)	3,518	58.35
Gender		
Male	2,515	41.72
Female	3,514	58.28
Race		
Black	2,802	46.47
White	2,931	48.62
Hispanic	62	1.03
Asian	70	1.16
Other	164	2.72
Completed Associate Degree in Three Years		
No	4,845	80.36
Yes	1,184	19.64
GPA Over Three Years	-	2.52 (0.82)
Accumulated Credit Hours Over Three Years	-	39.61 (26.21)

Note: Numbers in parentheses are standard deviations.

The SES of the student sample, as determined by Pell Grant receipt, included 2,511 (41.65%) students from a high SES and 3,518 students (58.35%) from a low SES status. The sample included 2,515 males (41.72%) and 3,514 females (58.28%). Within the sample, 2,802 students (46.47%) were identified as black; 2,931 (48.62%) were

identified as white; 62 students (1.03%) were identified as Hispanic; 70 students (1.16%) were identified as Asian; and 164 students (2.72%) were identified as some other non-Hispanic race. Some 4,845 students (80.36%) did not complete an associate degree within three years of first-time, full-time enrollment. The mean grade point average for the sample was 2.52 ($M = 2.52, s = 0.82$), and students accumulated an average of 39.61 credit hours over three years of enrollment ($M = 39.61, s = 26.21$).

Instruments and Materials Used

Due to the nature of this research, no specific instrument was used to gather the data. The research was not conducted by gathering data from individual subjects, but was instead completed through the use of an existing data set collected by each of the participating Mississippi community colleges. This data was subsequently provided to nSPARC. Upon approval by each of the colleges, as outlined in the data collection procedures below, the researcher worked with nSPARC to complete the research.

Data Collection Procedures

The dual credit and dual enrollment data was collected from the office of the Mississippi State Board of Community and Junior Colleges (now the Mississippi Community College Board) and from the individual community and junior colleges across the state of Mississippi, by way of nSPARC. Data requests were submitted to persons identified as the dual credit or dual enrollment managers at each institution, specifying which information fields were needed and how these data were to be formatted in accordance with guidelines set forth by Dr. Debra West of the Mississippi State Board of Community and Junior Colleges. After communication with each of the

institutions, the researcher was directed by each institution to gather institutional data directly from nSPARC. The cohort study focused on students initially enrolling during AY 2007 in a community college and examined cohort data through AY 2009, as outlined in Table 2.

Table 2

Academic Years

Student Activity	Academic Years
Enrolled in High School*	Fall 2005 / Spring 2006 (AY 2005) Fall 2006 / Spring 2007 (AY 2006)
Enrolled in Community College	Fall 2007 / Spring 2008 (AY 2007) Fall 2008 / Spring 2009 (AY 2008) Fall 2009 / Spring 2010 (AY 2009)

*Some students took high school courses only; other cohort members were enrolled in high school and dual credit or dual enrollment courses.

Data Analysis Procedures

Once the data for this study were obtained, a logistic regression was completed for research question 1, which examined likelihood of associate degree completion within three years of first-time, full-time college enrollment. A linear regression was completed for research question 2, which examined differences in college GPA over a three-year period for dual credit or dual enrollment participants, as compared to non-participants. A linear regression was also completed for research question 3, which examined accumulated credit hours over a three-year period for dual credit or dual enrollment participants, as compared to non-participants. The logistic regression allowed for the analysis data related to the completion of an associate degree while controlling for

variables such as gender, race, and socioeconomic status. The linear regression was used to examine outcomes related to both college GPA and accumulated credit hours while controlling for variables such as gender, race, and socioeconomic status.

Summary of Method

In summary, five community colleges were selected based upon the number of students participating in dual credit or dual enrollment programs. The dual credit and dual enrollment data were collected from the office of the Mississippi State Board of Community and Junior Colleges (now the Mississippi Community College Board) and from the individual CJs across the state of Mississippi, by way of nSPARC.

Students in the study were not randomly assigned, but were grouped according to their prior participation in a dual credit or dual enrollment program during high school. Data analyses were completed in order to examine the effects of dual credit or dual enrollment participation on the completion of an associate degree, college GPA, and accumulated credit hours.

CHAPTER IV

RESULTS OF THE STUDY

Chapter Overview

The research findings are organized by outcome, based on the information being examined by each of the three research questions. The effect of dual credit and dual enrollment participation on the completion of an associate degree within three years will be considered first. The effect of dual credit and dual enrollment on college GPA will be considered next. The results of the third research question examine the effect of dual credit and dual enrollment on the accumulation of credit hours during college. For each of the above areas of research, additional information on the effect of race, gender, and SES will be presented as well.

Research Results

Completion of an Associate Degree

Research Question 1: Controlling for gender, race, and socioeconomic status, were students who participated in a dual credit or dual enrollment program significantly more likely to complete an associate degree within three years of first-time, full-time college enrollment than students who did not participate?

Through a logistic regression analysis, research revealed that, when controlling for gender, race, and socioeconomic status, students who participated in a dual credit or

dual enrollment program were significantly more likely to complete an associate degree within three years of first-time, full-time college enrollment than students who did not participate ($B = 0.97, p < .001$). In fact, students who started college with prior experience in a dual credit or dual enrollment program were 2.51 times more likely to complete an associate degree than individuals who did not participate. Furthermore, gender played a significant role in the completion of an associate degree, as males were 1.30 times more likely than females to complete a degree ($B = 0.26, p < .001$). Race was also a significant factor in the completion rate of associate degrees within three years, particularly among black and Hispanic students. Black students were only 0.54 times as likely as white students to complete an associate degree within three years ($B = -0.61, p < .001$), while Hispanic students were only 0.42 times as likely as white students to complete an associate degree within three years ($B = -0.87, p < .05$). The results for this analysis are included in Table 3.

Table 3

Logistic Regression on Completing Associate Degree in Three Years

Independent Variables	B	SE	Odds Ratio
Dual Credit or Dual Enrollment	0.9217***	0.1346	2.514
Received Pell Grant	0.00162	0.0725	1.002
Gender (Male as Reference)	0.2633***	0.0689	1.301
Race (White as Reference)			
Black	-0.609***	0.075	0.544
Asian	-0.2424	0.304	0.785
Hispanic	-0.8736*	0.4042	0.417
Other	-0.3455	0.208	0.708

*** $p < .001$; ** $p < .01$; * $p < .05$

College Grade Point Average

Research Question 2: Controlling for gender, race, and socioeconomic status, is there a significant difference in college GPA in three years of first-time, full-time college enrollment for students who participated in a dual credit or dual enrollment program as compared to students who did not participate?

A linear regression analysis was completed to examine the effect of dual credit or dual enrollment participation and other factors – SES, gender, and race – on GPA over a three-year period of college enrollment. This analysis yielded a y-intercept for GPA of 2.73 ($p < .001$).

When examining the effect of dual credit and dual enrollment participation on college GPA, as outlined in Table 4, the model revealed that students participating in dual credit and dual enrollment programs had an improved college GPA of 0.32 points ($p < .001$), as compared to students who did not participate in dual credit or dual enrollment programs. Furthermore, three-year GPA was 0.10 points ($p < .001$) lower among Low SES students (Pell Grant recipients) than among students who did not receive a Pell

Grant. The three-year GPA among males was 0.12 points ($p < .001$) higher than that among females. Race also played a statistically significant factor in GPA differences among some subgroups of students. When referenced against white students, black students had a three-year GPA that was 0.52 points ($p < .001$) lower; Asian students had a GPA that was 0.26 points ($p < .01$) higher; and students of other non-Hispanic races had a GPA that was 0.17 points ($p < .05$) lower than the white student sample.

Table 4

Linear Regression on GPA Over Three Years

Independent Variables	B	SE
Intercept	2.73145***	0.02062
Dual Credit or Dual Enrollment	0.31963***	0.05009
Received Pell Grant	-0.10162***	0.02366
Gender (Male as Reference)	0.11979***	0.02158
Race (White as Reference)		
Black	-0.52183***	0.02370
Asian	0.25737**	0.09443
Hispanic	-0.10603	0.11124
Other	-0.16479*	0.06723
Adjusted R ²	0.13	

*** $p < .001$; ** $p < .01$; * $p < .05$

Accumulated Credit Hours

Research Question 3: Controlling for gender, race, and socioeconomic status, is there a significant difference in the number of accumulated credit hours in three years of first-time, full-time college enrollment for students who participated in a dual credit or dual enrollment program as compared to students who did not participate?

A linear regression analysis was also completed to examine the effect of dual credit and dual enrollment participation and other factors on the number of credit hours

accumulated by students over a three-year period of college enrollment. Results of this analysis, included in Table 5, indicate a y-intercept for accumulated credit hours of 42.31 ($p < .001$). When examining the effect of dual credit and dual enrollment participation on accumulated hours, the model did not reveal a statistically significant effect of dual credit and dual enrollment participation on accumulated hours. Students participating in dual credit or dual enrollment programs earned 0.41 fewer credit hours than non-dual enrollment students, but this did not prove to be statistically significant in the research model. Low SES students earned 5.22 more credit hours ($p < .001$) than High SES students. Also of statistical significance, race was a factor in accumulated credit hours among some subgroups of students. When referenced against white students, black students earned 13.03 fewer credit hours ($p < .001$); Hispanic students earned 13.36 fewer credit hours ($p < .001$); and students of other non-Hispanic races earned 7.21 fewer credit hours ($p < .001$) than the white student sample.

Table 5

Linear Regression on Accumulated Credit Hours Over Three Years

Independent Variables	B	SE
Intercept	42.31138***	0.64881
Dual Enrollment	-0.41363	1.66304
Received Pell Grant	5.22316***	0.73305
Gender (Male as Reference)	1.0975	0.68062
Race (White as Reference)		
Black	-13.03176***	0.73674
Asian	1.46288	3.08870
Hispanic	-13.36323***	3.27934
Other	-7.21607***	2.05343
Adjusted R ²	0.05	

*** $p < .001$; ** $p < .01$; * $p < .05$

Results Summary

This study revealed that dual credit and dual enrollment participation does, in fact, affect postsecondary outcomes for students enrolling in community colleges – specifically in the areas of associate degree completion and college GPA. With regard to degree completion, students who started college with prior experience in a dual credit or dual enrollment program were 2.51 times more likely to complete an associate degree within three years of first-time, full-time college enrollment than individuals who did not participate.

Additionally, the study revealed that factors such as SES, gender, and race had an effect on college GPA; and that SES and race affected the number of credit hours earned by community college students.

CHAPTER V
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Chapter Overview

The following chapter includes a summary of results from the research, looking at significant findings from each of the research questions posed in the study. The discussion of findings outline potential connections and implications and provide a basis of thought for policy and practitioner recommendations. Finally, recommendations for future research are provided.

Results Summary

This study revealed that dual credit and dual enrollment participation does, in fact, affect postsecondary outcomes for students enrolling in community colleges – specifically in the areas of associate degree completion and college GPA. Additionally, the study revealed that factors such as SES, gender, and race had an effect on college GPA; and that SES and race affected the number of credit hours earned by community college students.

Results indicated that, when controlling for gender, race, and socioeconomic status, students who participated in a dual credit or dual enrollment program were 2.51 times more likely to complete an associate degree within three years of first-time, full-time college enrollment than students who did not participate in such a program.

Students participating in dual credit and dual enrollment programs had a better college GPA than students who did not participate. Furthermore, GPA was affected by SES, gender, and race. The average three-year GPA was slightly higher among students who did not receive a Pell Grant. The three-year GPA among males was also slightly higher than that among females. Race played a statistically significant factor in GPA differences among some subgroups of students, as Asian students had a GPA that was higher than whites, while black and other non-Hispanic students had a lower 3-year GPA than white students.

While participation in a dual credit or dual enrollment program did not have a significant effect on the accumulation of credit hours, other factors did affect the number of credit hours earned by students. Pell Grant recipients earned more credit hours than students who did not receive a grant. Also of statistical significance, race was a factor in accumulated credit hours among some subgroups of students. When referenced against white students, black students, Hispanic students, and students of other non-Hispanic races earned fewer credit hours than the white student sample.

Discussion of Findings

Given the strong connection between participation in a dual credit or dual enrollment program and associate degree completion, the idea of further expanding dual credit and dual enrollment programs certainly bears much consideration. A factor that increases the likelihood of associate degree completion by 2.51 times, dual credit and dual enrollment program participation could significantly improve educational attainment in Mississippi. Also worth noting, significant differences in associate degree completion exist based upon both gender and race, as males were more likely than females to

complete an associate degree within three years of first-time, full-time enrollment. Much work still needs to be done to ensure minority students and females have opportunities and the necessary support to complete postsecondary studies if so desired.

College GPA was also affected positively by dual credit and dual enrollment participation. Perhaps the prior exposure to college-level courses provided a stronger foundation for course content or teacher expectations, but additional research would need to be conducted in this area. Race and gender also had an effect on college GPA. Male students had a slightly higher GPA than female students. When referenced again white students, Asian students had a higher GPA, while black students and other non-Hispanic student groups had a lower GPA than the white student sample.

When examining the results of research question 3, which considered credit hour accumulation, research indicated that there was no significant difference in credit hours accumulated during three years of college enrollment. Interesting, Pell Grant recipients earned approximately five credit hours more than students who did not receive a grant. While this could possibly be due to the availability of funds to pay for tuition and related costs, additional study could be considered in this area. As with associate degree completion rates, black and Hispanic students lagged behind their white classmates, accumulating 13 fewer credit hours over a three-year period of time. While one might expect to see a correlation between credit hour accumulation and associate degree completion, this connection was not studied as part of this research.

McCauley (2007) noted that students who participated in a dual enrollment program had an increased likelihood of graduating from four-year university within six years by factor of 2.05. The results of the current study yielded a similar trend –

improved graduation from a postsecondary institution within an established period of time.

Additionally, McCauley (2007) noted difficulty in collecting data to control for academic ability, since data must come from multiple sources. The researcher found this to also be the case during the course of this current study. While longitudinal data systems are becoming more robust, some data elements are still unavailable at the student level.

Prior research noted improved college GPAs for students who participated in a dual credit or dual enrollment program (Community College Research Center, 2012; Jones, 2014; Young, Joyner, and Slate, 2013). Similarly, the current study indicated that students who participated in such a program had a high college GPA than their non-participating college classmates.

General Recommendations for Practitioners and Policymakers

While the associate degree completion rate for the fall 2007 cohort in this study was only 19.64%, a clear correlation exists between participation in dual credit and dual enrollment programs and completion of an associate degree within three years of first-time, full-time college enrollment, as dual credit and dual enrollment students were more than twice as likely to complete a degree as those students who did not participate in these programs during high school. For this reason, state education and policy leaders might further examine ways to further expand participation and ease the financial burden of dual credit and dual enrollment programs. Beginning in 2012, the alignment process for high schools and community colleges offering dual credit and dual enrollment courses changed in Mississippi. This change provided some consistency across the state

regarding course names, content, and credits awarded for specific courses. In 2012, the Mississippi Department of Education began using course names as outlined by the community colleges, rather than allowing individual schools to try to align dual credit and dual enrollment course content with existing secondary course offerings.

Additionally, 3-hour credit college courses were structured to count as a single Carnegie unit of high school credit at this time. While uniform requirements for initial and continued participation in dual credit and dual enrollment programs are in place, individual colleges in Mississippi work with the school districts in their respective regions to establish memorandums of understanding, which address dual credit and dual enrollment course costs as well as the individuals responsible for tuition and fees. (Mississippi Department of Education, 2011, 2012).

State leaders should examine existing policies as the state works to improve associate degree completion rates, particularly among subgroups of students who, according to this body of research, do not accumulate college credit hours or complete associate degrees at the same rate as their white student counterparts. Policies regarding access to courses and funding structures for dual credit and dual enrollment courses are among those that should be reviewed.

Given the positive outcomes resulting from participation in dual credit and dual enrollment programs, including improved college GPA and an increased likelihood of completion of an associate degree within three years of college enrollment, these programs certainly bear consideration for expansion and further study in the future.

Recommendations for Future Research

As a result of this research, several additional studies should be considered going forward, particularly given the growing availability of longitudinal data within statewide longitudinal data systems that have launched in recent years across the United States. Additionally, state leaders might consider the need for an expanded study. This particular research study focused on dual credit and dual enrollment program participation's effect on community college completion in a selected group of five colleges within Mississippi's public community and junior college system. That being the case, a broader study could be conducted to examine outcomes within individual colleges and within the 10 Mississippi community colleges not included in this initial research.

Further research might also be conducted to examine other factors that account for differences in college GPA and credit hours earned. In this study, the adjusted R^2 for the linear regression analysis of GPA over three years was only 0.13. Furthermore, the adjusted R^2 for the linear regression analysis on accumulated credit hours over three years was even less at 0.05. In both cases, it seems that factors other than dual credit or dual enrollment status, Pell Grant receipt, gender, and race played a role both in overall GPA and in accumulated credit hours.

While the results of this study provide some clarity as to the potential effect of dual credit and dual enrollment programs on student outcomes at the community college level, the body of research remains relatively small. With the growing availability of data systems to connect student information longitudinally, an upward trend in dual credit and dual enrollment participation, and policy changes to allow for local schools and colleges

to coordinate services to meet the needs of their communities, now is the time for additional research on this topic.

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APPENDIX A
INSTITUTIONAL REVIEW BOARD APPROVAL

Study 12-327: Dual Credit/Dual Enrollment as a Predictor of College Success

jroberts@research.msstate.edu <jroberts@research.msstate.edu>
To: nro1@msstate.edu
Cc: jroberts@research.msstate.edu

Mon, Feb 4, 2013 at 2:59 PM

February 4, 2013

Nathan Oakley

RE: HRPP Study #12-327: Dual Credit/Dual Enrollment as a Predictor of College Success

Dear Mr. Oakley:

This email serves as official documentation that the above referenced project was reviewed and approved via administrative review on 2/4/2013 in accordance with 45 CFR 46.101(b)(4). Continuing review is not necessary for this project. However, in accordance with SOP 01-03 Administrative Review of Applications, a new application must be submitted if the study is ongoing after 5 years from the date of approval. Additionally, any modification to the project must be reviewed and approved by the HRPP prior to implementation. Any failure to adhere to the approved protocol could result in suspension or termination of your project. The HRPP reserves the right, at anytime during the project period, to observe you and the additional researchers on this project.

Please refer to your HRPP number (#12-327)! when contacting our office regarding this application.

Thank you for your cooperation and good luck to you in conducting this research project. If you have questions or concerns, please contact me at jroberts@research.msstate.edu or call 662-325-2238.

Finally, we would greatly appreciate your feedback on the HRPP approval process. Please take a few minutes to complete our survey at <http://www.surveymonkey.com/s/YZC7QQD>.

Sincerely,

Jodi Roberts, Ph.D.
IRB Officer

cc: Williams, Frankie (Advisor)