Does Location Matter? Evaluating the Influence of Dual Enrollment Program Location on Noncognitive Measures of College Readiness and Academic Performance: A Multiyear Study

Donald Galen DeHay
*Clemson University, gdehay@tctc.edu*

Follow this and additional works at: https://tigerprints.clemson.edu/all_dissertations

**Recommended Citation**
https://tigerprints.clemson.edu/all_dissertations/2432

This Dissertation is brought to you for free and open access by the Dissertations at TigerPrints. It has been accepted for inclusion in All Dissertations by an authorized administrator of TigerPrints. For more information, please contact kokeefe@clemson.edu.
ABSTRACT

The purpose of this quantitative study was two-fold. First, this study examines whether differences exist in students’ noncognitive readiness between non-dually enrolled students, dually-enrolled students on high school campuses, and dually-enrolled students on college campuses. Second, this study evaluates the relationship between noncognitive college readiness factors, dual enrollment program location, and students’ first year college grade point average (GPA).

Poor college readiness has been a persistent issue in higher education, contributing to stagnant college retention and graduation rates. Community colleges deliver dual enrollment programs to improve college readiness and postsecondary academic outcomes. Dual enrollment participation has grown at a rapid pace, and wide variation exists in program implementation. Program location is often cited as a variation in program implementation, but few studies have evaluated the influence of dual enrollment program location on students’ academic outcomes. Researchers have assessed dual enrollment students’ academic outcomes to quantify college readiness, but few studies have evaluated the influence of dual enrollment on noncognitive factors of college readiness.

Using data from a rural Southeastern community college, this nonexperimental quantitative study was structured in two phases. The first phase used a comparative design to analyze differences in student scores on six noncognitive measures of college readiness between students that did not complete dual enrollment coursework, students that completed dual enrollment coursework at a high school campus, and students that
completed dual enrollment coursework at a college campus. Analysis of covariance statistical tests were conducted to evaluate differences. The second phase of this study used a correlational design to determine whether dual enrollment program location and noncognitive measures influenced dual enrollment students’ first year college GPAs. Hierarchical regression analyses were conducted to evaluate the variance in first year college grade point average that was accounted by dual enrollment program location and noncognitive measures of college readiness.

No significant differences were found between groups for Academic Attributes, Help Seeking, Locus of Control, Persistence, and Procrastination noncognitive measures. Dual enrollment completers reported significantly higher Time Management scores compared to non-dually enrolled students, but the effect size was small. Hierarchical regression analyses showed dual enrollment program location and noncognitive measures significantly predicted students’ first year college GPA, controlling for high school GPA and bio-demographic variables.

The findings from this study suggest completing dual enrollment coursework on a college campus significantly predicts higher first year college GPA. Noncognitive measures exert significant influence student’s college readiness as measured by first year college GPA. Findings from this study may influence policymakers in revising dual enrollment policy implementation and practitioners in creating partnership agreements between secondary and postsecondary educational systems.
DEDICATION

No one travels an educational journey alone. This dissertation is dedicated to my mother, Betty DeHay. Throughout my life, she has been the ultimate resource I’ve relied upon during each of my educational and life transitions. She provided the challenge and support I needed to successfully reach each goal. Thank you for all you do for me.
ACKNOWLEDGMENTS

This educational journey was truly a partnership with my Clemson University family, my college family, and my “at-home” family. Each group contributed significantly to my ability to complete this dissertation and you deserve acknowledgements.

First, I would like to thank my dissertation committee for your advice, support, and recommendations. Dr. Tony Cawthon, I appreciate your guidance throughout my Ph.D. journey, especially during this dissertation endeavor. You spent a great deal of time helping me hone in on my research questions. I cannot thank you enough for your guidance in helping me navigate the process. Dr. Qian, I appreciate all your insights and quick email responses as I developed my methods. Your feedback on Chapters Three and Four provided me with the guidance and fortitude to finish this dissertation. Dr. Boettcher, I have appreciated your kind words of encouragement throughout my educational journey and your direction during the numerous times I became disordered. Dr. Frady, thank you for helping me to find ways to combine my professional experiences with my educational goals. I truly appreciate your guidance and friendship.

Next, I must acknowledge the support and friendship of numerous cohort members. Bethany, Emily, and Monica, I have been privileged to learn with you over the past three years. Each of you have provided support and have become friends. I could not have persevered through this program without each of you.

I would like to thank my college family for all your support. To my President, Dr. Ronnie Booth, thank you for encouraging me to earn a Ph.D. and for providing the
support for me to take classes while working full-time. To my college family, thank you for all your support.

Lastly, I must thank my “at-home” family and friends. each of you have supported me as I’ve sacrificed time away from you to complete this program and dissertation. Thank you for listening to me and supporting me along the way.
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE PAGE</td>
<td>i</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>DEDICATION</td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>iv</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>x</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xii</td>
</tr>
<tr>
<td><strong>CHAPTER</strong></td>
<td></td>
</tr>
<tr>
<td>I.  INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Background</td>
<td>1</td>
</tr>
<tr>
<td>Problem</td>
<td>4</td>
</tr>
<tr>
<td>Purpose</td>
<td>5</td>
</tr>
<tr>
<td>Research Questions</td>
<td>6</td>
</tr>
<tr>
<td>Research Design</td>
<td>6</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>8</td>
</tr>
<tr>
<td>Delimitations</td>
<td>9</td>
</tr>
<tr>
<td>Limitations</td>
<td>9</td>
</tr>
<tr>
<td>Conceptual Framework</td>
<td>10</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>11</td>
</tr>
<tr>
<td>Summary and Organization of the Study</td>
<td>13</td>
</tr>
<tr>
<td>II. REVIEW OF THE LITERATURE</td>
<td>15</td>
</tr>
<tr>
<td>Literature Review Method</td>
<td>15</td>
</tr>
<tr>
<td>College Readiness in American Higher Education</td>
<td>16</td>
</tr>
<tr>
<td>Disjointed Educational Systems</td>
<td>25</td>
</tr>
<tr>
<td>Dual Enrollment: A College Readiness Intervention</td>
<td>27</td>
</tr>
<tr>
<td>Characteristics of Dual Enrollment Programs</td>
<td>31</td>
</tr>
<tr>
<td>Benefits of Dual Enrollment for Students</td>
<td>34</td>
</tr>
<tr>
<td>Individual Characteristics Influencing Student Success</td>
<td>39</td>
</tr>
<tr>
<td>Dual Enrollment Limitations</td>
<td>43</td>
</tr>
</tbody>
</table>
Table of Contents (continued)

Dual Enrollment Educational Settings ................................................... 45
Influence of Dual Enrollment on Noncognitive College Readiness Factors .................................................. 52
Gaps and Limitations in the Literature .................................................. 54
Conceptual Framework .......................................................................... 57
Summary ................................................................................................ 65

III. METHODS .................................................................................................. 66

Purpose, Research Questions, and Hypotheses ........................................ 66
Research Designs ................................................................................... 69
Variables ................................................................................................ 73
Sample .................................................................................................... 76
Data Collection ...................................................................................... 77
Delimitations .......................................................................................... 78
Instrumentation ...................................................................................... 79
Research Ethics and Institutional Review Board Approval ................... 81
Data Analysis ......................................................................................... 82
Limitations and Threats to Validity ....................................................... 90
Summary ................................................................................................ 91

IV. RESULTS .................................................................................................... 92

Comparative Study Results .................................................................... 93
Correlational Study Results ................................................................. 117
Summary .............................................................................................. 130

V. DISCUSSION, IMPLICATIONS, AND CONCLUSION ........................ 132

Summary of the Study ............................................................................ 132
Conceptual Framework Summary ....................................................... 134
Discussion of Findings .......................................................................... 136
Implications .......................................................................................... 147
Limitations ........................................................................................... 151
Recommendations for Future Research ............................................... 153
Conclusion ........................................................................................... 155

APPENDICES ............................................................................................................. 159

A: SmarterMeasure Individual Attributes Questions .................................... 160
Table of Contents (Continued)

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>B: Institutional Review Board Approval Email</td>
<td>162</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>163</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Means and Standard Deviations of Academic Attributes Scores by Dual Enrollment Completion</td>
<td>94</td>
</tr>
<tr>
<td>4.2</td>
<td>One way ANCOVA Tests of Between-Subjects Effects for Academic Attributes with High School GPA as a Covariate</td>
<td>96</td>
</tr>
<tr>
<td>4.3</td>
<td>Estimated Adjusted Means for One-Way ANCOVA for Academic Attributes with High School GPA as a Covariate</td>
<td>97</td>
</tr>
<tr>
<td>4.4</td>
<td>Means and Standard Deviations of Help Seeking Scores by Dual Enrollment Completion</td>
<td>98</td>
</tr>
<tr>
<td>4.5</td>
<td>One way ANCOVA Tests of Between-Subjects Effects for Help Seeking with High School GPA as a Covariate</td>
<td>100</td>
</tr>
<tr>
<td>4.6</td>
<td>Estimated Adjusted Means for One-Way ANCOVA for Help Seeking with High School GPA as a Covariate</td>
<td>100</td>
</tr>
<tr>
<td>4.7</td>
<td>Means and Standard Deviations of Locus of Control Scores by Dual Enrollment Completion</td>
<td>101</td>
</tr>
<tr>
<td>4.8</td>
<td>One way ANCOVA Tests of Between-Subjects Effects for Locus of Control with High School GPA as a Covariate</td>
<td>104</td>
</tr>
<tr>
<td>4.9</td>
<td>Estimated Adjusted Means for One-Way ANCOVA for Locus of Control with High School GPA as a Covariate</td>
<td>104</td>
</tr>
<tr>
<td>4.10</td>
<td>Means and Standard Deviations of Persistence Scores by Dual Enrollment Completion</td>
<td>105</td>
</tr>
<tr>
<td>4.11</td>
<td>One way ANCOVA Tests of Between-Subjects Effects for Persistence with High School GPA as a Covariate</td>
<td>107</td>
</tr>
<tr>
<td>4.12</td>
<td>Estimated Adjusted Means for One-Way ANCOVA for Persistence with High School GPA as a Covariate</td>
<td>108</td>
</tr>
<tr>
<td>4.13</td>
<td>Means and Standard Deviations of Procrastination Scores by Dual Enrollment Completion</td>
<td>109</td>
</tr>
</tbody>
</table>
List of Tables (continued)

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.14</td>
<td>One way ANCOVA Tests of Between-Subjects Effects for Procrastination with High School GPA as a Covariate</td>
</tr>
<tr>
<td>4.15</td>
<td>Estimated Adjusted Means for One-Way ANCOVA for Procrastination with High School GPA as a Covariate</td>
</tr>
<tr>
<td>4.16</td>
<td>Means and Standard Deviations of Time Management Scores by Dual Enrollment Completion</td>
</tr>
<tr>
<td>4.17</td>
<td>One way ANCOVA Tests of Between-Subjects Effects for Time Management with High School GPA as a Covariate</td>
</tr>
<tr>
<td>4.18</td>
<td>Estimated Adjusted Means for One-Way ANCOVA for Time Management with High School GPA as a Covariate</td>
</tr>
<tr>
<td>4.19</td>
<td>Pairwise Comparisons for One-Way ANCOVA for Time Management with High School GPA as a Covariate</td>
</tr>
<tr>
<td>4.20</td>
<td>Sample Bio-demographic Information for Categorical Independent Variables</td>
</tr>
<tr>
<td>4.21</td>
<td>Descriptive Statistics for Independent Variables</td>
</tr>
<tr>
<td>4.22</td>
<td>Correlations Between Independent Variables and First Year College GPA</td>
</tr>
<tr>
<td>4.23</td>
<td>Hierarchical Regression Model Summary Predicting First Year College GPA</td>
</tr>
<tr>
<td>4.24</td>
<td>Hierarchical Regression Analysis ANOVA Table Predicting First Year College GPA</td>
</tr>
<tr>
<td>4.25</td>
<td>Summary of Hierarchical Regression Predicting First Year College GPA from High School GPA, Race, SES, Sex, Dual Enrollment Program Location, and Noncognitive Measures of College Readiness</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Conley’s (2008) conceptual model of college readiness</td>
<td>58</td>
</tr>
<tr>
<td>2.2</td>
<td>Conceptual model</td>
<td>64</td>
</tr>
<tr>
<td>4.1</td>
<td>Academic Attributes Scores for Dual Enrollment Completion</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>High School GPA as a Covariate</td>
<td></td>
</tr>
<tr>
<td>4.2</td>
<td>Help Seeking Scores for Dual Enrollment Completion</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>High School GPA as a Covariate</td>
<td></td>
</tr>
<tr>
<td>4.3</td>
<td>Locus of Control Scores for Dual Enrollment Completion</td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>High School GPA as a Covariate</td>
<td></td>
</tr>
<tr>
<td>4.4</td>
<td>Persistence Scores for Dual Enrollment Completion</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td>High School GPA as a Covariate</td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td>Procrastination Scores for Dual Enrollment Completion</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>High School GPA as a Covariate</td>
<td></td>
</tr>
<tr>
<td>4.6</td>
<td>Time Management Scores for Dual Enrollment Completion</td>
<td>114</td>
</tr>
<tr>
<td></td>
<td>High School GPA as a Covariate</td>
<td></td>
</tr>
<tr>
<td>4.7</td>
<td>Normal P-P Plot of Standardized Residuals for the First Year</td>
<td>129</td>
</tr>
<tr>
<td></td>
<td>College GPA Outcome Variable</td>
<td></td>
</tr>
<tr>
<td>4.8</td>
<td>Scatterplot of Standardized Residuals by Standardized Predicted Values</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>for the College GPA Outcome Variable</td>
<td></td>
</tr>
<tr>
<td>5.1</td>
<td>Conceptual model</td>
<td>136</td>
</tr>
</tbody>
</table>
CHAPTER ONE
INTRODUCTION

Background

At no time has earning a college degree been more important. For many years, a high school diploma served as the gateway to employment (Baker, Clay, & Gramata, 2005). A shift to a knowledge economy has changed the requirements to obtain employment. Researchers predicted that by 2020, an associate’s or bachelor’s degree will be required for sixty-five percent of occupations (Carnevale, Smith, & Strohl, 2013). Individuals with associate’s degree and bachelor’s degree may earn up to 84 percent more compared to individuals with high school diplomas (Carnevale, Rose, & Cheah, 2011).

While the value of a postsecondary credential continues to increase, retention and college completion rates are stagnant. Between 2011 and 2016, four-year college retention rates and bachelor’s degree attainment rose by one percent and two-year college retention rates and associate’s degree attainment rose by 2 percent (U.S. Department of Education, 2018). Two-year college completion rates remained low. In 2016, two-year college graduation rates were 30 percent (U.S. Department of Education, 2018).

Low retention and graduation rates have led external constituents to demand colleges and universities refocus their efforts on success and access and college completion to meet workforce needs (Carnevale, Smith, & Strohl, 2010; Obama, 2014; O’Banion, 2012). Retention and graduation rates are particularly important to community colleges that enrolled about 40% of the college student population in the United States
Community colleges offer open access to higher education, but open access creates academic achievement issues because many students enrolled academically underprepared for the rigors of college work and did not possess the requisite skills to navigate the college environment (Cohen, Brawer, & Kisker, 2014).

Accordingly, educators, policymakers, and researchers have increased their focus on aligning high school academic requirements with entry-level college coursework and expectations. Their work has focused on improving students’ readiness for college (Nagaoka, Farrington, Roderick, Allensworth, Keyes, Johnson, & Beechum, 2013). College readiness is a persistent challenge that often determines whether a student is successful in a higher education setting. Poor college readiness has led to low persistence and completion rates (Barnett, 2011). Pittman (2010) differentiated fully credentialed high school students from fully prepared high schools students, stating about thirty percent of high school graduates are fully prepared for college. Poor postsecondary outcomes were partly a result of academic underpreparedness (Bailey, Jeong, & Cho, 2010), and approximately fifty percent of college students enrolled in one or more remedial courses in their first year of college (Scott-Clayton & Rodriguez, 2015), but academically prepared students also struggled to persist in their first year in college. Shields (2002) asserted freshman experienced difficulty learning to navigate the complexities of the college environment, learning new time management strategies, and forming new social relationships.

College readiness encompasses an array of knowledge and skills that include content knowledge, academic behaviors, and understanding the context of college
(Tierney & Sablan, 2014). Recognizing the complexity of college readiness, Conley (2008, 2012) provided a holistic model comprised of four broad dimensions: (a) key cognitive strategies, (b) key content knowledge, (c) key learning skills and techniques, and (d) key transition knowledge and skills. Conley’s model highlights cognitive and noncognitive dimensions of college readiness (Camara, 2013). Researchers have identified cognitive and noncognitive factors as two broad categories of college readiness (Bragg & Taylor, 2014; Porter & Polikoff, 2012; Strayhorn, 2014). Recently, researchers have increased their focus on evaluating and explaining noncognitive factors that influence student’s readiness for college. Researchers found positive correlations between noncognitive college readiness factors and academic outcomes (An & Taylor, 2015; Martin, 2013; Robbins et al, 2006).

Bailey and Karp (2003) stated that community colleges offer dual enrollment programs to improve college readiness, student access, and academic outcomes. Participation in dual enrollment was purported to ease a student’s transition into college (Karp, 2012). Over two million students enrolled in one or more dual enrollment courses each year (Thomas, Marken, Gray, & Lewis, 2013). Dual enrollment is “an organized system with special guidelines that allows high school students to take college-level courses” (Thomas, Marken, Gray, & Lewis, 2013, p. 1). Benefits included improved academic performance in college (Allen & Dadgar, 2012), increased access to higher education (Pretlow & Wathington, 2014), and improved completion outcomes (An, 2013b).
Problem

Proponents claim dual enrollment programs improved college readiness by providing college-level coursework to high school students (Bound, Lovenheim, & Turner, 2010), but few studies have evaluated the veracity of the claim that dual enrollment improves students’ college readiness. Most extant literature focused on academic achievement of dual enrollment students while in high school or their academic performance in college. These studies used academic performance as indirect indicators of college readiness (An & Taylor, 2015). Few studies have evaluated the relationship between dual enrollment participation and cognitive or noncognitive dimensions that encompass college readiness.

A second problem that was identified was the variation in which states and colleges implemented dual enrollment programs (Perna, Rowan-Kenyon, Bell, Thomas, & Li, 2008). The physical location where dual enrollment coursework was delivered is a consistently cited variation of dual enrollment implementation (Bailey, Hughes, Karp, & Fermin, 2005). Researchers have noted offering dual enrollment coursework on a college campus creates the most authentic experience for high school students to develop the knowledge and skills to be college-ready (Edwards, Hughes, & Weisberg, 2011; Karp, 2012). Only 17 percent of dual enrollment coursework was offered at a college campus (U.S. Department of Education, 2019). Consequently, researchers have recommended assessing the influence of dual enrollment program location on student outcomes (An, 2013a; Ozmun, 2013).
Few studies have evaluated the relationship between dual enrollment participation and noncognitive measures of college readiness (An & Taylor, 2015; Burns & Lewis, 2000; Kanny, 2015; Martin, 2013). Prior studies point towards the importance of program location on dual enrollment students’ college readiness and academic performance (An, 2013a; Dare, Dare, & Nowicki, 2017; Karp, 2012). No studies have evaluated the influence of program location on noncognitive measures of college readiness. Further, no studies have addressed to what extent dual enrollment program location and noncognitive measures of college readiness predict students’ academic performance in college.

**Purpose**

The purpose of this non-experimental quantitative study is two-fold. First, this study examines whether differences existed in students’ noncognitive readiness between non-dually enrolled students, dually-enrolled students who completed coursework on a college campus, and dually enrolled students who completed coursework on a high school campus. Second, this study evaluates the relationship between noncognitive college readiness factors, dual enrollment program location, and students’ first year college GPA.

Researchers (Robbins, Allen, Casillas, Peterson, & Le, 2006; Komarraju, Ramsey, & Rinella, 2013) have illustrated that noncognitive college readiness factors influence a student’s academic achievement. Conley (2014) theorized noncognitive dimensions influence a student’s college readiness and subsequent academic performance in college. In this study, I use six noncognitive measures of college readiness from the SmarterMeasure learning readiness survey to examine noncognitive factors of college readiness.
readiness: (a) academic attributes, (b) help seeking, (c) persistence, (d) procrastination, (e) time management, and (f) locus of control.

Uniquely, this study incorporates dual enrollment program location and noncognitive measures as predictor variables of first year college grade point average. Numerous studies cited the need to assess the influence of where dual enrollment courses were delivered (An, 2013a; Dare, Dare, & Nowicki, 2017; Karp, 2012; Taylor, 2015). Researchers reported correlations between noncognitive factors and academic performance in college (Farrington et al., 2012; Robbins et al, 2006; Sedlacek, 2011). Completing dual enrollment coursework on a college campus may differentially influence the development of a student’s college readiness skills and improve students’ academic outcomes.

**Research Questions**

The following research questions guide this study.

1. Are there significant differences in scores on noncognitive measures of college readiness between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus?

2. Is there a relationship between dual enrollment students’ scores on noncognitive measures of college readiness, the location where students completed their dual enrollment coursework, and their first year college GPA?
Research Design

This non-experimental quantitative study is designed in two phases based on research questions. A comparative design is used to answer the first research question. Using students’ scores on measures of noncognitive college readiness from a survey, I conduct an analysis of variance (ANCOVA) test to answer research question one. ANCOVA is used to evaluate differences in means between more than two groups where statistical adjustments are made to the means based on the correlation between a covariate and the dependent variable (Hinkle, Wiermsa, & Jurs, 2003). An ACNOVA test is congruent with evaluating differences in adjusted means between more than two groups (Shadish, Cook, & Campbell, 2002).

The independent variable is dual enrollment completion. The covariate is high school GPA. The dependent variables are six noncognitive college readiness measures taken from the SmarterMeasure learning readiness survey: (a) academic attributes, (b) help seeking, (c) persistence, (d) procrastination, (e) time management, and (f) locus of control. Student responses from the SmarterMeasure learning readiness survey are used to compare scores on noncognitive measures between students who did not participate in dual enrollment, students who completed dual enrollment coursework on a college campus, and students who completed dual enrollment coursework on a high school campus. ANCOVA analyses are conducted for each dependent variable, controlling for high school GPA.

The second phase of this study uses a correlational design to answer the second research question. I use multiple regression analyses and a hierarchical regression
framework to evaluate the relationship between dual enrollment program location, students’ scores on noncognitive college readiness measures, and students’ first year college GPA. Multiple regression analysis is useful in evaluating the influence of multiple predictor variables on a continuous dependent variable (Hinkle, Wiersma, & Jurs, 2003). Using a hierarchical regression framework, predictor variables are added sequentially to the regression model based on theoretical grounds. Students’ noncognitive college readiness scores and the location where they completed their dual enrollment coursework are used to predict students’ first year college GPA.

**Significance of the Study**

Dual enrollment participation grew at a rapid pace with 82% of all high schools offering dual enrollment coursework to students (Thomas, Marken, Gray, & Lewis, 2013). Proponents identify improving college readiness as a central goal for dual enrollment programs, yet little research has evaluated the influence of dual enrollment participation on college readiness (An, 2015). This study contributes to the literature assessing the effectiveness of dual enrollment programs. Further research is needed to evaluate dual enrollment programs and their impact on college readiness.

States exert control over dual enrollment policies (Borden, Taylor, & Park, 2015). The findings from this study can inform policymakers in designing more effective dual enrollment policies that promote college readiness for high school students. Understanding the influence of dual enrollment participation on noncognitive college readiness factors can inform policymakers and practitioners as they design and implement dual enrollment programs.
Community colleges and high schools used partnership agreements to delineate where dual enrollment coursework was offered and how resources were allocated (Taylor, Borden, & Park, 2015). Evaluating the influence of dual enrollment program location on noncognitive college readiness factors and academic performance can inform college and high school administrators in designing partnership agreements that promote an authentic college experience.

**Delimitations**

This study’s primarily delimitation was the context. All data were collected from one rural community college located in the Southeast United States. The study was further delimited to include only first time college students who enrolled at the Southeastern community college. This study was delimited to dual enrollment courses offered by the community college used in this study. Students who completed dual enrollment coursework from other institutions were excluded from this study because high school transcripts did not denote the location where dual enrollment coursework was completed.

The SmarterMeasure survey was administered to entering students between the years of 2012 and 2017 as part of the admissions process, thus delimiting the sample to students who enrolled as first time freshman at the community college between the 2012 and 2017 academic years. The study was delimited to subscale scores from students’ responses to the Individual Attributes section of the SmarterMeasure learning readiness survey. The Individual Attributes section contained six subscales that functioned as
noncognitive measures of college readiness. The measure of academic performance was delimited to first year college GPA.

**Limitations**

This study presents numerous limitations and potential issues. This study used data from a single community college. The sample may not be representative of the entire dual enrollment population, thus limiting the generalizability of the findings. The SmarterMeasure instrument assesses students’ perceptions of their readiness at a single point in time. Self-reported data functions as a threat to internal validity (Shadish, Cook, & Campbell, 2002). In this study, students self-reported their noncognitive measures of readiness which may not reflect their actual capabilities. Speroni (2012) asserted students’ self-selection to participate in dual enrollment introduced selection bias that may lead to overstating the influence of dual enrollment when measuring academic achievement outcomes. Archival data from a learning readiness survey was used to measure noncognitive factors of college readiness. The archival data did not contain student responses to individual questions. Therefore, it was not possible to validate construct validity or reliability for student responses in this study.

**Conceptual Framework**

A successful transition to college is predicated on a student’s college readiness (Conley, 2008). The conceptual framework for this study draws from Conley’s (2008; 2014) college readiness framework and Transition Theory to understand the relationships between dual enrollment program location, noncognitive factors of college readiness, and students’ academic performance in college. Conley’s (2008; 2014) college readiness
framework incorporates cognitive and noncognitive dimensions into a holistic perspective of college readiness. Two dimensions, key cognitive strategies and key content knowledge, comprise cognitive dimensions of college readiness. Key learning skills and techniques and key transition knowledge and skills constitute noncognitive college readiness dimensions.

Conley’s (2008, 2014) framework was developed to explain college readiness in context of a traditional high school student experience, but the framework does not account for the influence of dual enrollment program location on students’ college readiness. Therefore, this study incorporates Schlossberg’s (1984) Transition Theory to understand how the context of dual enrollment program location influences students’ transition to college. The context of a transition includes the physical setting which contributes to or detracts from a successful transition (Chickering & Schlossberg, 2002). Utilizing transition theory allows for interpretation of results regarding the influence of program location on dual enrollment students’ perceptions of their college readiness and their subsequent academic performance.

Drawing from these frameworks, I postulate completing dual enrollment coursework influences noncognitive measures of college readiness factors and completing dual enrollment coursework on a college campus significantly increases noncognitive measures. I also postulate completing dual enrollment on a college campus significantly increases students’ first year college GPA.

**Definition of Terms**

The following definitions represent important terms used throughout this study.
• **Academic Performance**: An outcome that represents the extent to which a student demonstrates the skills and abilities to complete college coursework. Academic performance is measured by a student’s first-year college grade point average (Robbins et al., 2006).

• **College Readiness**: The preparation required of a student to enroll and succeed in college coursework required for a college credential (Conley, 2014).

• **Construct Validity**: The extent to which specific observed measures represent their higher order constructs (Shadish, Cook, & Campbell, 2002).

• **Dual Enrollment**: An organized acceleration program with defined guidelines whereby high school students participate in college coursework, earning either college credit or both college and high school credit (Thomas, Marken, Gray, & Lewis, 2013).

• **First-generation college student**: A student whose parents have a high school education or lower and neither parent attended college (Chen, 2005).

• **Grade Point Average (GPA)**: a ratio that represents the average of final grades earned in all courses a student completed (Adelman, 2006).

• **Noncognitive College Readiness Factors**: Attitudes, behaviors, and skills that are essential to students’ academic performance and retention in college but may not be reflected on achievement exams (Farrington et al., 2012).

• **Program Location**: The physical location where dual enrollment programs are delivered. Dual enrollment programs are physically located on either high school or college campuses (Edwards, Hughes, & Weisberg, 2011).
• **Race**: A designation created by the U.S. Office of Management and Budget to categorize individuals who identify into one of the following communities: American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or other Pacific Islander, or White (U.S. Department of Education, 2018-19 IPEDS Data Collection System, n.d.).

• **Reliability**: The consistency of measurements (Shadish, Cook, & Campbell, 2002).

• **Sex**: A dichotomous designation of male or female as identified by the individual (Peter & Horn, 2005).

• **Socioeconomic Status (SES)**: An index based on parental education level, family income, and parent’s occupation (Lauff & Ingels, 2015).

• **Transition**: An event or nonevent that results in a change in assumptions, relationships, roles, or routines as defined by the perceptions of the individual experiencing the event or nonevent (Chickering & Schlossberg, 2002).

**Summary and Organization of the Study**

This chapter introduced college readiness as an issue in American higher education and presented dual enrollment as a college readiness intervention. Noncognitive factors were introduced as dimensions of college readiness that warrant further exploration for dual enrollment participants. Dual enrollment program location was introduced as a policy variation that warrants further investigation. The purposes of the study were: (1) to examine whether differences existed in students’ noncognitive readiness between non-dually enrolled students and dually-enrolled students by program
location, and (2) to evaluate the relationship between noncognitive college readiness factors, dual enrollment program location, and students’ first year college GPA.

This study is organized in five chapters. Chapter 1 provided background for study and presented the problem, research questions, limitations and delimitations of the study, the significance of the study, and the theoretical and conceptual frameworks used to explain the findings. Chapter 2 situates the study in the existing literature related to dual enrollment as a college readiness intervention. The chapter explores program location as an important policy variation and examines gaps and limitations of the literature. Chapter 3 describes the research methodology, the dataset, analytic methods, and threats to validity. Chapter 4 describes the results from the analysis and the findings derived from analyzing the dataset. Chapter 5 discusses findings using the theoretical and conceptual frameworks and provides conclusions and implications for research and practice.
CHAPTER TWO

REVIEW OF THE LITERATURE

This chapter summarizes and evaluates the literature concerning dual enrollment programs and their relationship to college readiness and the transition to college. After reviewing the methods used to conduct the literature review, this chapter introduces college readiness as a critical issue in American higher education. An exploration of college readiness factors is provided, with specific attention given to noncognitive college readiness factors. Next, dual enrollment is explained as a college readiness intervention. The benefits and limitations of dual enrollment programs are explored, followed by the differential impacts based on student characteristics. The literature review then focuses on dual enrollment program location as a policy variation that warrants further investigation. Then, an examination gaps in the literature are provided with regards to the influence of program location on dual enrollment students’ college readiness and academic performance. The literature review concludes with an exploration of conceptual frameworks that will be used to understand the findings.

Literature Review Method

The review of literature covered published journals and reports since the year 2000. A Boolean search using the EBSCO Multiple Database Search produced 5,114 publications using the following terms: dual enroll* OR dual credit and college read*. Narrowing results using Academic Search Complete and the Education Resource Information Center yielded 1,179 publications. Further filtering for peer reviewed studies, reports, and government reports produced 993 publications. After sorting the
results for relevance, a review of publication titles and abstracts identified articles and reports most relevant to the study.

A second Boolean search using the EBSCO Multiple Database Search produced 81 publications using the following terms: college read* AND noncognitive. Further filtering for peer reviewed studies, reports, and government reports produced 72 publications. A review of publication titles and abstracts identified additional articles and reports relevant to the study. Both searches produced a study by An and Taylor (2015) that evaluated noncognitive college readiness factors of dually-enrolled students. A review of references in An and Taylor’s (2015) study yielded additional articles related to college readiness.

**College Readiness in American Higher Education**

At no time in American history has earning a college degree been more important. In the past, earning a high school diploma served as the gateway for employment and a good life (Baker, Clay, & Gramata, 2005). A shift to a knowledge economy radically changed the knowledge and skills required to attain employment. Jobs that required an associate’s or bachelor’s degree continued to rise, outpacing jobs requiring a high school diploma (Carnevale & Desrochers, 2003). By 2020, sixty-five percent of jobs will require an associate’s degree or bachelor’s degree (Carnevale, Smith, & Strohl, 2013). The economic payoff for earning a postsecondary credential provides compelling evidence for earning a college degree. Those who earn a bachelor’s degree can expect to earn 84 percent more than those with a high school diploma and those who earn an associate’s degree can expect to earn 31 percent more than those with a high school diploma.
(Carnevale, Rose, & Cheah, 2011). Thus, the value of holding only a high school degree continues to decline.

At the same time as the need for postsecondary credentials has risen, college completion and retention rates remained stagnant. Between 2011 and 2016, bachelor’s degree completion rates rose from 59 percent to 60 percent. Over the same time period, the completion rates at two-year colleges rose from 28 percent to 30 percent (U.S. Department of Education, 2018). Between 2012 and 2016, four-year college retention rates rose from 80 percent to 81 percent, while rates for least selective institutions rose from 61 percent to 62 percent. Over the same timeframe, two-year college retention rates rose from 60 percent to 62 percent (U.S. Department of Education, 2015; U.S. Department of Education, 2018).

Exacerbated by low completion rates, external constituents were asking colleges and universities to refocus efforts on access and success (O’Banion, 2012), college completion (Obama, 2011), and meeting workforce talent demands (Carnevale, Strohl, & Smith, 2013). These issues were particularly cogent for community colleges who enroll about 40 percent of the total college student population in the United States (U.S. Department of Education, 2018). Arguably the greatest strength of community colleges is open access to education. Open access also presents the greatest challenge to community colleges because many community college students enroll academically underprepared for the rigors of college work and many students entered college without the requisite skills to navigate the college environment (Cohen, Brawer, & Kisker, 2014).

In an effort to address growing concerns around college completion, educators,
policymakers, and researchers increased their focus on aligning high school academic requirements with entry-level college coursework and expectations. Their work centered around improving students’ academic content knowledge and skills in addition to noncognitive factors that influenced performance. In essence, their work focused on improving students’ college readiness (Nagaoka, Farrington, Roderick, Allensworth, Keyes, Johnson, & Beechum, 2013).

**College Readiness Definitions**

College readiness is a multifaceted construct. Baker, Clay, and Gratama (2005) defined three elements of college readiness: (a) college awareness, (b) college eligibility, and (c) college preparation. Taken together, these elements represent a college-ready student capable of success in college. Baker, Clay, and Gratama (2005) defined college awareness as a student’s ability to acquire knowledge about aspects of college attendance that include setting goals, career exploration, understanding costs, and learning admissions requirements. College eligibility was defined as the completion of required coursework to be admitted into college. Indicators of college eligibility included completion of college-preparatory level sequences of English, mathematics, natural sciences, and social studies coursework that aligned with college admissions requirements (Baker, Clay, & Gratama, 2005). College preparation was defined by the application of college awareness skills such that a student was able to enroll and succeed in college-level coursework without the need for remediation (Baker, Clay, & Gratama, 2005).
Baker, Clay, and Gratama’s (2005) conceptualization of college readiness underscored the construct’s complexity. Traditional definitions characterized college readiness based on a student’s cognitive ability and academic outcomes (Komarraju, Ramsey, & Rinella, 2013). One definition for college readiness was based on high school students’ course taking patterns. In this context, readiness was defined by the level of high school course rigor and whether students meet college admissions requirements (Roderick, Nagaoka, & Coca, 2009; Venezia, Callan, Finney, Kirst, & Usdan, 2005).

A second definition focused on students’ performance on standardized tests, the ACT or SAT, to define their college readiness (Wiley, Wyatt, & Camara, 2010). For community colleges, Venezia and Voloch (2012) stated that they use ACCUPLACER to assess readiness for English and mathematics. Using these tests, policymakers and educators created benchmark scores to predict success in college and to determine whether remediation is required (Camara, 2013). A third definition of college readiness centered on the need for remediation. Researchers using this definition assumed that students who were college-ready could demonstrate requisite content knowledge and skills as measured by entrance exams (Bragg & Taylor, 2014). Using this definition, the need for remediation served as a proxy to measure for college readiness (Porter & Polikoff, 2012).

Three college readiness definitions focus on various aspects of students’ cognitive abilities and academic outcomes. Yet, researchers have asserted the importance of noncognitive academic factors on students’ college readiness and academic outcomes in college (An & Taylor, 2015; Martin, 2013; Roderick, Nagaoka, & Coca, 2009; Robbins,
The next section summarizes Conley’s (2008) college readiness model that incorporates cognitive and noncognitive dimensions of college readiness.

**A Comprehensive College Readiness Model**

A student who demonstrates college readiness “can qualify for and succeed in entry-level, credit-bearing college courses leading to a baccalaureate or certificate, or career pathway-oriented training programs without the need for remedial or developmental coursework” (Conley 2012, p. 1). Conley (2008) proposed a college-ready student comprehends college expectations, possesses skills to cope with content knowledge, and understands the norms and behaviors of the college environment. Conley (2008, 2014) proposed a comprehensive college readiness framework that defined the cognitive and noncognitive knowledge and skills required for students to be college ready. The framework was comprised of four dimensions: (a) key cognitive strategies, (b) key content knowledge, (c) key learning skills and techniques, and (d) key transition knowledge and skills. Key content knowledge and key content knowledge comprised cognitive dimensions of the model. Noncognitive dimensions included key learning skills and techniques and key transition knowledge and skills.

Key cognitive strategies comprised the intellectual behaviors required to successfully complete college work. Strategies included research, problem formation, interpretation, and communication (Conley, 2008). Key content knowledge denoted the foundational knowledge and skills of a subject required for students to develop academic aptitude for a subject or area of inquiry. Components included the student’s challenge
level, effort, technical knowledge, and the perceived value of the knowledge. For Conley (2008), academic preparedness was an important output of this dimension.

Key learning skills and techniques were categorized into ownership of learning and learning techniques. Ownership of learning was characterized by setting goals, persistence towards achieving goals, help-seeking, and self-efficacy. Learning techniques encompassed study skills, time management skills, and collaborative learning (Conley, 2008). Key transition knowledge and skills constituted the knowledge and skills needed to successfully navigate the transition to college and the college environment. Key transition knowledge included awareness of postsecondary expectations, admissions processes, costs, self-advocacy, and adopting the college student role. Underrepresented populations often lacked transition knowledge and skills (Conley, 2008). Conley (2008) theorized the four dimensions interacted such that a student demonstrated readiness for college to the extent that the student demonstrated mastery in all dimensions.

**College Readiness Factors**

College readiness encompasses a wide array of knowledge and skills that include content knowledge, academic behaviors, and understanding the context of college (Tierney & Sablan, 2014). Conley’s model emphasized the importance of both cognitive and noncognitive academic dimensions of college readiness (Camara, 2013). Researchers identified cognitive and noncognitive factors as two broad categories of college readiness (Bragg & Taylor, 2014; Porter & Polikoff, 2012; Strayhorn, 2014). Prior quantitative studies have examined the influence of cognitive and noncognitive measures on college success (Kitsantas, Winsler, & Huie, 2008; Robbins et al., 2004; Robbins et al., 2006;
The next section explores prior studies that have measured cognitive and noncognitive factors and the extent to which these factors predict academic success in college.

**Cognitive factors of college readiness.** Cognitive factors of college readiness were defined as the content knowledge and cognitive strategies required to be successful in college coursework (Roderick, Nagaoka, & Coca, 2009). Adelman (2006) found students gained content knowledge through completing rigorous academic coursework. Academic preparation in the core subject areas of English and mathematics were strongly correlated with academic performance in college (Porter & Polikoff, 2012). Conley (2008) asserted students must also possess cognitive skills that transcend any single academic discipline. These skills included critical thinking, communication, problem-solving, and research skills.

Byrd and MacDonald (2005) reported researchers used various measures to predict college readiness, including placement exams and standardized tests. The most common cognitive measures of college readiness were college entrance exam scores (Geartner & McClarty, 2015) and high school grade point average (Ngo & Kwon, 2015). Most often, these measures were used to predict students’ first-year college GPA (Porter & Polikoff, 2012). Zwick (2006) found high school GPA was the strongest cognitive predictor of academic performance in college. In a study of college student transcripts from 192 colleges, Sawyer (2013) found high school GPA was the strongest predictor of college GPA. Additionally, the predictive nature of high school GPA on academic performance was stronger for students who enrolled in less selective colleges (Sawyer,
Using entrance exam scores as a predictor, Robbins et al. (2004) found ACT scores, high school GPA and socioeconomic status accounted for 21.9% of the variance in predicting college GPA.

**Noncognitive college readiness factors.** Given the limitations of academic cognitive factors in predicting college readiness, researchers turned to evaluating the influence of noncognitive factors on success in college (Heckman & Rubinstein, 2001; Robbins et al., 2004; Robbins, Allen, Casillas, Peterson, & Le, 2006; Sedlacek, 2004). In addition to cognitive factors, students must possess noncognitive abilities to be college-ready (Robbins, Allen, Casillas, Peterson, & Le, 2006). Noncognitive abilities, termed factors, were attitudes, behaviors, and skills that were essential to students’ academic performance and retention in college (Nagaoka et al., 2013).

Robbins et al. (2004) identified three broad noncognitive constructs that significantly predicted college readiness: (a) academic goals, (b) academic motivation, and (c) academic self-efficacy. Sedlacek (2004) identified preference for long-term goals, successfully handling the system, availability of a strong support person, confidence, successful leadership experience, community involvement, and knowledge acquired in a field as important noncognitive variables of college readiness. Farrington et al. (2012) listed study skills, time management, and help-seeking behaviors as important noncognitive factors of college readiness. Noncognitive factors may be particularly important to the academic success of first-generation college students (Sedlacek, 2011).

Prior studies have correlated noncognitive factors with academic performance. Robbins et al. (2004) found self-efficacy and motivation were moderate predictors of
college GPA, $\rho_s = .496$ and $\rho_s = .303$ respectively. Taken together, noncognitive factors accounted for 26.2% of the variance in college GPA. In a subsequent study, Robbins et al. (2006) found students’ self-reported academic motivation to earn a degree and their level of campus engagement were significant predictors of college GPA. In a predictive validity study, self-regulation, academic motivation, and time management were found to strongly correlate with first year college GPA. Additionally, these factors accounted for 10 percent of the variance in first year college GPA (Kitsantas, Winsler, & Huie, 2008). In a meta-analysis of prior studies correlating noncognitive factors with academic performance, Richardson, Abraham, and Bond (2012) reported small correlations between college GPA and locus of control ($r^+ = .13$) help-seeking ($r^+ = .15$), and time management ($r^+ = .22$). Schwartz et al. (2018) found students who developed help-seeking behaviors experienced significantly higher college GPAs. Overall, noncognitive factors exerted significant influence on college readiness.

**Remediation: A Consequence of Poor Readiness**

The ability of college freshman to enroll in credit-bearing coursework is an important indicator of college readiness, but many college students required remedial coursework in their first year of college (Kim & Bragg, 2008). Remediation is a direct consequence of academic unpreparedness. Approximately half of college freshman required at least one remedial course, and those who required remediation average 2.6 remedial courses. In 2014, the cost of remediation was an estimated $7 billion dollars each year (Scott-Clayton, Crosta, & Belfield). Students were often discouraged because remedial coursework did not count towards graduation and the length of time to graduate
was extended. Few students successfully completed remedial coursework and continued their college journey, resulting in lower persistence rates. (Jaggars & Stacey, 2014). Accordingly, remedial coursework has been characterized as the place “where college dreams go to die” (Hern, 2012, p. 60).

**Disjointed Educational Systems**

Secondary and postsecondary educational systems are disjointed, leaving students and parents to navigate the divide. The historical disconnects between K-12 and postsecondary education have been widely discussed as a significant reason for students’ poor college readiness and the need for remedial coursework (Kirst & Venezia, 2004; Roderick, Nagaoka, & Coca, 2009; Page & Scott-Clayton, 2016; Venezia, Callan, Finney, Kirst, & Usdan, 2005). Disconnects included different governance structures (Venezia, Callan, Finney, Kirst, & Usdan, 2005), unaligned high school graduation requirements with entry-level college coursework (Rosenbaum, Deil-Amen, & Person, 2006), and a poor understanding of college expectations (Goldrick-Rab, 2010).

Venezia et al. (2005) found separate governance structures created structural disconnects between secondary and postsecondary educational systems. The researchers reported colleges and K-12 are governed by separate boards that created educational policies separately from one another. The policies were often misaligned, resulting in a disjointed understanding of college readiness. Guided by misaligned understandings of college readiness, high school teachers and college instructors often had different views of what it meant to be college-ready (Venezia, Callan, Finney, Kirst, & Usdan, 2005).
Venezia, Kirst, and Antonio (2003) reported standards and assessments required to graduate high school were not aligned with entry-level college coursework. The researchers found K-12 and postsecondary institutions’ curriculum standards and associated assessments were not aligned to create an effective transition from high school to college. Rosenbaum, Deil-Amen, and Person (2006) reported higher education and K-12 defined and implemented curriculum standards in isolation. Higher education institutions defined standards for entry-level coursework, differentiating college-level and remedial coursework standards. Without consultation with higher education, K-12 institutions defined standards and assessments for college preparatory coursework. Thus, standards of college readiness have been poorly coordinated between K-12 and higher education.

For students, the disconnects between K-12 and higher education often manifested as unpreparedness for college. A six-state study revealed students spent most of their time in the 12th grade applying for college and taking college entrance exams. As a result, their focus turned from academic preparation to preparing for entrance exams and engaging in activities associated with the college admissions process (Venezia, Kirst, & Antonio, 2003). Students earn admission to college in the second semester of the senior year, and some students earn early admission in the first semester of the senior year. As such, the senior year grades were often not considered for college admission and students take less rigorous coursework. In effect, high school students often spent their senior year waiting to enter college instead of engaging in rigorous academic preparation for college (Kirst, 2001).
To address educational system disconnects and student success issues, policymakers and researchers have called for the creation of structured pathways that intentionally connect secondary and postsecondary institutions. Much extant literature focused on the role of community colleges in creating pathways for high school students into college (American Association of Community Colleges, 2014; Bailey, Jaggars, & Jenkins, 2015; Dadgar, Venezia, Nodine, & Bracco, 2013). Dadgar et al. (2013) defined pathways as structures that create systemic alignment between K-12 and higher education to provide students with knowledge and resources needed to access higher education and succeed after enrolling. Elements of pathways included intentionally aligned curricula, proactive academic support, guided advising, and alignment with work or a four-year degree requirements (Dadgar, Venezia, Nodine, & Bracco, 2013). Community colleges have a strong history of collaborating with secondary education. As such, K-12 and community colleges often collaborated to address college access and success issues. (Cohen, Brawer, & Kisker, 2014). Dual enrollment has become a burgeoning pathway that aims to improve college readiness and success in college (Hoffman, Vargas, & Santos, 2009). The next section presents dual enrollment as a college readiness intervention that can improve student access and success in college.

**Dual Enrollment: A College Readiness Intervention**

As secondary education and higher education strive to improve college readiness, practitioners have turned to dual enrollment as a solution to the problem of college readiness. Dual enrollment programs have purported to increase college readiness, thereby facilitating the transition to college (Bailey & Karp, 2003). Dual enrollment
represents the fastest-growing partnership between secondary and postsecondary institutions. Throughout the United States, dual enrollment students receive college education and services through contractual arrangements between secondary and postsecondary institutions. States defined the dual enrollment student-college relationship within postsecondary enrollment regulations (Taylor, Borden, & Park, 2015). Community colleges led higher education in the amount of dual enrollment coursework offered to high school students (Thomas, Marken, Gray, & Lewis, 2013).

Thomas, Marken, Gray, and Lewis (2013) defined a dual enrollment program as “an organized system with special guidelines that allows high school students to take college-level courses” (p. 1). Dual enrollment may also include dual credit where high school students receive credit for high school completion as well as college credit (Karp, Calcango, Hughes, Jeong, & Bailey, 2007). The delivery of college-level coursework to high school students is the unifying element of all dual enrollment programs.

Broadly, college transition research is categorized into two areas: (a) adjustment as students enter college and (b) college completion (Goldrick-Rab, Carter, & Wagner, 2007). Dual enrollment programs provide experiences that facilitate the transition into college and improve college completion. Dual enrollment programs were designed to prepare high school students for college by exposing students to college-level coursework (Struhl & Vargas, 2012). Rigorous high school coursework was reported as a strong predictor of a student’s academic performance upon matriculating to college (Adelman, 1999). Participation in college-level coursework was one strategy aimed to increase the
rigor of high school curricula while preparing high school students for college coursework (Hoffman, Vargas, & Santos, 2009).

Dual enrollment lies at the convergence of college readiness and college success initiatives, serving as a program that builds college readiness skills that prepare students to succeed in college. Hoffman and Voloch (2012) asserted dual enrollment programs introduced high school students to college language, the rigor of college coursework, and the skills required to successfully complete college coursework. Dual enrollment programs foster connections between faculty, staff, and students. Forming connections was associated with college readiness and successful transition, especially for first-generation and underrepresented students (Baker, 2013). Dual enrollment programs provided high school students to try on the college student role, facilitating the development of college-ready attitudes and behaviors (Karp, 2012).

Dual enrollment improved students’ short-term academic outcomes, key predictors of college readiness. Dual enrollment participants enrolled in college at higher rates (Pretlow & Wathington, 2014), persisted at higher rates in the first year (D'Amico, Morgan, Robertson, & Rivers, 2013), and earned higher first year GPAs compared to their non-dually enrolled counterparts (Jones, 2014; An, 2015). Studies have shown dual enrollment participants experience longer-term academic outcomes such as higher graduation rates (An, 2013b; Speroni, 2011). Recently, studies linked dual enrollment participation with developing noncognitive factors that promoted college readiness (An & Taylor, 2015; Martin, 2013).
Prevalence of Dual Enrollment

Dual enrollment participation continues to increase. In 2002, approximately 680,000 high school students participated in dual enrollment programs (Kleiner & Lewis, 2005). By 2010, approximately two million high school students participated in dual enrollment programs (Thomas, Marken, Gray, & Lewis, 2013). The American Association of Community Colleges (2018) reported about 1.3 million high school students participated in dual enrollment coursework offered by community colleges. Dual enrollment programs pervade the high school experience. Eighty-two percent of high schools reported students participated in dual enrollment coursework (Thomas, Marken, Gray, & Lewis, 2013). A review of state education policies identified dual enrollment offerings in all 50 states and 47 states with policies that regulate dual enrollment programs (Zinth, 2016).

Types of Dual Enrollment and Operational Definition of Dual Enrollment

Policy variations across and within states has resulted in many forms of dual enrollment. Broadly, dual enrollment has been defined as any arrangement whereby high school students take college coursework (Taylor & Pretlow, 2015). While dual enrollment always involved students earning college credit, students may not necessarily earn equivalent high school credit (Thomas, Marken, Gray, & Lewis, 2013). Complicating matters, the terms dual credit and concurrent enrollment have been used interchangeably with dual enrollment (Hoffman, Vargas, & Santos, 2009). If dual enrollment is conceptualized as a broad construct whereby high school students take college coursework, each variant may represent a unique form of dual enrollment.
Dual credit has referred to a course or program that leads to high school students earning both high school and college credit for completing the same course (Thomas, Marken, Gray, & Lewis, 2013). In essence, students earned credit for high school graduation and college credit for the same course. Concurrent enrollment has referred to a course or program whereby students take college coursework taught by a high school instructor on a high school campus. Students earned credit for both high school and college (Hoffman, 2005). For the purposes of this study, dual enrollment is defined as arrangement whereby high school students take college coursework and earn college credit. This broad definition encompasses the variations of dual enrollment course-taking present in the sample.

**Characteristics of Dual Enrollment Programs**

State policies often dictate how dual enrollment programs are structured and implemented. While state dual enrollment policies share some common characteristics, differences lead to variations in implementation across and within states (Perna, Rowan-Kenyon, Bell, Thomas, & Li, 2008). Variations included eligibility criteria defining who can participate, who teaches courses, and where courses are taught (Edwards, Hughes, & Weisberg, 2011). A survey of state policies and laws across the United States categorized four factors common among dual enrollment policies: (a) access, (b) finance, (c) ensuring course quality, and (d) transferability of credit. (Zinth, 2016).

**Access.** Access is a multi-faceted factor that includes eligibility criteria and access to programs and services. In 2016, ten states required high schools to offer dual enrollment options to their students while other states permitted school districts and
colleges to enter into contractual agreements to offer dual enrollment courses (Zinth). The majority of state policies documented eligibility criteria. The most common criteria were high school GPA, parental permission, and a requirement to be at grade level ten (Zinth, 2016).

Dual enrollment participants have needs beyond academic course-taking. Students required advising and guidance throughout their dual enrollment experience (Kanny, 2015). In 2016, only 22 state policies required programs to provide students advising and counseling (Zinth). Courses were most often delivered on a high school campus or a college campus (Thomas, Marken, Gray, & Lewis, 2013). The majority of states allowed dual enrollment courses to be taught at high school campuses, and only three states required dual enrollment coursework to be delivered exclusively on a college campus (Zinth, 2016). A recent analysis revealed 80% of dual enrollment participants completed coursework on a high school campus (U.S. Department of Education, 2019).

**Finance.** Funding is a major barrier to access for dual enrollment programs, and who pays for dual enrollment varies widely across states. No consistency exists for dual enrollment funding across states. Few states provide additional funding for dual enrollment, leaving funding decisions to colleges and high schools. Some colleges have required students to pay tuition while other colleges waive tuition (Zinth, 2016). Participation and achievement of underserved students increased when states provide funding for dual enrollment programs. Minority participation increased in states that have policies and programs that intentionally provide access to underrepresented populations (Hoffman, Vargas, & Santos, 2009; Kim, 2012). For example, Florida provided open
access to dual enrollment programs for all high school students who met eligibility requirements and state law mandated all tuition and fees be waived for dual enrollment students (Khazem & Khazem, 2012).

**Ensuring course quality.** Academic rigor is critical to ensure the quality of dual enrollment programs. The quality of dual enrollment has most often been evaluated using instructor credentials and program evaluation requirements. Forty-one states included course quality and instructor credentials within state policy (Zinth, 2016). Nationally, dual enrollment courses were delivered by high school teachers and college instructors. Concerns have been raised that courses delivered by high school teachers are not as rigorous as equivalent courses on college campuses taught by college faculty (Borden, Park, Taylor, & Seiler, 2013). Nationally, eighty percent of colleges offering dual enrollment programs reported the high school instructors met the same minimum qualifications as college instructors (Taylor, Borden, & Park, 2015).

In 2016, twenty-eight states required dual enrollment program evaluation and thirty-seven states required reports of dual enrollment outcomes (Zinth). Oregon and South Dakota required program review and approval before a dual enrollment program could be offered. Illinois and Oregon performed periodic program reviews for quality. Florida, Oregon, and South Dakota mandated student outcome analysis to ensure dual enrollment students were achieving the same learning outcomes as courses taught on college campuses. Florida and Utah policies called for reviews of individual courses. Oregon, Utah, and Virginia mandated regular meetings where administrators discussed best practices, reviewed standards, and addressed program issues (Lowe, 2010).
Transferability of credit. Hoffman, Vargas, and Santos (2009) reported a key distinguishing feature of dual enrollment programs was that students earned college credit upon successful completion of the coursework. Zinth (2016) found state policies varied with respect to transferability of credit. Twenty-five states had policies that required public institutions to accept dual credit coursework, while fifteen states did not require public institutions to accept dual enrollment coursework (Zinth, 2016). Taylor, Borden, and Park (2015) asserted students may not receive the full benefit of dual enrollment participation if their credits did not transfer to their college of choice.

Benefits of Dual Enrollment for Students

The majority of quantitative studies have examined the beneficial effects of dual enrollment using national, regional, or state datasets. These data represent a limited view of the variations in dual enrollment programs across states. Nevertheless, researchers reported numerous effects for students who participate in dual enrollment programs. Community colleges provided dual enrollment programs to improve high school students’ transition to college and accelerate college completion (Hoffman, Vargas, & Santos, 2009). In the broadest sense, proponents claim dual enrollment programs improved college-going rates and college completion (Giani, Alexander, & Reyes, 2014).

The benefits of dual enrollment may be grouped into the following categories: (a) benefits during the transition into college, (b) benefits during the transition through college, and (c) benefits during the transition out of college. Additionally, numerous studies have evaluated the influence dual enrollment participation on student outcomes based on gender, race, level of parental education, and socioeconomic status (An, 2013a,
Benefits during the Transition into College

The transition into college has been defined as the period between enrolling and the first year (Chickering & Schlossberg, 2002). Prior studies have used state-level data to evaluate the effects of dual enrollment participation on college enrollment, the need for remediation in college, and the development of noncognitive college readiness factors. A study of Texas dual enrollment programs found Texas high school students who participated in dual enrollment coursework were 2.2 times more likely to enroll in college compared to their non-dually enrolled counterparts (Struhl & Vargas, 2012). Karp et al. (2007) found Florida dual enrollment participants were 17% more likely to enroll in college than non-dually enrolled students.

A study of Virginia dual enrollment programs found students were more dual enrollment participants were more likely to enroll in college immediately after graduating high school (Pretlow & Wathington, 2014). Speroni (2011) found dual enrollment participation was a significant predictor of college enrollment for Florida high school students. The study also found dual enrollment participants enrolled in college at a significantly higher rate than those who completed Advanced Placement coursework. Dual enrollment also impacts rural students. A study of South Carolina high school students revealed dual enrollment participation increased opportunities for rural students to access higher education while exposing them to college-level work (D’Amico, Morgan, Robertson, & Rivers, 2013).

The need for remediation has been identified as a key measure of college
readiness (Conley, 2008; Kim & Bragg, 2008). Approximately 68% of community college students required remediation in one or more subject areas (Scott-Clayton & Rodriguez, 2015). A study of 250,000 students entering 57 community colleges from around the nation found 33% were advised to take a remedial English or reading course and 59% were advised to take remedial math (Bailey, Jeong, and Cho, 2010). Dual enrollment programs were purported to reduce the need for remediation, but limited empirical evidence existed to support the claim. Kim and Bragg (2008) found dual enrollment participation was correlated with college readiness in reading, writing, and mathematics. A study of dual enrollment students in Tennessee revealed a 9% decrease in the need for remediation (Grubb, Scott, & Good, 2017).

Academic success in college has been linked to factors beyond academic skills (Karp, 2012). Conley (2008, 2014) proposed a holistic college readiness model that incorporated these factors, termed noncognitive dimensions of college readiness. Noncognitive dimensions included key transition knowledge and skills and key learning skills and techniques (Conley, 2014). Noncognitive factors have been linked to successful transition to college. A meta-analysis analyzing the relationships between noncognitive factors and college outcomes revealed noncognitive factors accounted for 17% of the variance in persistence and 26% of the variance in GPA (Robbins et al., 2004).

Dual enrollment programs have been purported to improve college readiness by promoting the development of college-ready study habits, time management, help-seeking, and note taking (Stephenson, 2013), but few studies have linked dual enrollment participation with the development of noncognitive factors of college readiness. Kanny
(2015) reported dual enrollment students learned skills to navigate the college environment. Students reported learning the “hidden curriculum”, like how to interact with professors and becoming more comfortable seeking help (p. 62). An and Taylor (2015) found dually-enrolled students reported significantly higher key learning skills and techniques compared to their non-dually enrolled counterparts. The researchers did not find a significant difference in key transition knowledge and skills between groups.

**Benefits during the Transition through College**

The transition through college was defined as the period after the first year of college and graduation (Chickering & Schlossberg, 2002). Numerous studies support the assertion that dual enrollment programs improve academic achievement in college. Academic achievement is often measured using college GPA, and numerous studies reported differential effects on college GPA as a result of dual enrollment participation. An (2013a) reported dual enrollment students earned significantly higher GPAs compared to their non-dually enrolled counterparts. The two groups were matched by SES and race to control for the influences of the bio-demographic factors on college GPA. Karp et al. (2007) found Florida dual enrollment students earned significantly higher first semester GPAs compared to their non-dually enrolled counterparts. Differentially higher GPAs for dual enrollment participants have been found in other studies (Crouse & Allen, 2014; Allen & Dadgar, 2012; Ganzert, 2014; Jones, 2014).

Dual enrollment participation has been linked to improved student persistence and retention. Texas dual enrollment participants were two times more likely to persist to the second year of college compared to non-participants (Struhl & Vargas, 2012). Similarly,
Swanson (2008) reported dual enrollment students experienced higher retention rates past the second year of college compared to non-participants. Jones (2014) found higher persistence rates among dual enrollment students through their first year of college compared to non-dually enrolled students.

A smaller body of research provides evidence that dual enrollment participation was positively correlated with accumulation of credit. Adelman (2006) found the number of college credits high school students earned prior to graduation was a predictor of college completion. A study of a California dual enrollment program found participants accumulated 10 to 18 percent more credits in their first year and 20 percent more credits by their second year in college compared to their non-dually enrolled counterparts (Rodriguez, Hughes, & Belfield, 2012). Other studies reported a positive correlation between dual enrollment participation and the number of credits earned in college (Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; Speroni, 2011).

**Benefits during the Transition out of College: College Completion**

The transition out college was defined as the period during which students graduate and leave college (Chickering & Schlossberg, 2002). Dual enrollment participation has been positively correlated with college completion (Ganzert, 2014). Prior studies have found a positive correlation between dual enrollment completion and graduation rates. (An, 2013b; Giani, Alexander, & Reyes, 2014; Struhl & Vargas, 2012). A study conducted on Texas dual enrollment programs found dual enrollment participants were 17% more likely to graduate in six years compared to non-participants (Struhl & Vargas, 2012). Using a national dataset, An (2013b) reported dual enrollment students
were 6% more likely to earn a college degree compared to non-participants.

The cost to obtain a degree was identified as a significant barrier to college completion (Page & Scott-Clayton, 2016). Across the United States, dual enrollment coursework was offered for free or a low cost (Thomas, Marken, Gray, & Lewis, 2013). Thus, dual enrollment programs purported to reduce the cost of earning a degree (Giani, Alexander, & Reyes, 2014). Some evidence exists to support a reduction in cost. An analysis of state policies revealed numerous states subsidize tuition and book costs for dual enrollment students. Minnesota’s program was estimated to save students $10.9 million in tuition and book costs. The analysis did not track whether the students completed their programs faster, an important measure for cost savings (Boswell, 2001). Bailey and Karp (2003) claimed dual enrollment participation should reduce cost to earn a college degree by improving college completion. A study of New York’s College Now dual enrollment program found participation reduced the time to degree (Allen & Dadgar, 2012).

**Individual Characteristics Influencing Student Success**

Evidence exists for the positive effects of dual enrollment participation on college readiness, but educational interventions may have differential effects on students based on their individual characteristics (Mayhew, Pascarella, Bowman, Rockenbach, Seifert, Terenzini, & Wolniak, 2016). Dual enrollment programs enrolled an increasingly diverse student body (U.S. Department of Education, 2019). Accordingly, researchers have evaluated the influence of race, gender, socioeconomic status, and parental education level on dual enrollment student outcomes.
Race/ethnicity. The achievement gap for students of color has been well-documented in the literature (Martin, Spenner, & Mustillo, 2017). Page and Scott-Clayton (2016) reported students of color faced numerous transition issues, including financial, informational, academic preparedness, and support. Dual enrollment programs improved enrollment and academic achievement for minority student participants (Pretlow & Wathington, 2014). National data showed fewer students of color participate in dual enrollment compared to White students (U.S. Department of Education, 2019). In an analysis of six states’ dual enrollment programs, only New York served a majority minority dual enrollment population (Hoffman, 2005).

Flores, Park, and Baker (2017) found disparities in Texas dual enrollment participation between African American and White students, contributing to lower postsecondary access for African American students. The researchers found SES and race interacted to create unique obstacles to completion. In effect, lower participation in dual enrollment programs of African American students perpetuated postsecondary access and achievement gaps. Still, researchers have found improved college enrollment rates for dually-enrolled students of color. In Florida, African American and Hispanic participants enroll in college at higher rates than their peers, 70% compared to 45% (Hoffman, 2005).

Dual enrollment minority student participants outperformed their counterparts in college, but achievement gaps persisted when comparing minority participants with White participants. A study of South Carolina dual enrollment found African American and Hispanic dual enrollment students experienced higher college persistence rates compared to their non-dually enrolled counterparts (D’Amico, Morgan, Robertson, &
A study of Texas dual enrollment programs revealed African American and Native American students who completed dual enrollment coursework outperformed their counterparts who matriculated to college and did not take dual enrollment coursework (Giani, Alexander, & Reyes, 2014). A study of Illinois dual enrollment student outcomes revealed significantly higher college graduation rates for dual enrollment students of color compared to their non-dually enrolled counterparts. The results indicated that while dual enrollment participation attributed to improving students’ postsecondary outcomes, the effects were inequitable for students of color compared to White students (Taylor, 2015).

**First generation college student status.** Porchea, Allen, Robbins and Phelps (2010) identified parental education level as a significant factor influencing students’ college readiness. First-generation college students have significantly lower college enrollment and achievement outcomes compared to students whose parents earned a postsecondary credential (Walpole, 2003). Becker, Krodel, and Tucker (2009) described first-generation college students as under-resourced and found that these students needed assistance learning to navigate the college environment. Navigating the college environment requires students to learn college procedures. Procedural and informational barriers such as completing the admissions process (Hoxby & Avery, 2013) and navigating financial aid processes (Castleman & Page, 2014) may negatively impact transition and persistence.

Some evidence exists that dual enrollment participation positively impacts first generation college students. Prior studies found first-generation students who earned dual
credit experienced significantly higher college enrollment rates (Karp et al., 2007; Rodriguez, Hughes, & Belfield, 2012). An (2013b) found a strong effect of dual enrollment participation on college graduation for first-generation college students. Dual enrollment participation increased the percentage of first-generation students who earned a college credential by 8% compared to non-participants.

**Gender.** Some studies have evaluated gender differences in dual enrollment participation and student outcomes. Of those studies, mixed evidence for differential benefits based on gender was reported. When analyzing data from New York, Karp et al. (2007) found males experienced significantly higher college grades compared to females. In a Virginia study, researchers reported males were less likely to participate in dual enrollment coursework, contributing to a growing gender gap in postsecondary enrollment (Pretlow & Wathington, 2014).

Using a national dataset, Swanson (2008) found significantly higher persistence rates for female dual enrollment participants compared to their male counterparts. Kim and Bragg (2008) reported significantly greater credit accumulation for females in dual enrollment programs in Oregon. Yet, Struhl and Vargas’s (2012) study of Texas dual enrollment programs found no significant effects based on gender. In a South Carolina study, gender was not a significant predictor of persistence for dual enrollment participants (D’Amico, Morgan, Robertson, & Rivers, 2013).

**Socioeconomic status.** Low socioeconomic status (SES) college students experienced poorer outcomes compared to their high SES counterparts, including lower GPA, participation in college activities, and completion rates. These outcomes persisted
later in life, resulting in lower income and advanced degree attainment (Walpole, 2003). Prior studies reported lower dual enrollment participation for students from lower SES categories (Giani, Alexander, & Reyes, 2014; Pretlow & Wathington, 2014), but researchers reported significant benefits for low SES students if they participated in dual enrollment coursework (Speroni, 2011; Taylor, 2015).

Speroni (2011) found significant effects on college enrollment and degree completion for low SES dual enrollment participants. Taylor’s (2015) study of Illinois dual enrollment student outcomes revealed significantly higher postsecondary enrollment and completion outcomes for low SES dual enrollment participants, but enrollment and achievement gaps persisted for low SES students compared to dual enrollment participants from higher SES categories.

**Dual Enrollment Limitations**

While the majority of studies have shown positive effects for dual enrollment participation, researchers have also noted some limitations. Variations in dual enrollment program structure created limitations that include substandard instructor qualifications, poor oversight of academic rigor, and problems with transferability of dual enrollment coursework (Borden, Taylor, Park, & Seiler, 2013). Several studies also revealed mixed results of participation (Crouse & Allen, 2014; Kim & Bragg, 2008; Speroni, 2011).

Dual enrollment program structure can have potentially negative effects on students. Borden et al. (2013) reported dual enrollment programs do not have consistent standards for content, course design, delivery, or student learning assessment strategies. The academic rigor of dual enrollment coursework has been called into question (Karp,
Bailey, Hughes, & Fermin, 2004). There is concern that courses delivered by high school teachers were not as rigorous as equivalent courses taught by college faculty (Zinth, 2016). Edwards, Hughes, and Weisberg (2011) asserted high school teachers may require help to modify their teaching strategies for college content. Compounding these issues, some students experienced problems transferring dual enrollment coursework once they matriculate to college. In assessing dual enrollment state policies, Zinth (2014) reported numerous states did not have structures to assure transferability of dual enrollment coursework.

A few studies found no effects of dual enrollment participation. Kim and Bragg (2008) reported mixed results in a study that assessed college readiness for dual enrollment completers. The researchers reported negative relationships between dual enrollment participation and college retention for students in Florida and Texas and a negative relationship between credit hours earned and dual enrollment participation in Oregon. Speroni (2011) found negative effects on college enrollment for dual enrollment participants, although the results were not statistically significant. An (2013a) reported dual enrollment students earned a 0.11 higher GPA in the first year of college compared to students who did not take dual enrollment courses. Results were inconclusive whether socioeconomic status effected college GPA for dual enrollment students and participation in dual enrollment did not close achievement gaps for students from lower socioeconomic status. Crouse and Allen (2014) reported a small positive effect of dual enrollment participation compared to traditional student course grades. No significant effect was observed for subsequent course success for dual enrollment students after they
matriculated to a community college or to a four-year college.

College success of dual enrollment participants varies by state. While 64% of dual enrollment participants earned a college degree within five years of entering college, graduation rates varied from 34% in Nevada to 75% in Florida (Fink, Jenkins, & Yanagiura, 2017). Prior studies associate policy variations with differences in student success (Borden, Taylor, Park, & Seiler, 2013). Since dual enrollment courses are college courses, students may earn a grade of F that impacted their college transcript and high school graduation. Kanny (2015) reported some students earned failing grades, negatively impacting their high school transcript and earning the dual credit required to graduate high school. Failing grades are recorded on college transcripts and followed the student upon entry to college.

**Dual Enrollment Educational Settings**

A key aim of dual enrollment programs is to provide students with an authentic college experience. Edwards, Hughes, and Weisberg (2011) asserted variations in dual enrollment structure may influence whether students perceive their experiences as authentic. One consistently noted variation was the location where dual enrollment programs were delivered. Community colleges offered dual enrollment coursework on high school campuses and on college campuses, with the majority of courses offered on high school campuses (Karp, Bailey, Hughes, & Fermin, 2004; Taylor, Borden, & Park 2015; Thomas, Marken, Gray, & Lewis, 2013). Overall, 17 percent of high school students took dual enrollment coursework on a college campus (U.S. Department of Education, 2019). Researchers have questioned whether variations in program location
influence dual enrollment student outcomes (An, 2013a, Howley, Howley, Howley, & Duncan, 2013). Accordingly, researchers have recommended comparing dual enrollment student outcomes by program location to evaluate whether location play a role in student performance (An, 2013a; Ozmun, 2013).

The college environment sets rigorous academic standards while creating supportive conditions that promoted student learning (Kuh, Kinzie, Schuh, and Whitt, 2010). Farrington et al. (2012) suggested noncognitive factors and the educational setting interact to influence a student’s performance of college-ready attitudes, skills, and behaviors. Consequently, researchers have asserted dual enrollment coursework offered on a college campus created an authentic college experience where students learn behaviors and skills required to be successful college students (Karp, 2012; Kanny, 2015).

Unfortunately, little research has been conducted about the influence of program location on dual enrollment student outcomes. Quantitative studies evaluating dual enrollment student outcomes consistently cited the inability to assess the impact of program location as a limitation (An, 2013a; An & Taylor, 2015; Taylor, 2015). Researchers have called for further evaluation of the influence of dual enrollment program location on college readiness and academic outcomes (Dare, Dare, & Nowicki, 2017; Lile, Ottusch, Jones, & Richards, 2017). The next section explores the extant literature on dual enrollment program location and student outcomes.

**Impact of Educational Setting on Dual Enrollment Authenticity**

The educational setting plays an integral role in determining the extent to which a
student displays the attitudes, skills and behaviors indicative of a successful college student. Student learning occurs as a result of an interaction between cognitive and noncognitive factors and learning is effected by the educational setting. The setting affords students opportunities to access the resources and the social support required to be successful (Farrington et al., 2012). Dual enrollment programs have typically been offered on high school and college campuses (Thomas, Marken, Gray, & Lewis, 2013). Prior studies indicated dual enrollment programs should strive to create an authentic college experience (Allen & Dagar, 2012; An, 2013a; Lile, Ottusch, Jones, & Richards, 2017; Karp, 2012).

Students perceived their experiences as authentic when the dual enrollment coursework offers opportunities for students to practice the college student role and gain confidence in completing college work (Karp, 2012). Edwards, Hughes, and Weisberg (2011) asserted dual enrollment program features impact authenticity. The location of classes, the type of instructor, and the mix of students were listed as important program features to consider when designing for authenticity. The researchers claimed offering dual enrollment programs on college campuses enhanced authenticity. Edwards, Hughes and Weisberg (2011) also claimed college instructors delivered an authentic college learning experience, while high school instructors may struggle using college-level pedagogies. Burns and Lewis (2000) found students who completed dual enrollment coursework on a college campus experienced greater improvements in maturity and the ability to meet college expectations. Lile, Ottusch, Jones, and Richards (2017) reported dual enrollment students were more likely to learn college-level behaviors when students
were mixed with college students on a college campus.

Authentic dual enrollment coursework supported students in trying on the college role. Karp (2012) differentiated authentic and inauthentic high school dual enrollment coursework by the extent to which courses mirrored the rigors and expectations of college courses. Authentic courses matched the course content, pedagogies, and expectations of a college course. The expectations of an authentic course required students to take responsibility for their learning and engage in self-efficacy behaviors such as help-seeking. Inauthentic courses did not provide students opportunities to take responsibility for their learning and course assignments and pedagogies were dissimilar from college coursework. As a result, 80 percent of students who participated in dual enrollment courses on a college campus reported a greater understanding of the college role while 45 percent of students enrolled in coursework taught on a high school site reported a greater understanding of the college role (Karp, 2012).

**Dual Enrollment on a High School Campus**

The majority of dual enrollment coursework has been delivered on a high school campus (U.S. Department of Education, 2019). Students from rural schools were more likely to complete dual enrollment coursework on a high school campus compared to students in urban schools (Thomas, Marken, Gray, & Lewis, 2013). The primary drivers for offering dual enrollment coursework at high schools were to increase dual enrollment access and to address transportation issues to and from a college campus (Edwards, Hughes, & Weisberg, 2011). Offering coursework on high school campuses has led to concerns about course quality and whether the dual enrollment effectively supports the
transition to college. Questions about the structure of program delivery have led to assertions that dual enrollment programs offered a “decontextualized entry to college” (Goldrick-Rab, Carter, & Wagner, 2007, p. 2449).

Researchers have linked concerns about course quality with offering coursework at the high school campus. Taczak and Thelin (2014) found students perceived their dual enrollment coursework differently when completing coursework on a high school campus. The course content delivered on a high school campus may substantially vary with a traditional college course. Instructors felt they must meet both the high school standards and college standards, leading to variations in content delivery. Kinnick (2012) found coursework delivered by high school teachers may not align with college-level expectation and pedagogies. College faculty expressed concern about ensuring the quality of coursework delivered by high school teachers. Howley et al. (2013) found high school instructors were preoccupied with discussing daily requirements such as completing paperwork rather than discussing college coursework with faculty.

The high school campus may inhibit development of college-level behaviors. Zimmerman (2012) offered a critique of dual enrollment, focusing exclusively on the negative impact of the high school campus setting on dual enrollment student outcomes. He asserted the high school environment cannot offer a similar experience to college because high schools “lack the decorum associated with higher learning, and the atmosphere is as important as the instructor” (p. 39). He argued low academic expectations coupled with commitments to sports and activities reduce the quality of the coursework. This critique of the high school setting has been echoed by Weber. Weber
(2014) reported high schools were consumed with standardized tests and common core standards that lead to teaching to the test rather than a focus on learning. As a result, students were not interested in learning and their behaviors were incongruent with college-level learning.

Some studies evaluating dual enrollment at the high school campus have found positive student outcomes when content and expectations are aligned between the high school and college (Charlier & Duggan, 2009; Denecker, 2013). Charlier and Duggan (2009) studied a dual enrollment adjunct orientation. The findings revealed the orientation program aligned college expectations and pedagogies between high school teachers and college faculty. High school teachers reported improved confidence in delivering college-level coursework and learned methods college faculty use to challenge students in rigorous coursework (Charlier & Duggan, 2009). Denecker (2013) found students in a high school English dual enrollment course were able to perform college-level writing. The researcher attributed students’ success in the English course to collaboration between college faculty and high school teachers. Teachers and faculty purposefully aligned English content and course expectations.

**Dual Enrollment on a College Campus**

Klopfenstein and Livey (2012) reported dual enrollment coursework offered on a college campus created a framework for high school students to obtain a real college experience. The college campus exposed dual enrollment students to diverse perspectives that enriched their learning experiences (Jordan, Cavalluzzo, & Corallo, 2006). Prior studies have found that dual enrollment students experience strong positive outcomes as a
result of completing coursework on a college campus (Lile, Ottusch, Jones, and Richards, 2017; Speroni, 2011; Tobolowsky and Allen, 2016).

Qualitative studies show positive association between dual enrollment and students’ perceptions of their readiness to attend college. Karp (2012) found classes on a college campus to have a direct influence the adoption of the college-ready skills, familiarity with the college environment, and adopting the college student role. Coursework offered on a college campus created the most authentic experience for students to learn the role of a college student. Tobolowsky and Allen (2016) found dual enrollment courses offered on a college campus exposed students to the rigors and expectations of college coursework. Students spoke of academically challenging coursework that prepared them for college. Lile, Ottusch, Jones, and Richards (2017) found dual enrollment students who completed coursework on a community college campus experienced greater affiliation with the college student role, clarity of college expectations, and personal growth. The researchers linked learning the college student role as a strategy that facilitates the transition into college.

A few quantitative studies have evaluated the influence of program location on dual enrollment student outcomes. Speroni (2011) reported improved bachelor’s degree attainment for students who completed dual enrollment coursework on a community college campus, but the effect did not persist for dual enrollment students that completed coursework on a high school campus. A study of Florida dual enrollment student outcomes revealed students who completed dual enrollment coursework on a college campus experienced significantly higher college enrollment and graduation rates when
compared to students that completed coursework on a high school campus (Community College Research Center, 2012).

D’Amico, Morgan, Robertson, and Rivers (2013) used student outcomes and demographic data to assess the relationship between course setting, and college persistence for students who completed dual enrollment coursework through South Carolina technical colleges. The researchers found students who completed dual enrollment coursework on a community college campus experienced significantly higher persistence rates once enrolled in college.

Arnold, Knight, and Flora (2017) found students who completed dual enrollment courses on a college campus earned significantly lower English grades while they found no difference in biology grades by course location. The researchers recommended future research to evaluate whether the program location influences academic performance in college.

**Influence of Dual Enrollment on Noncognitive Factors of College Readiness**

Few studies have evaluated the influence of dual enrollment on noncognitive factors of college readiness, and the findings linked dual enrollment participation with the development of noncognitive factors (An & Taylor, 2015; Burns & Lewis, 2000; Ganzert, 2014; Martin, 2013). Karmelita (2017) reported when transition programs are purposefully designed to emulate the college environment, students were more confident in their capacity to complete college-level work. Students were also more capable of evaluating potential barriers, thereby anticipating problems and developing coping strategies such as help-seeking to mitigate issues (Karmelita, 2017).
Completing coursework on a college campus may afford dual enrollment students opportunities to learn how to navigate the college environment. Burns and Lewis (2000) compared experiences of students completing dual enrollment at high school campuses and college campuses. The researchers found students completing college campus coursework perceived greater value of their dual enrollment experience. Specifically, these students reported stronger time management and greater self-efficacy. Kanny (2015) reported students completing dual coursework on college campus learned a “hidden curriculum” comprised of expectations and skills required of a successful college student (p. 62). Students also learned to interact with faculty to answer questions about coursework.

Three studies have evaluated differences in noncognitive factors between dually-enrolled and non-dually enrolled students. Martin (2013) evaluated differences for five noncognitive factors: (a) commitment to education, (b) self and resource management skills, (c) interpersonal and social skills, (d) academic success skills, and (e) career planning skills. A significant difference was found only for career planning skills. The study was limited by the researcher’s decision to not control for socioeconomic status. An (2015) found significant differences in academic motivation and engagement between dually-enrolled and non-dually enrolled students. Academic motivation and engagement explained less than 20 percent of the effect of dual enrollment participation on first year college GPA. In an ex post facto study, An and Taylor (2015) found dual enrollment participants demonstrated significantly higher key learning skills when compared with non-dually enrolled students. However, no significant differences were found for key
transition knowledge and skills. None of the studies disaggregated results by program location.

**Gaps and Limitations in the Literature**

While prior studies support positive outcomes of dual enrollment participation, these studies are limited in five ways. First, most studies have been descriptive in their evaluation of short-term outcomes related to dual enrollment participation. Second, studies have often failed to control for bio-demographic characteristics that correlate with dual enrollment participation. Third, few quantitative studies have evaluated the influence of program location on dual enrollment student outcomes. Fourth, no studies have evaluated the relationship between dual enrollment participation on a college campus on noncognitive factors of college readiness. Finally, data limitations restrict dual enrollment research.

**Gaps in the Literature**

Prior research on dual enrollment’s influence on college readiness narrowly focused on the immediate impact on students’ readiness prior to enrolling in college or the immediate influence of dual enrollment participation on grades and persistence. Quantitative studies have evaluated short-term outcomes of dually-enrolled students such as high school grades, high school GPA, college enrollment (Martin, 2013). Recently, studies have evaluated the influence of dual enrollment participation on college GPA and completion (An, 2013a, An, 2013b, Ganzert, 2014), but these studies were limited by the inability to assess the influence of program location on student outcomes.
Speroni (2012) asserted selection bias complicated assessing the influence of dual enrollment on students’ academic outcomes because students self-select to participate based on their academic ability and motivation to attend college. Recently, more studies have begun to use quasi-experimental and regression analysis techniques to evaluate the effects of dual enrollment participation on college enrollment and academic outcomes (An, 2013a, An, 2013b; An, 2015; Speroni, 2011; Speroni, 2012; Struhl & Vargas, 2012; Giani, Alexander, & Reyes, 2014).

Quantitative studies evaluating dual enrollment student outcomes consistently cited the inability to assess the impact of program location as a limitation (An, 2013a; An, 2015; Taylor, 2015). The samples of numerous studies did not include where students completed their coursework, limiting the ability of researchers to assess the influence of program location on student outcomes (Course & Allen, 2014; Taylor, 2015). Accordingly, Giani, Alexander, and Reyes (2014) recommended researchers to evaluate the influence of dual enrollment program location on academic achievement in college. Few studies have evaluated the influence of program location on student outcomes. Arnold, Knight, and Flora (2017) evaluated differences in course grades by program location. Other studies using small sample sizes have called for further evaluation of the effect of program location on college readiness and academic outcomes (Lile, Ottusch, Jones, & Richards, 2017). No studies have evaluated the influence of dual enrollment program location on participants’ academic performance after matriculating to college.

Dual enrollment programs claim to improve high school students’ college readiness (Hoffman & Voloch, 2012), but few studies have evaluated whether dual
enrollment participation effects noncognitive factors of college readiness. Of the few extant studies, researchers have evaluated only a few noncognitive factors, the studies possessed significant limitations, and the researchers called for further evaluation of noncognitive factors. Martin (2013) studied the impact of dual enrollment on five noncognitive college readiness measures. While the researcher found significantly higher career planning skills, the researcher could not assess the noncognitive measures for traditional students that matriculated directly into college. An & Taylor (2015) reported significantly higher key learning skills and techniques for dual enrollment participants, but the researchers used a dataset that was not evaluated for validity. No studies have evaluated the relationship between dual enrollment program location, noncognitive college readiness factors, and academic performance in college.

Data Limitations

Researchers have cited data limitations to answer dual enrollment research questions (Karp & Jeong, 2008). Little national statistical data exists documenting the prevalence of dual enrollment, and national datasets do not collect all the information required to assess variations in dual enrollment programs. The National Center for Education Statistics produced two publications documenting the prevalence of dual enrollment programs (Kleiner & Lewis, 2005; Thomas, Marken, Gray, & Lewis, 2013), but the National Center for Education Statistics surveys comprised the only available national dual enrollment statistics available.

National datasets were found insufficient for answering many dual enrollment research questions (Karp & Jeong, 2008). Prior studies used the National Center for
Educational Statistics Postsecondary Education Transcript Studies to evaluate dual enrollment participants’ educational outcomes (An, 2013a; An, 2013b; Kim & Bragg, 2008). However, the national datasets did not include all the variations in dual enrollment programs. For example, the National Student Clearinghouse dataset did not collect program location of dual enrollment coursework (Fink, Jenkins, & Yanagiura, 2017).

To address the shortcomings in national datasets, researchers have resorted to evaluating state-level data in an effort to answer specific student-level outcomes research questions (D’Amico, Morgan, Robertson, & Rivers, 2013; Grubb, Scott, & Good, 2017; Pretlow & Wathington, 2014; Speroni, 2011; Struhl & Vargas, 2012). These datasets are managed at the state-level and are subject to the limitations of tracking students from secondary to postsecondary education. Florida and New York were identified as notable exceptions as these states have comprehensive student tracking systems that allow for more complex non-experimental and quasi-experimental studies (Karp et al., 2007). A recent systematic review of quantitative dual enrollment studies revealed only five studies met the reviewers’ standards for rigorous statistical analysis (What Works Clearinghouse, 2017).

**Conceptual Framework**

A successful transition to college is predicated on a student’s college readiness (Conley, 2008). The conceptual framework for this study is grounded in Conley’s (2008, 2014) college readiness model and Transition Theory.

Prior studies used iterations of Conley’s college readiness framework to evaluate students’ college readiness and the influence of college readiness on academic
performance (An, 2013a; An & Taylor, 2015; Bragg & Taylor, 2014). Conley (2008; 2014) described a holistic model of college readiness comprised of four interrelated dimensions, termed keys to readiness. Two dimensions, key cognitive strategies and key content knowledge, comprise cognitive dimensions of college readiness. Key learning skills and techniques and key transition knowledge and skills constitute noncognitive college readiness dimensions. Figure 2.1 illustrates Conley’s (2008) conceptual model of college readiness. Each dimension represents a distinct facet of college readiness. As indicated by the nesting of the dimensions, dimensions interact with one another to yield a comprehensive model of college readiness.

![Figure 2.1 Conley’s (2008) conceptual model of college readiness](image)

Cognitive strategies include analysis and problem-solving. Key content knowledge involves the development of academic aptitude and content knowledge. Academic preparedness is an important output of this dimension. Study skills, time management skills, and help-seeking behaviors are indicative of key learning skills and
techniques. Key transition knowledge and skills encompass a student’s ability to successfully navigate the college environment through understanding the college culture, learning the college student role, and coping with changes through self-advocacy (Conley & French, 2014). Overall, a student’s readiness for college depends on the extent to which the student demonstrates mastery in all dimensions.

**Transition Theory**

The conceptual framework for this study incorporates Schlossberg’s Transition Theory (1984) to explore the research questions and interpret the findings. Transition Theory provides a perspective from which to understand how dual enrollment program location influences noncognitive dimensions of college readiness and academic performance in college.

Matriculating to college represents an important milestone for a student. Schlossberg’s (1984) transition theory offers a framework for exploring research questions concerning dual enrollment student transitions. A transition is “any event or nonevent that results in changed relationships, routines, assumptions, and roles” (Anderson, Goodman, & Schlossberg, 2012, p. 39). Chickering and Schlossberg (2002) identified attending college as an anticipated transition where students “move in, through, and out of college” (p. 189). Anderson, Goodman, and Schlossberg (2012) asserted transitions are not age-dependent, occurring for both young and old alike. Transition theory is a useful framework for understanding the influence of dual enrollment participation on a student’s readiness to transition to college, particularly as students transition into college.
**Transition model.** Transition theory is conceptualized as a three-phase model used to understand transition events (Chickering & Schlossberg, 2002; Anderson, Goodman, & Schlossberg, 2012). The first phase, approaching transitions, describes the type of transition, the student’s perspective regarding the transition, the context of the transition, and the impact of the transition on the student. A transition is a process occurring over time whereby an individual moves in, through, and out of the transition. Transitions may be anticipated or unanticipated and an event or non-event. Learning new roles and developing new relationships is a key feature of the transition process. An individual’s attitudes and behaviors influence the outcome of a transition event. An individual’s perception of the transition as positive or negative influences the outcome (Anderson, Goodman, & Schlossberg, 2012).

The context of the transition includes the physical setting which contributes to or detracts from a successful transition (Chickering & Schlossberg, 2002). Utilizing transition theory allows for interpretation of results regarding the influence of program location on dual enrollment students’ perceptions of their college readiness and their subsequent academic performance.

An individual brings resources and deficits to a transition. The second phase, taking stock of coping resources, is a system for evaluating an individual’s readiness to transition and capacity to cope with change. Four factors comprise the 4 S system for evaluating the resources a person brings to a transition: (a) situation, (b) self, (c) support, and (d) strategies (Sargent & Schlossberg, 1988; Anderson, Goodman, & Schlossberg, 2012).
• Situation references the characteristics of the transition. Characteristics include whether the transition anticipated or unanticipated and whether the transition involves a role change (Sargent & Schlossberg, 1988; Chickering & Schlossberg, 2002; Anderson, Goodman, & Schlossberg, 2012).

• Self describes an individual’s strengths, weaknesses, prior experiences, and bio-demographic characteristics. Bio-demographic characteristics include age, ethnicity, sex, and socioeconomic status (Sargent & Schlossberg, 1988; Chickering & Schlossberg, 2002; Anderson, Goodman, & Schlossberg, 2012). These variables influence community college students’ success and transitions (Goldrick-Rab, 2010). Transition theory provides a framework for interpreting the influence of demographic variables and students’ perceptions of their college readiness on their subsequent academic performance.

• Support includes the social and support networks an individual may use during the transition. Support manifests as personal relationships, institutional supports, and networks of friends (Sargent & Schlossberg, 1988; Chickering & Schlossberg, 2002; Anderson, Goodman, & Schlossberg, 2012).

• Strategies are the actions an individual may employ to cope with a transition. Actions may include seeking advice, modifying one’s role, and asserting oneself (Sargent & Schlossberg, 1988; Chickering & Schlossberg, 2002; Anderson, Goodman, & Schlossberg, 2012).

The third phase, taking charge, strengthens an individual’s resources to successfully navigate a transition. Taking charge occurs when an individual employs new
strategies to navigate a transition. In essence, the individual takes control of the 4 S’s by enacting new coping strategies (Chickering & Schlossberg, 2002; Anderson, Goodman, & Schlossberg, 2012). In this study, noncognitive college readiness factors represent resources a dual enrollment student uses to facilitate successful transition to college. Thus, transition theory is useful in examining the influence of dual enrollment participation on a student’s readiness for college.

**Rationale for incorporating Transition Theory.** Transition theory provides a perspective to understand the influence of dual enrollment participation on students’ perceptions of their college readiness, particularly noncognitive factors that may influence their transition to college. Dual enrollment programs claim to ease a student’s transition to college (Karp, 2012). Prior studies identified college readiness as an important aspect of dual enrollment students’ transition to college (Allen & Dagar, 2012; An, 2013a, 2015; Bailey, Hughes, & Karp, 2002) and claimed dual enrollment programs facilitated college transition by delivering a rigorous curriculum within a college environment (Bailey, Hughes, & Karp, 2003). Yet, few studies have evaluated these claims.

Transition theory provides a lens to explore the influence of a dual enrollment program on high school students’ transition experiences. This study uses transition theory to understand the influence of the physical environment, namely the location where the dual enrollment program is offered, on dual enrollment students’ perceptions of college readiness and their academic performance. Additionally, transition theory accounts for
numerous personal characteristics that influence a college student’s transition, specifically attitudes and behaviors that support or inhibit transition.

**Conceptual Model**

In this study, I extend Conley’s (2008) conceptual model of college readiness to incorporate dual enrollment program location as a key variable influencing college readiness. Conley (2008; 2014) noted the importance of transition knowledge and skills in the greater context of college readiness and described key transition knowledge and skills as a noncognitive dimension. Drawing from Transition Theory, I propose the following conceptual model to illustrate the influence of dual enrollment program location and noncognitive college readiness factors on academic performance in college. The conceptual model represented in Figure 2.2 characterizes the influence of dual enrollment program location on noncognitive college readiness measures and on academic performance. The factors included in Figure 2.2 represent six noncognitive measures used in this study. The factors are representative of constructs found in Conley’s (2008, 2014) key learning skills and techniques and key transition knowledge and skills dimensions.

I use the model to explain differences in students’ noncognitive measures between non-dually enrolled students and dually-enrolled students who completed coursework at either a college campus or high school campus. An and Taylor (2015) asserted the importance of measuring student performance after matriculating to college. I use the conceptual model to examine the influence of noncognitive measures of college readiness and dual enrollment program location on students’ academic performance at the end of
their first year in college. This study focuses on the noncognitive factors of college readiness and purposefully excludes cognitive dimensions in Conley’s (2008, 2014) model.

The conceptual model represents the influence of dual enrollment program location on college readiness measures and the impact of program location on academic performance. Conley’s (2008; 2014) model was developed to explain college readiness in context of a traditional high school student experience. Therefore, Conley’s (2008; 2014) college readiness model does not account for the influence of dual enrollment program location on students’ college readiness.

Using the conceptual model, I postulate completing dual enrollment coursework influences noncognitive measures of college readiness factors and completing dual enrollment coursework on a college campus significantly increases noncognitive
measures. I also postulate completing dual enrollment on a college campus significantly increases students’ first year college GPA.

Summary

This chapter reviewed the literature related to the effects of dual enrollment participation on students’ academic performance and noncognitive factors of college readiness. First, college readiness was discussed as a central issue in American higher education. A comprehensive model of college readiness was presented which included cognitive and noncognitive factors. Next, dual enrollment presented as an intervention aimed to improve college readiness. The characteristics and prevalence of dual enrollment were explored. The benefits and limitations of dual enrollment were presented, followed by the influence of bio-demographic characteristics on dual enrollment student outcomes. Then, campus location was presented as an important policy variation that may influence dual enrollment student outcomes. Gaps in the literature were discussed. Lastly, a conceptual framework was presented that included perspectives from Conley’s (2008; 2014) college readiness framework and Transition Theory. The next chapter will present the methodological approach used to examine the relationships between dual enrollment completion, noncognitive factors of college readiness, and program location.
CHAPTER THREE

METHODS

This chapter describes the research designs and methods for this study. Research questions and hypotheses are specified. A description of each research design and an explanation demonstrating the congruence between the research question and design are provided. The sample, variables, data collection, data analysis and statistical procedures are described. Limitations of the study and threats to validity are discussed.

Purpose, Research Questions, and Hypotheses

The purpose of this quantitative study was two-fold. First, a comparative study was conducted to examine whether differences exist in students’ scores on noncognitive measures of college readiness between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus. In the second phase of this study, a correlational study was conducted to examine the relationship between students’ scores on noncognitive college readiness measures, the campus location where students completed their dual enrollment coursework, and students’ first year college grade point average (GPA).

The following research questions and hypotheses guided this study.

1. Are there significant differences in scores on noncognitive measures of college readiness between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus?
The null and alternate research hypotheses for this question are as follows.

$H_01$: No significant differences exist in scores on the Academic Attributes noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

$H_11$: Significant differences exist in scores on the Academic Attributes noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

$H_02$: No significant differences exist in scores on the Help Seeking noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

$H_12$: Significant differences exist in scores on the Help Seeking noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

$H_03$: No significant differences exist in scores on the Locus of Control noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

$H_13$: Significant differences exist in scores on the Locus of Control noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.
measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

H04: No significant differences exist in scores on the Persistence noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

H14: Significant differences exist in scores on the Persistence noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

H05: No significant differences exist in scores on the Procrastination noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

H15: Significant differences exist in scores on the Procrastination noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

H06: No significant differences exist in scores on the Time Management noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-
enrolled students who completed their coursework on a college campus.

H_{16}: Significant differences exist in scores on the Time Management noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

2. Is there a relationship between dual enrollment students’ scores on noncognitive measures of college readiness, the location where students completed their dual enrollment coursework, and their first year college GPA?

The null and alternate research hypotheses for this question are as follows.

H_{07}: No significant correlation exists between dual enrollment program location and students’ first year college GPA.

H_{17}: A significant positive correlation exists between dual enrollment program location and students’ first year college GPA.

H_{08}: No significant correlation exists between scores of noncognitive college readiness and students’ first year college GPA.

H_{18}: A significant positive correlation exists between scores of noncognitive college readiness and students’ first year college GPA.

**Research Designs**

The research designs for this two-phase study were guided by the research questions. A comparative design was used to answer the first research question. A correlational design was used to answer the second research question.
Comparative Design

The following research question was evaluated using a comparative design:

Are there significant differences in scores on noncognitive measures of college readiness between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus?

Comparative studies permit the researcher to compare variations in a measured variable between two or more groups (Creswell, 2014). This first research question aimed to compare noncognitive college readiness between non-dual enrollment students, dual enrollment students who completed coursework on a college campus, and dual enrollment students who completed coursework on a high school campus.

Prior studies used comparative designs to evaluate differences between dually-enrolled and non-dually enrolled students (Arnold, Knight, & Flora, 2017; Ganzert, 2014; Martin, 2013). Arnold, Knight, and Flora (2017) used a comparative design to evaluate differences in biology, English, history, and mathematics grades of dual enrollment participants and high school students enrolled in a selective scholar’s program. Additionally, differences in grades of dual enrollment participants based on course delivery mode were compared. Ganzert (2014) employed a comparative design to assess differences between non-dually enrolled students and dual enrollment students that participated in two types of dual enrollment programs. Martin (2013) used a comparative design to evaluate differences in group means for noncognitive college readiness scores.
of dual enrollment participants. This study is unique in the inclusion of dual enrollment program location as an independent variable to compare noncognitive college readiness.

Comparative designs rely heavily upon extant datasets; consequently, the independent variable cannot be manipulated and participants are not randomly assigned into groups (Gay, Mills, & Airasian, 2006). This study used extant data from a Southeastern community college to answer the research question. Consequently, participants could not be randomly assigned into groups. Speroni (2012) asserted selection bias is a concern when designing a study to assess the impact of dual enrollment on student outcomes. Allen and Dadgar (2012) claimed selection bias weakened the design of prior dual enrollment studies. Ganzert (2014) found dual enrollment students exhibit greater academic motivation to attend college compared to non-dually enrolled students. As such, this study included only non-dual enrollment participants who enrolled in the community college after graduating high school. Selection bias was further controlled by comparing dually-enrolled students by program location.

**Correlational Design**

The following research question was evaluated using a correlational design:

Is there a relationship between dual enrollment students’ scores on noncognitive measures of college readiness, the location where students completed their dual enrollment coursework, and their first year college GPA?

Correlational designs are useful when the independent variable cannot be manipulated and the research question aims to evaluate the relationship between independent and dependent variables. One purpose of a correlational design is to predict
an outcome using one or more predictor variables (Gall, Gall, & Borg, 2006). Correlational designs may use existing data to evaluate and predict relationships between variables as they exist in their natural settings (Hinkle, Wiermsa & Jurs, 2003). Survey data are commonly used in correlational designs for educational research (Wiermsa & Jurs, 2005).

The second research question aimed to evaluate whether students’ scores on measures of noncognitive college readiness and dual enrollment program location predicted dual enrollment completers’ first year college GPA. This study used data obtained from a community college’s student information system and students’ scores from a college readiness survey to predict students’ first year college GPA. Thus, a correlational design is congruent with the second research question.

Prior studies used correlational designs to evaluate relationship between dual enrollment participation and academic performance in college, controlling for race and sex (Kim & Bragg, 2008; Ozmun, 2013; Smith, 2007). Kim and Bragg (2008) used a correlational design to assess whether the amount of dual credit hours accumulated predicted the number of credit hours students earned in college and their placement in remedial coursework. Multiple regression analyses were conducted to examine the relationships among variables. The researchers used extant data to conduct their analyses. Ozmun (2013) employed a correlational design to evaluate the relationship between dual enrollment students’ perceptions of their college self-efficacy and course grades. Smith (2007) used a correlational design to evaluate the relationship between dual enrollment participation and students’ aspirations to attend college. Additionally, the researcher
evaluated the relationship between dual enrollment program location and students’ aspirations to attend college. Multiple regression analyses were conducted to analyze survey data.

**Variables**

The first research question compared students’ scores on noncognitive measures of college readiness between students who did not complete dual enrollment coursework, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus. The independent variable was completion of dual enrollment coursework. There were three levels: (a) no completion, (b) completion on a college campus, and (c) completion on a high school campus. The dependent variables were (a) academic attributes, (b) help seeking, (c) persistence, (d) procrastination, (e) time management, and (f) locus of control. The dependent variables were measured by the SmarterMeasure learning readiness survey (SmarterMeasure n.d.). Scores from the survey represented students’ self-reported perceptions for each noncognitive measure. Measures were named in the dataset and defined as follows.

* Academic attributes (IA_ACADEMICATT) represent a student’s perceived ability to perform well academically (SmarterServices, 2014).

* Help-seeking behaviors (IA_HELPSEEKING) represents a student’s perceived willingness to seek help when encountering a problem (SmarterServices, 2014).
* Persistence (IA_PERSISTENCE) represents a student’s perceived determination to complete tasks (SmarterServices, 2014).

* Procrastination (IA_PROCRAS) represents a student’s perceived motivation to complete assignments and tasks without delay (SmarterServices, 2014).

* Time management (IA_TIMEMGT) represents a student’s perception of their ability to effectively use time to meet course expectations (SmarterServices, 2014).

* Locus of control (IA_LOCUS) represents the degree to which a student perceives to be in control of their experiences (SmarterServices, 2014).

These measures are represented within Conley’s (2008, 2014) key learning skills and techniques and key transition skills and knowledge readiness dimensions. Researchers have identified these measures as noncognitive variables that influence college readiness (Farrington et al., 2012; Sedlacek, 2004; Sedlacek; 2011).

The second research question evaluated the relationship between dual enrollment students’ scores on six noncognitive college readiness measures, the location where students completed their dual enrollment coursework, and their first year college GPA. The independent, predictor variables are high school campus location, college campus location, and the aforementioned six noncognitive factors of college readiness. The dependent variable was first year college GPA.

Additionally, four bio-demographic control variables were used: (a) first generation college student, (b) race, (c) sex, and (d) socioeconomic status. Prior studies have illustrated the influence of these bio-demographic variables on dual enrollment
student outcomes (An, 2013b; D’Amico, Morgan, Robertson, & Rivers, 2013; Giani, Alexander, & Reyes, 2014; Kim & Bragg, 2008). The control variables and dependent variable were named in the dataset and defined as follows.

* First-generation student (FIRSTGEN): A student whose parents have a high school education or lower and neither parent attended college (Chen, 2005).

* First year college grade point average (FIRSTYEARCGPA): A ratio that represents the average of final grades earned in all courses for the first full year of college attendance (Adelman, 2006).

* High school grade point average (HSGPA): A ratio that represents the average of final grades earned in all courses a student completed in high school (Adelman, 2006).

* Race (RACE): A designation created by the U.S. Office of Management and Budget to categorize individuals who identify into one of the following communities: American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or other Pacific Islander, or White (U.S. Department of Education, IPEDS Data Collection System, n.d.).

* Sex (SEX): A dichotomous designation of male or female as identified by the individual (Peter & Horn, 2005).

* Socioeconomic status (SES): An index based on parental education level, family income, and parent’s occupation (Lauff & Ingels, 2015). This study used expected family contribution as a proxy for SES. Expected family contribution is a measure used by the federal government to determine federal
student aid eligibility (U.S. Department of Education, 2016). An expected family contribution of 0 is an acceptable proxy for low SES (Davidson, 2015).

**Sample**

The sample for this study included all first time college students under the age of 21 who enrolled at a rural community college in Southeastern United States within one year of high school graduation and completed the SmarterMeasure readiness survey between the years 2012 and 2017 ($N=2,864$). The sample was divided by students who did not participate in dual enrollment ($N=2,587$) and students who completed dual enrollment ($N=277$). The dually-enrolled group was divided into two subgroups: (a) students who completed dual enrollment coursework on a community college campus ($N=151$) and (b) students who completed dual enrollment on a high school campus ($N=126$). The dual enrollment sample consisted of students who completed dual enrollment coursework at one of 11 high schools in the community college’s service region. The community college’s service region was classified as rural, and all schools were within a 30 miles of one another.

A priori power analysis was conducted to determine adequacy of the sample sizes. Howell (2010) stated a power of .8 is acceptable for educational studies. Martin (2013) reported a medium effect size for group comparisons of dual enrollment student outcomes. Power analysis revealed a minimum sample size of 78 for 3 treatment groups using an alpha of .05, a power of .8, and a medium effect size (Hinkle, Wiermsa, & Jurs, 2003). Therefore, the sample size ($N=2,864$) was adequate for the comparative study. For multiple regression analysis, Gall, Gall, and Borg (2006) recommended a sample size
of at least 15 individuals per predictor variable. In this study, there were a total of 11 predictor variables. Therefore, the minimum sample size was 165. The sample size \((N = 277)\) was adequate for the multiple regression analysis.

**Data Collection**

Data were collected from a community college located in the Southeast of the United States for the 2012 through 2017 academic years. Student records were extracted from Banner, the college’s student information system. The community college’s institutional research office provided the researcher access to student data in accordance with Institutional Review Board procedures. Students’ high school GPA, first year college GPA, race, sex, first-generation status, and socioeconomic status were extracted from the student information system. Additionally, data were gathered indicating whether students completed dual enrollment coursework and the location where coursework was completed. The student information system included coding that designated the location where dual enrollment coursework was completed. Prior studies illustrated the efficacy of using existing datasets to analyze relationships between independent variables and college academic performance (An, 2013b, An, 2015; Kim & Bragg, 2008).

Archival data of students’ responses to the SmarterMeasure learning readiness survey were collected from the community college’s institutional records. In accordance with the purpose of this study, only the responses from the Individual Attributes section of the survey were collected. To protect identifiable student data, all student data were anonymized and data were stored on a password-protected drive on the community college’s server.
Delimitations

This setting of this study is a principal delimitation. All data were obtained from one rural community college located in the Southeast United States. Only first time college students under the age of 21 who enrolled at the Southeastern community college were included in this study. This study was further delimited to dual enrollment courses offered by the community college used in this study. The college offered dual enrollment coursework at 11 high school campuses, at college campuses, and online. This study excluded online dual enrollment completers ($N = 6$). Students who completed dual enrollment coursework from other institutions were excluded from this study because high school transcripts did not denote the location where dual enrollment coursework was completed.

The study was delimited by evaluating dual enrollment students’ noncognitive measure of college readiness and academic performance based on whether students completed dual enrollment coursework on college campus or high school campus. The researcher did not evaluate differences in students’ noncognitive measures and academic performance by high school campus. All high schools where dual enrollment was offered were located within the community college’s service area, and all dual enrollment courses delivered by the community college were taught by a college instructor. Therefore, any variability by instructor type was controlled.

This study was delimited by the timeframe the SmarterMeasure survey was administered to students. The college administered the survey to students between the years of 2012 and 2017 as part of the admissions process, thus delimiting the sample to
students who enrolled as first time freshman at the community college between the 2012 and 2017 academic years.

The study was delimited to subscale scores from students’ responses to the Individual Attributes segment of the SmarterMeasure learning readiness survey. The Individual Attributes section contained six subscales that functioned as noncognitive measures of college readiness. Students’ scores on each measure were compared between non-dually students, dually-enrolled students who completed coursework on a college campus, and dually-enrolled students who completed coursework on a high school campus. The measure of student academic performance was delimited to first year college GPA.

**Instrumentation**

I used the SmarterMeasure learning readiness survey to measure noncognitive factors of college readiness. The SmarterMeasure learning readiness survey was developed to assess students’ readiness for technology-rich college coursework and online coursework (SmarterMeasure, n.d.). The survey is a web-based instrument that included cognitive and noncognitive measures (SmarterServices, 2011). The instrument was used by 367 colleges and universities in the United States, and community colleges comprised the majority of institutions that used the survey (SmarterServices, 2014).

For this study, I used the Individual Attributes factor from the SmarterMeasure learning readiness survey. The Individual Attributes factor is one of eight factors measured by the survey (SmarterServices, 2011). Twenty-four Likert scale questions comprise the Individual Attributes factor (See Appendix A). Six subscales have been
identified within the Individual Attributes factor: (a) academic attributes, (b) help seeking, (c) persistence, (d) procrastination, (e) time management, and (f) locus of control. Each subscale was measured by four Likert scale questions (SmarterServices, 2014).

Questions were scaled on a four-point Likert scale with the following response options: not like me at all, not much like me, somewhat like me, and very much like me. Each response option was scored by an algorithm as follows: not like me at all with a score of 1, not much like me with a score of 2, somewhat like me with a score of 3, and very much like me with a score of 4 (SmarterServices, 2014). Each subscale score represented the sum of a student’s responses to the questions that comprised the subscale.

Archival data from the SmarterMeasure learning readiness survey were used in this study to examine students’ noncognitive measures of college readiness. Students’ scores from the subscales in the Individual Attributes factor were used for this study. The instrument was administered to students in a web-based format during the admissions process or within one month of students’ first term in college.

**Validity and Reliability of the Instrument**

For this study, I used the Individual Attributes subscales as noncognitive measures of college readiness. Construct validity is the degree to which a measure is representative of a higher order concept (Shadish, Cook, & Campbell, 2002). Several construct validity studies have revealed strong, statistically significant relationships for goodness of fit for college coursework and academic success. Decade Consulting (2007) reported the Individual Attributes factor showed the highest correlation with academic
success, \( p < 0.001 \). In a second study, researchers conducted multiple regression analysis to measure whether the subscales in Individual Attributes factor were predictors of college GPA (SmarterServices, 2011). The results revealed the help seeking, time management and locus of control subscales were significant predictors of college GPA, \( F = 22.11, p = 0.0001 \) (SmarterServices, 2011).

Prior work assessed reliability of the SmarterMeasure instrument using Cronbach’s alpha. Cronbach’s alpha is used to estimate the internal consistency of a composite score (Hinkle, Wiersma, & Jurs, 2003). The reported Cronbach’s alpha was .80 for the Individual Attributes questions. DeVellis (2012) asserted an alpha between .8 and .9 is within the good range for reliability.

The purpose of this study was not to verify the Individual Attributes subscales in the SmarterMeasure instrument. Therefore, conducting an exploratory factor analysis to create new measures of college readiness or verification of the subscale measures was beyond the scope of this study. Prior work was conducted to assess the construct validity and reliability of the SmarterMeasure instrument.

**Research Ethics and Institutional Review Board Approval**

The protection of the rights and welfare of human subjects is paramount in educational research (Clemson University, 2019). I requested and received permission from the community college’s Office of Institutional Research to conduct research using anonymized institutional data. Prior to conducting the study, I applied for and received approval from Clemson University’s Institutional Review Board to conduct this study. (See Appendix B).
Data Analysis

Data were analyzed using SPSS Statistics 25 software. Analysis began with descriptive statistics that provided an overview of the dataset. Descriptive statistics included the number of students in the sample who did not participate in dual enrollment courses, the number of students who participated in dual enrollment coursework on a high school campus, and the number of students who participated in dual enrollment coursework on a college campus. Additionally, the frequencies for first-generation student, race, sex, and socioeconomic status were collected. Measures of central tendency, standard deviation, kurtosis, and skew were collected for each noncognitive measure.

After descriptive statistics were analyzed, I studied each research question using statistical analyses in congruence with each research design. For the comparative study, an analysis of covariance (ANCOVA) was used to examine differences in scores on noncognitive measures of college readiness between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus. For the correlational study, multiple regression analysis was used to examine the relationships between scores on noncognitive measures of college readiness, dual enrollment program location, and first year college GPA.

Comparative Study

The first research question was examined using one-way analysis of covariance (ANCOVA) tests for each noncognitive measure. The dependent variables were
academic attributes, help seeking, persistence, procrastination, time management, and locus of control. The independent variable was dual enrollment participation. Students were coded into one of three groups based on their dual enrollment completion: (a) no completion, (b) completion on a college campus, and (c) completion on a high school campus. The null hypothesis for each measure was there is not significant difference in adjusted means for scores of noncognitive readiness measures between groups.

ANCOVA is an analysis method used to evaluate differences in means between more than two groups where statistical adjustments are made to the means based on the correlation between a covariate and the dependent variable. The group means of the covariate are accounted for by the ANCOVA analysis method (Hinkle, Wiermsa, & Jurs, 2003).

I chose ANCOVA to account for high school GPA, a covariate that influences college readiness as measured by academic performance in college (An, 2013b). Speroni (2012) asserted dual enrollment studies must account for selection bias because students who chose to participate in dual enrollment based on their motivation to attend college and their academic abilities. Using high school GPA as a covariate, I controlled for dual enrollment students’ higher academic motivation and individual cognitive abilities. High school GPA was named HSGPA in the dataset.

ANCOVA reduces the probability of making Type I and Type II errors. If independent-means $t$ tests were used in place of ANCOVA, the probability of Type I errors increases. ANCOVA also reduces the probability of making Type II errors. ANCOVA is superior to analysis of variance (ANOVA) in that the introduction of a
known covariate reduces the probability of failing to reject a false null hypothesis (Hinkle, Wiermsa, & Jurs, 2003).

I used descriptive statistics to check the assumptions for each ACNOVA analysis. Two unique assumptions underlie ANCOVA in addition to the assumptions for ANOVA. ANCOVA assumes a linear relationship between the covariate and the dependent variable (Hickle, Wiermsa, & Jurs, 2003). I evaluated a scatterplot to evaluate the relationship between high school GPA and each dependent variable. The second assumption unique to ANCOVA is the homogeneity of regression slopes. This assumption was evaluated by conducting an ANOVA on the independent variable and covariate, then examining the significance of an $F$ test for interaction of the independent variable and the covariate. The assumption of normality was evaluated by checking skew and kurtosis values for each dependent variable. The equal variance assumption was evaluated using Levine’s $F$ test to check for equality of variances.

Using the univariate general linear model procedure in SPSS Statistics 25, ANCOVA analyses were conducted for each noncognitive measure to assess whether significant differences existed between groups. The general linear model procedure accounted for the unbalanced design of the sample. An alpha level of .05 was adopted when completing all analyses. An alpha of .05 is an acceptable significance level in educational research (Wiermsa & Jurs, 2005). The computed $F$ statistic and level of significance were reported from the ANCOVA table for each analysis. The estimated marginal means were reported for each analysis. Where results revealed significant differences among group means, pairwise comparison analyses were conducted to
determine where differences existed between groups (Hinkle, Wiermsa, & Jurs, 2003). Effect size was calculated for each ANCOVA analysis using Cohen’s (1998) standard to measure the strength of the association.

**Correlational Study**

The second research question was examined using multiple regression analysis. The aim of the research question was to evaluate the extent to which dual enrollment program location and scores on noncognitive measures of college readiness predicted students’ first year college GPA. The dependent (outcome) variable was first year college GPA. The independent (predictor) variables were dual enrollment program location, high school GPA, first generation status, gender, race, socioeconomic status, and the six noncognitive measures of college readiness.

I chose multiple regression analysis because the outcome variable, first year college GPA, was a continuous variable. Multiple regression analysis is useful when the researcher intends to use multiple independent variables to predict the outcome of a single, continuous dependent variable (Hinkle, Wiermsa, & Jurs, 2003). Multiple regression analysis is congruent with correlational research design (Gall, Gall, & Borg, 2006). Prior dual enrollment studies used multiple regression analyses to evaluate the relationship between variables. Smith (2007) used multiple regression analyses to evaluate the relationship between dual enrollment participation and students’ educational aspirations. I chose a hierarchical multiple regression framework to conduct the analysis.

**Hierarchical regression model.** In hierarchical multiple regression, predictor variables are sequentially added in steps to the regression model based on theoretical
grounds. The focus of hierarchical regression is to evaluate the additional variance explained between predictor variables that are added at different steps. Hierarchical regression allows the researcher to evaluate a change in $R^2$ associated with predictor variables that are added later in the analysis compared with predictor variables entered in a prior step of the analysis. The corresponding change if $F$ values allows the researcher to assess whether the change in $R^2$ significantly improved the model’s ability to predict the outcome variable (Cohen, Cohen, West, & Aiken, 2003). I built the hierarchical regression model for this study on the following theoretical grounds.

Anderson, Goodman, and Schlossberg (2012) theorized students’ individual characteristics influence their transition to college. Specifically, race, sex, and socioeconomic status are examples of individual characteristics that influence the transition to college. Conley (2012) theorized students’ cognitive abilities influence academic success in college. High school GPA is a strong predictor of academic performance in college (Ngo & Kwon, 2015). Consequently, I built the first regression model using high school GPA, race, sex, and socioeconomic status as predictor variables and first year college GPA as the dependent variable. This first model evaluated the extent to which bio-demographic variables and high school GPA predicted first year college GPA. This model functioned as a control to evaluate the additional variance explained by dual enrollment program location and noncognitive measures of college readiness for predicting first year college GPA.

Chickering and Schlossberg (2002) theorized the setting of the transition influences the extent to which a student experiences a successful transition. I added dual
enrollment program location to create the second regression model. The dual enrollment location predictor variable was categorical, high school campus or college campus. Consequently, I dummy coded the campus location predictor variable. Dual enrollment on the high school campus was dummy coded 0 and dual enrollment on the high school campus was dummy coded 1. The difference in $R^2$ and difference in $F$ values between the first and second regression model were calculated. The difference in $R^2$ represented the additional variance explained by program location. The difference in $F$ values and the corresponding $p$ value represented the significance of the additional variance.

Researchers have theorized noncognitive factors influence academic performance. No single factor supersedes another in its importance to college readiness (Conley, 2008; Farrington et al., 2012). Therefore, all six noncognitive measures were added to build the third regression model. The difference in $R^2$ and $F$ values between the second and third regression model were calculated. The difference in $R^2$ represented the additional variance explained by noncognitive measures. The difference in $F$ values and the corresponding $p$ value represented the significance of the additional variance.

**Multiple regression analysis procedures.** The multiple regression analysis was guided by steps outlined by Hinkle, Wiermsa, and Jurs (2003). A multiple regression analysis was conducted for each of the three regression models. To check the assumption of linearity, I used a scatterplot to determine whether there is a linear relationship between the independent and dependent variables. The first regression model contained five independent variables. As such, there was a chance for multicollinearity where one independent variable was significantly linearly related to another independent variable.
(Hinkle, Wiermsa, & Jurs, 2003). I used a matrix scatterplot to evaluate whether multicollinearity existed between independent variables. If multicollinearity exists, the researcher must remove one of the correlated independent variables from the regression model (Hinkle, Wiermsa, & Jurs, 2003). The assumption of normality was evaluated by examining skew and kurtosis values for each variable.

Next, a regression model was created using the independent variables found not to exhibit multicollinearity. Since sex was a nominal variable, I dummy coded male and female as 0 and 1 respectively. SPSS generated the regression model that included the $\beta$ regression coefficients for each predictor variable and the coefficient of determination ($R^2$) for the regression model. The coefficient of determination provided the amount of variance explained by predictor variables. The significance of $R^2$ was evaluated using the $F$ statistic and $p$ value provided within the ANOVA table. The significance of the regression coefficients was evaluated using the $t$ statistic and $p$ value provided in the coefficients table. The results were used to accept or reject the null hypothesis and a regression equation was presented.

Plots of residuals were used to evaluate the existence of outliers. A scatterplot of regression standard residuals was evaluated to check the normality assumption that the residuals were normally distributed. A scatterplot of regression standardized residuals versus unstandardized predicted values was evaluated to determine whether the equal variances assumption was met. A scatterplot of regression standardized residuals versus first year college GPA was evaluated to determine whether the independence of errors assumption was met.
The multiple regression analysis process was completed to test each null hypothesis. The second regression model tested the null hypothesis that no significant correlation existed between the location where students completed their dual enrollment coursework and students’ first year college GPAs. A multiple regression analysis was conducted that included dual enrollment program location as an additional predictor variable. Since the predictor variable was a nominal variable, I dummy coded high school campus and college campus as 0 and 1 respectively. The difference in $R^2$ and difference in $F$ values between the first and second regression model were calculated. The difference in $R^2$ represented the additional variance explained by program location. The difference in $F$ values and the corresponding $p$ value represented the significance of the additional variance.

The third regression model tested the null hypothesis that no significant correlation existed between students’ scores on noncognitive measures of college readiness and students’ first year college GPAs. A multiple regression analysis was conducted using students’ scores from six noncognitive measures of college readiness: academic attributes, help seeking, persistence, procrastination, time management, and locus of control. All of the predictor variables were added together in the third regression model. The difference in $R^2$ and $F$ values between the second and third regression model were calculated. The difference in $R^2$ represented the additional variance explained by noncognitive measures. The difference in $F$ values and the corresponding $p$ value represented the significance of the additional variance.
Limitations and Threats to Validity

This study limited by the inclusion of data from a single community college. The sample may not be representative of the entire dual enrollment population, thus limiting the generalizability of the findings. Further, the study was limited by the exclusion of dual enrollment participants who completed dual enrollment coursework from other colleges. High school transcripts and college transcripts did not denote where dual enrollment coursework was completed. Therefore, I could not determine where students completed dual enrollment if the dual enrollment coursework was not completed at the community college used in this study.

This study used archival data that did not contain student responses to individual questions in the Individual Attributes section of the survey, and individual responses could not be retrieved. Therefore, it was not possible to conduct exploratory factor analysis to validate construct validity or reliability for student responses in this study.

The SmarterMeasure instrument measured students’ perceptions of their college readiness at a single point in time. Students self-reported perceptions of their readiness which may not reflect their actual capabilities. Self-reported data is a threat to internal validity (Shadish, Cook, & Campbell, 2002).

There was a possibility of introducing selection bias as a threat to internal validity. Students’ prior academic achievement and academic motivation are known to influence academic and noncognitive measures of college readiness (An, 2013b; Farrington et al., 2012; Ganzert, 2014; Smith, 2007). I accounted for selection bias by using high school GPA as a covariate, thus mitigating this threat to internal validity.
Summary

This chapter explained the research designs and methods used to conduct this study. Research questions and hypotheses were presented. Descriptions of the sample, variables, and instrumentation were provided. I used ANCOVA to examine the first research question and multiple regression analyses to examine the second research question. The findings of the study were presented in the next chapter.
CHAPTER FOUR
RESULTS

The purpose of this study was two-fold. First, a comparative study examined whether differences exist in students’ scores on noncognitive measures of college readiness between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus. Second, a correlational study examined whether a relationship existed between the campus location where students completed their dual enrollment coursework, students’ scores on noncognitive measures of college readiness, and students’ first year college grade point average (GPA). The studies were conducted to answer the following research questions:

1. Are there significant differences in scores on noncognitive measures of college readiness between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus?

2. Is there a relationship between dual enrollment students’ scores on noncognitive measures of college readiness, the location where students completed their dual enrollment coursework, and their first year college GPA?

Data were obtained from a rural community college in the Southeastern United States. SPSS Statistics 25 was used to conduct analysis of covariance (ANCOVA) for the comparative study phase and hierarchical multiple regression for the correlational study phase. This chapter presents descriptive statistics, analyses, and findings.
Comparative Study Results

A comparative study was conducted to answer the following research question: Are there significant differences in scores on noncognitive measures of college readiness between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus? Scores for six noncognitive measures were compared between students who did not participate in dual enrollment, students who completed dual enrollment coursework on a college campus, and students who completed dual enrollment coursework on a high school campus.

The independent variable was dual enrollment completion. There were three levels: (a) no completion, (b) completion on a college campus, and (c) completion on a high school campus. The covariate was high school GPA. The dependent variables were six noncognitive college readiness measures taken from the SmarterMeasure learning readiness survey: (a) academic attributes, (b) help seeking, (c) locus of control, (d) persistence, (e) procrastination, and (f) time management. ANCOVA analyses were conducted for each dependent variable, controlling for high school GPA. Analyses were conducted to examine whether differences existed between the dependent variables between groups. The results from ANCOVA analyses were presented for each dependent variable.

Academic Attributes

A one-way analysis of covariance (ANCOVA) was conducted on Academic Attributes scores to evaluate whether a statistically significant difference existed between
students who did not complete dual enrollment coursework, students who completed dual enrollment coursework on a high school campus, and students who completed dual enrollment coursework on a college campus, controlling for high school grade point average. Examination of boxplots revealed 16 outliers. Preliminary analyses were conducted to assess the influence of outliers, and the inclusion of outliers did not significantly influence the results. Therefore, all outliers were included in the analysis.

Table 4.1 illustrates descriptive statistics for the sample.

Table 4.1

<table>
<thead>
<tr>
<th>DE Completion</th>
<th>$M$</th>
<th>$SD$</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>13.96</td>
<td>1.79</td>
<td>126</td>
</tr>
<tr>
<td>Main Campus</td>
<td>13.84</td>
<td>1.60</td>
<td>151</td>
</tr>
<tr>
<td>No DE Courses</td>
<td>13.70</td>
<td>1.82</td>
<td>2587</td>
</tr>
<tr>
<td>Total</td>
<td>13.72</td>
<td>1.81</td>
<td>2864</td>
</tr>
</tbody>
</table>

Evaluations of the assumptions of normality, homogeneity of regression slopes, and homogeneity of variance revealed all assumptions were met. The distribution of Academic Attributes scores for non-dual enrollment participants had an approximately normal distribution, normal skew, $sk = -.83$, $kurt = .67$. The distribution of Academic Attributes scores for students completing dual enrollment on a high school campus had an approximately normal distribution, normal skew, $sk = -.91$, $kurt = .83$. The distribution of Academic Attributes scores for students completing dual enrollment on a college
campus had an approximately normal distribution, normal skew, $sk = -0.46$, $kurt = -0.37$. Therefore, the assumption of normality was met.

The homogeneity of regression slopes assumption was evaluated by testing the interaction between high school GPA and dual enrollment participation. The homogeneity of regression slopes assumption was also evaluated by regressing the Academic Attributes variable on the high school GPA covariate. Figure 4.1 shows the regression lines are approximately parallel; therefore, the assumption of homogeneity of regression slopes was met. No significant interaction between dual enrollment participation and high school GPA effect on Academic Attributes was found, $p = 0.057$. Therefore, the homogeneity of regression assumption was met. Levene’s test indicated the variances were equal, thus the equal variance assumption was met, $p = 0.258$.

![Figure 4.1. Academic Attributes Scores for Dual Enrollment Completion Groups with High School GPA as a Covariate](image)
ANCOVA analysis was conducted in SPSS Statistics 25 using the general linear model procedure. High school GPA was used as a covariate to evaluate differences in means for Academic Attributes scores between students who did not complete dual enrollment, students who completed dual enrollment on a high school campus, and students who completed dual enrollment on a college campus. Table 4.2 contains the findings from the ANCOVA analysis. Estimated means are presented in Table 4.3. After controlling for high school GPA, ANCOVA results revealed there was no significant effect of dual enrollment participation on the Academic Attributes measure, $F(2, 2860) = .656, p = .519$. Thus, I failed to reject the null hypothesis that there were no differences in means between groups.

Table 4.2

One way ANCOVA Tests of Between-Subjects Effects for Academic Attributes with High School GPA as a Covariate

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>49.361$^a$</td>
<td>3</td>
<td>16.454</td>
<td>5.056</td>
<td>.002</td>
<td>.005</td>
</tr>
<tr>
<td>Intercept</td>
<td>10623.958</td>
<td>1</td>
<td>10623.958</td>
<td>3264.654</td>
<td>.000</td>
<td>.533</td>
</tr>
<tr>
<td>HSGPA</td>
<td>38.692</td>
<td>1</td>
<td>38.692</td>
<td>11.890</td>
<td>.001</td>
<td>.004</td>
</tr>
<tr>
<td>DE Comp</td>
<td>4.268</td>
<td>2</td>
<td>2.134</td>
<td>.656</td>
<td>.519</td>
<td>.000</td>
</tr>
<tr>
<td>Error</td>
<td>9307.120</td>
<td>2860</td>
<td>3.254</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>548277.000</td>
<td>2864</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>9356.480</td>
<td>2863</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^a R^2 = .005$ (Adjusted $R^2 = .004$)
Table 4.3

*Estimated Adjusted Means for One-Way ANCOVA for Academic Attributes with High School GPA as a Covariate*

<table>
<thead>
<tr>
<th>DE Completion</th>
<th>$M$</th>
<th>$SE$</th>
<th>95% Confidence Interval</th>
<th>$\text{Lower Bound}$</th>
<th>$\text{Upper Bound}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>13.888$^a$</td>
<td>.162</td>
<td>13.570</td>
<td>14.206</td>
<td></td>
</tr>
<tr>
<td>Main Campus</td>
<td>13.770$^a$</td>
<td>.148</td>
<td>13.479</td>
<td>14.061</td>
<td></td>
</tr>
<tr>
<td>No DE Courses</td>
<td>13.706$^a$</td>
<td>.036</td>
<td>13.636</td>
<td>13.776</td>
<td></td>
</tr>
</tbody>
</table>

$^a$ Covariate appearing in the model was evaluated at the following value: HSGPA = 3.43771.

**Help Seeking**

A one-way analysis of covariance (ANCOVA) was conducted on Help Seeking scores to evaluate whether a statistically significant difference existed between students who did not complete dual enrollment coursework, students who completed dual enrollment coursework on a high school campus, and students who completed dual enrollment coursework on a college campus, controlling for high school grade point average. Examination of boxplots revealed two outliers. Preliminary analyses were conducted to assess the influence of outliers, and the inclusion of outliers did not significantly influence the results. Therefore, all outliers were included in the analysis. Table 4.4 illustrates descriptive statistics for the sample.
Table 4.4

<table>
<thead>
<tr>
<th>DE Completion</th>
<th>M</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>11.37</td>
<td>1.568</td>
<td>126</td>
</tr>
<tr>
<td>Main Campus</td>
<td>11.56</td>
<td>1.711</td>
<td>151</td>
</tr>
<tr>
<td>No DE Courses</td>
<td>11.36</td>
<td>1.624</td>
<td>2587</td>
</tr>
<tr>
<td>Total</td>
<td>11.37</td>
<td>1.626</td>
<td>2864</td>
</tr>
</tbody>
</table>

Evaluations of the assumptions of normality, homogeneity of regression slopes, and homogeneity of variance revealed all assumptions were met. The distribution of Help Seeking scores for non-dual enrollment participants had an approximately normal distribution, normal skew, \( sk = -.30,\) kurt = -.014. The distribution of Help Seeking scores for students completing dual enrollment on a high school campus had an approximately normal distribution, normal skew, \( sk = -.25,\) kurt = -.13. The distribution of Help Seeking scores for students completing dual enrollment on a college campus had an approximately normal distribution, normal skew, \( sk = -.43,\) kurt = -.26. Therefore, the assumption of normality was met.

The homogeneity of regression slopes assumption was evaluated by testing the interaction between high school GPA and dual enrollment participation. The homogeneity of regression slopes assumption was also evaluated by regressing the Help Seeking variable on the high school GPA covariate. Figure 4.2 shows the regression lines are approximately parallel; therefore, the assumption of homogeneity of regression slopes was met. No significant interaction between dual enrollment participation and high school GPA effect on Help Seeking was found, \( p = .498.\) Therefore, the homogeneity of
regression assumption was met. Levene’s test indicated the variances were equal, thus the equal variance assumption was met, $p = .342$.

![Figure 4.2. Help Seeking Scores for Dual Enrollment Completion Groups with High School GPA as a Covariate](image)

ANCOVA analysis was conducted in SPSS Statistics 25 using the general linear model procedure. High school GPA was used as a covariate to evaluate differences in means for Help Seeking scores between students who did not complete dual enrollment, students who completed dual enrollment on a high school campus, and students who completed dual enrollment on a college campus. Table 4.5 contains the findings from the ANCOVA analysis. Estimated means are presented in Table 4.6. After controlling for high school GPA, ANCOVA results revealed there was no significant effect of dual enrollment participation on the Help Seeking measure, $F(2, 2860) = .517, p = .596$. Thus,
I failed to reject the null hypothesis that there were no differences in means between groups.

Table 4.5

One way ANCOVA Tests of Between-Subjects Effects for Help Seeking with High School GPA as a Covariate

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>40.356&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3</td>
<td>13.452</td>
<td>5.109</td>
<td>.002</td>
<td>.005</td>
</tr>
<tr>
<td>Intercept</td>
<td>7130.871</td>
<td>1</td>
<td>7130.871</td>
<td>2708.304</td>
<td>.000</td>
<td>.486</td>
</tr>
<tr>
<td>HSGPA</td>
<td>34.719</td>
<td>1</td>
<td>34.719</td>
<td>13.186</td>
<td>.000</td>
<td>.005</td>
</tr>
<tr>
<td>DE Comp</td>
<td>2.724</td>
<td>2</td>
<td>1.362</td>
<td>.517</td>
<td>.596</td>
<td>.000</td>
</tr>
<tr>
<td>Error</td>
<td>7530.281</td>
<td>2860</td>
<td>2.633</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>377736.000</td>
<td>2864</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>7570.637</td>
<td>2863</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
<sup>a</sup> R<sup>2</sup> = .005 (Adjusted R<sup>2</sup> = .004)

Table 4.6

Estimated Adjusted Means for One-Way ANCOVA for Help Seeking with High School GPA as a Covariate

<table>
<thead>
<tr>
<th>COMPDEC</th>
<th>M</th>
<th>SE</th>
<th>95% Confidence Interval</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
</tr>
<tr>
<td>High School</td>
<td>11.304&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.146</td>
<td>11.019</td>
<td>11.590</td>
</tr>
<tr>
<td>Main Campus</td>
<td>11.489&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.133</td>
<td>11.227</td>
<td>11.750</td>
</tr>
<tr>
<td>No DE Courses</td>
<td>11.365&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.032</td>
<td>11.302</td>
<td>11.428</td>
</tr>
</tbody>
</table>

<sup>a</sup> Covariate appearing in the model was evaluated at the following value: HSGPA = 3.43771.
Locus of Control

A one-way analysis of covariance (ANCOVA) was conducted on Locus of Control scores to evaluate whether a statistically significant difference existed between students who did not complete dual enrollment coursework, students who completed dual enrollment coursework on a high school campus, and students who completed dual enrollment coursework on a college campus, controlling for high school grade point average. Examination of boxplots revealed three outliers. Preliminary analyses were conducted to assess the influence of outliers, and the inclusion of outliers did not significantly influence the results. Therefore, all outliers were included in the analysis.

Table 4.7 illustrates descriptive statistics for the sample.

Table 4.7

<table>
<thead>
<tr>
<th>DE Completion</th>
<th>M</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>11.06</td>
<td>1.594</td>
<td>126</td>
</tr>
<tr>
<td>Main Campus</td>
<td>10.75</td>
<td>1.883</td>
<td>151</td>
</tr>
<tr>
<td>No DE Courses</td>
<td>10.69</td>
<td>1.823</td>
<td>2587</td>
</tr>
<tr>
<td>Total</td>
<td>10.71</td>
<td>1.818</td>
<td>2864</td>
</tr>
</tbody>
</table>

Evaluations of the assumptions of normality, homogeneity of regression slopes, and equal variance revealed all assumptions were met. The distribution of Locus of Control scores for non-dual enrollment participants had an approximately normal distribution, normal skew, \( sk = .12, kurt = -.064 \). The distribution of Locus of Control scores for students completing dual enrollment on a high school campus had an
approximately normal distribution, normal skew, $sk = .21$, $kurt = .39$. The distribution of Locus of Control scores for students completing dual enrollment on a college campus had an approximately normal distribution, normal skew, $sk = .093$, $kurt = -.13$. Therefore, the assumption of normality was met.

The homogeneity of regression slopes assumption was evaluated by testing the interaction between high school GPA and dual enrollment participation. The homogeneity of regression slopes assumption was also evaluated by regressing the Locus of Control variable on the high school GPA covariate. Figure 4.3 shows the regression lines are approximately parallel; therefore, the assumption of homogeneity of regression slopes was met. No significant interaction between dual enrollment participation and high school GPA effect on Locus of Control was found, $p = .968$. Therefore, the homogeneity of regression assumption was met. Levene’s test indicated the variances were equal, thus the equal variance assumption was met, $p = .054$. 
ANCOVA analysis was conducted in SPSS Statistics 25 using the general linear model procedure. High school GPA was used as a covariate to evaluate differences in means for Locus of Control scores between students who did not complete dual enrollment, students who completed dual enrollment on a high school campus, and students who completed dual enrollment on a college campus. Table 4.8 contains the findings from the ANCOVA analysis. Estimated means are presented in Table 4.9. After controlling for high school GPA, ANCOVA results revealed there was no significant effect of dual enrollment participation on the Locus of Control measure, $F(2, 2860) = 3.223, p = .073$. Thus, I failed to reject the null hypothesis that there were no differences in means between groups.
Table 4.8

One way ANCOVA Tests of Between-Subjects Effects for Locus of Control with High School GPA as a Covariate

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>105.031^a</td>
<td>5</td>
<td>21.006</td>
<td>6.417</td>
<td>.000</td>
<td>.011</td>
</tr>
<tr>
<td>Intercept</td>
<td>923.838</td>
<td>1</td>
<td>923.838</td>
<td>282.214</td>
<td>.000</td>
<td>.090</td>
</tr>
<tr>
<td>HSGPA</td>
<td>.388</td>
<td>2</td>
<td>.194</td>
<td>.059</td>
<td>.942</td>
<td>.000</td>
</tr>
<tr>
<td>DE Comp</td>
<td>10.549</td>
<td>1</td>
<td>10.549</td>
<td>3.223</td>
<td>.073</td>
<td>.001</td>
</tr>
<tr>
<td>Error</td>
<td>.213</td>
<td>2</td>
<td>.106</td>
<td>.032</td>
<td>.968</td>
<td>.000</td>
</tr>
<tr>
<td>Total</td>
<td>9355.765</td>
<td>2858</td>
<td>.213</td>
<td>.032</td>
<td>.968</td>
<td>.000</td>
</tr>
<tr>
<td>Corrected Total</td>
<td>338221.000</td>
<td>2864</td>
<td>3.274</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

^a R^2 = .011 (Adjusted R^2 = .009)

Table 4.9

Estimated Adjusted Means for One-Way ANCOVA for Locus of Control with High School GPA as a Covariate

<table>
<thead>
<tr>
<th>COMPDEC</th>
<th>M</th>
<th>SE</th>
<th>95% Confidence Interval</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
</tr>
<tr>
<td>High School</td>
<td>10.969^a</td>
<td>.204</td>
<td>10.568</td>
<td>11.369</td>
</tr>
<tr>
<td>Main Campus</td>
<td>10.669^a</td>
<td>.178</td>
<td>10.320</td>
<td>11.018</td>
</tr>
<tr>
<td>No DE Courses</td>
<td>10.706^a</td>
<td>.036</td>
<td>10.636</td>
<td>10.776</td>
</tr>
</tbody>
</table>

^a Covariate appearing in the model was evaluated at the following value: HSGPA = 3.43771.

Persistence

A one-way analysis of covariance (ANCOVA) was conducted on Persistence
scores to evaluate whether a statistically significant difference existed between students who did not complete dual enrollment coursework, students who completed dual enrollment coursework on a high school campus, and students who completed dual enrollment coursework on a college campus, controlling for high school grade point average. Examination of boxplots revealed five outliers. Preliminary analyses were conducted to assess the influence of outliers, and the inclusion of outliers did not significantly influence the results. Therefore, all outliers were included in the analysis. Table 4.10 illustrates descriptive statistics for the sample.

Table 4.10

<table>
<thead>
<tr>
<th>DE Completion</th>
<th>M</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>12.21</td>
<td>1.410</td>
<td>126</td>
</tr>
<tr>
<td>Main Campus</td>
<td>12.03</td>
<td>1.579</td>
<td>151</td>
</tr>
<tr>
<td>No DE Courses</td>
<td>11.97</td>
<td>1.517</td>
<td>2587</td>
</tr>
<tr>
<td>Total</td>
<td>11.99</td>
<td>1.516</td>
<td>2864</td>
</tr>
</tbody>
</table>

Evaluations of the assumptions of normality, homogeneity of regression slopes, and equal variance revealed all assumptions were met. The distribution of Persistence scores for non-dual enrollment participants had an approximately normal distribution, normal skew, $sk = .13$, $kurt = -.038$. The distribution of Persistence scores for students completing dual enrollment on a high school campus had an approximately normal distribution, normal skew, $sk = -.096$, $kurt = .087$. The distribution of Persistence scores for students completing dual enrollment on a college campus had an approximately
normal distribution, normal skew, \( sk = .090, kurt = .016 \). Therefore, the assumption of normality was met.

The homogeneity of regression slopes assumption was evaluated by testing the interaction between high school GPA and dual enrollment participation. The homogeneity of regression slopes assumption was also evaluated by regressing the Persistence variable on the high school GPA covariate. Figure 4.4 shows the regression lines are approximately parallel; therefore, the assumption of homogeneity of regression slopes was met. No significant interaction between dual enrollment participation and high school GPA effect on Persistence was found, \( p = .681 \). Therefore, the homogeneity of regression assumption was met. Levene’s test indicated the variances were equal, thus the equal variance assumption was met, \( p = .638 \).

*Figure 4.4. Persistence Scores for Dual Enrollment Completion Groups with High School GPA as a Covariate*
ANCOVA analysis was conducted in SPSS Statistics 25 using the general linear model procedure. High school GPA was used as a covariate to evaluate differences in means for Persistence scores between students who did not complete dual enrollment, students who completed dual enrollment on a high school campus, and students who completed dual enrollment on a college campus. Table 4.11 contains the findings from the ANCOVA analysis. Estimated means are presented in Table 4.12. After controlling for high school GPA, ANCOVA results revealed there was no significant effect of dual enrollment participation on the Persistence measure, $F(2, 2860) = .648, p = .523$. Thus, I failed to reject the null hypothesis that there were no differences in means between groups.

Table 4.11

One way ANCOVA Tests of Between-Subjects Effects for Persistence with High School GPA as a Covariate

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected</td>
<td>44.010$^a$</td>
<td>3</td>
<td>14.670</td>
<td>6.418</td>
<td>.000</td>
<td>.007</td>
</tr>
<tr>
<td>Intercept</td>
<td>7971.745</td>
<td>1</td>
<td>7971.745</td>
<td>3487.455</td>
<td>.000</td>
<td>.549</td>
</tr>
<tr>
<td>HSGPA</td>
<td>37.255</td>
<td>1</td>
<td>37.255</td>
<td>16.298</td>
<td>.000</td>
<td>.006</td>
</tr>
<tr>
<td>DE Comp</td>
<td>2.963</td>
<td>2</td>
<td>1.481</td>
<td>.648</td>
<td>.523</td>
<td>.000</td>
</tr>
<tr>
<td>Error</td>
<td>6537.486</td>
<td>2860</td>
<td>2.286</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>418086.000</td>
<td>2864</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>6581.496</td>
<td>2863</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^a R^2 = .007$ (Adjusted $R^2 = .006$)
Table 4.12

*Estimated Adjusted Means for One-Way ANCOVA for Persistence with High School GPA as a Covariate*

<table>
<thead>
<tr>
<th>COMPDEC</th>
<th>M</th>
<th>SE</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>High School</td>
<td>12.135</td>
<td>.136</td>
<td>11.869</td>
</tr>
<tr>
<td>Main Campus</td>
<td>11.957</td>
<td>.124</td>
<td>11.713</td>
</tr>
<tr>
<td>No DE Courses</td>
<td>11.981</td>
<td>.030</td>
<td>11.923</td>
</tr>
</tbody>
</table>

* Covariate appearing in the model was evaluated at the following value: HSGPA = 3.43771.

**Procrastination**

A one-way analysis of covariance (ANCOVA) was conducted on Procrastination scores to evaluate whether a statistically significant difference existed between students who did not complete dual enrollment coursework, students who completed dual enrollment coursework on a high school campus, and students who completed dual enrollment coursework on a college campus, controlling for high school grade point average. Examination of boxplots revealed seven outliers. Preliminary analyses were conducted to assess the influence of outliers, and the inclusion of outliers did not significantly influence the results. Therefore, all outliers were included in the analysis. Table 4.13 illustrates descriptive statistics for the sample.
Table 4.13

*Means and Standard Deviations of Procrastination Scores by Dual Enrollment Completion*

<table>
<thead>
<tr>
<th>DE Completion</th>
<th>M</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>11.39</td>
<td>2.280</td>
<td>126</td>
</tr>
<tr>
<td>Main Campus</td>
<td>11.31</td>
<td>2.482</td>
<td>151</td>
</tr>
<tr>
<td>No DE Courses</td>
<td>11.46</td>
<td>2.287</td>
<td>2587</td>
</tr>
<tr>
<td>Total</td>
<td>11.45</td>
<td>2.297</td>
<td>2864</td>
</tr>
</tbody>
</table>

Evaluations of the assumptions of normality, homogeneity of regression slopes, and equal variance revealed all assumptions were met. The distribution of Procrastination scores for non-dual enrollment participants had an approximately normal distribution, normal skew, $sk = -.16$, $kurt = -.15$. The distribution of Procrastination scores for students completing dual enrollment on a high school campus had an approximately normal distribution, normal skew, $sk = -.092$, $kurt = -.25$. The distribution of Procrastination scores for students completing dual enrollment on a college campus had an approximately normal distribution, normal skew, $sk = -.19$, $kurt = -.30$. Therefore, the assumption of normality was met.

The homogeneity of regression slopes assumption was evaluated by testing the interaction between high school GPA and dual enrollment participation. The homogeneity of regression slopes assumption was also evaluated by regressing the Procrastination variable on the high school GPA covariate. Figure 4.5 shows the regression lines are approximately parallel; therefore, the assumption of homogeneity of regression slopes was met. No significant interaction between dual enrollment...
participation and high school GPA effect on Procrastination was found, $p = .665$.

Therefore, the homogeneity of regression assumption was met. Levene’s test indicated the variances were equal, thus the equal variance assumption was met, $p = .261$.

---

**Figure 4.5. Procrastination Scores for Dual Enrollment Completion Groups with High School GPA as a Covariate**

ANCOVA analysis was conducted in SPSS Statistics 25 using the general linear model procedure. High school GPA was used as a covariate to evaluate differences in means for Procrastination scores between students who did not complete dual enrollment, students who completed dual enrollment on a high school campus, and students who completed dual enrollment on a college campus. Table 4.14 contains the findings from the ANCOVA analysis. Estimated means are presented in Table 4.15. After controlling for high school GPA, ANCOVA results revealed there was no significant effect of dual
enrollment participation on the Procrastination measure, $F(2, 2860) = 1.205, p = .300$.

Thus, I failed to reject the null hypothesis that there were no differences in means between groups.

Table 4.14

*One way ANCOVA Tests of Between-Subjects Effects for Procrastination with High School GPA as a Covariate*

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>75.095$^a$</td>
<td>3</td>
<td>25.032</td>
<td>4.765</td>
<td>.003</td>
<td>.005</td>
</tr>
<tr>
<td>Intercept</td>
<td>6677.059</td>
<td>1</td>
<td>6677.059</td>
<td>1271.005</td>
<td>.000</td>
<td>.308</td>
</tr>
<tr>
<td>HSGPA</td>
<td>71.193</td>
<td>1</td>
<td>71.193</td>
<td>13.552</td>
<td>.000</td>
<td>.005</td>
</tr>
<tr>
<td>DE Comp</td>
<td>12.657</td>
<td>2</td>
<td>6.328</td>
<td>1.205</td>
<td>.300</td>
<td>.001</td>
</tr>
<tr>
<td>Error</td>
<td>15024.636</td>
<td>2860</td>
<td>5.253</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>390788.000</td>
<td>2864</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>15099.730</td>
<td>2863</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^a R^2 = .005$ (Adjusted $R^2 = .004$)

Table 4.15

*Estimated Adjusted Means for One-Way ANCOVA for Procrastination with High School GPA as a Covariate*

<table>
<thead>
<tr>
<th>COMPDEC</th>
<th>M</th>
<th>SE</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>High School</td>
<td>11.291$^a$</td>
<td>.206</td>
<td>10.887</td>
</tr>
<tr>
<td>Main Campus</td>
<td>11.215$^a$</td>
<td>.188</td>
<td>10.845</td>
</tr>
<tr>
<td>No DE Courses</td>
<td>11.475$^a$</td>
<td>.045</td>
<td>11.387</td>
</tr>
</tbody>
</table>

$^a$ Covariate appearing in the model was evaluated at the following value: HSGPA = 3.43771.
Time Management

A one-way analysis of covariance (ANCOVA) was conducted on Time Management scores to evaluate whether a statistically significant difference existed between students who did not complete dual enrollment coursework, students who completed dual enrollment coursework on a high school campus, and students who completed dual enrollment coursework on a college campus, controlling for high school grade point average. Examination of boxplots revealed 19 outliers. Preliminary analyses were conducted to assess the influence of outliers, and the inclusion of outliers significantly influenced the results. All outliers were excluded that were 1.5 standard deviations from the mean. The original sample, \( N = 2864 \), was reduced to \( N = 2845 \) Table 4.16 illustrates descriptive statistics for the sample.

Table 4.16

<table>
<thead>
<tr>
<th>DE Completion</th>
<th>( M )</th>
<th>( SD )</th>
<th>( n )</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>13.93</td>
<td>1.620</td>
<td>122</td>
</tr>
<tr>
<td>Main Campus</td>
<td>13.82</td>
<td>1.596</td>
<td>147</td>
</tr>
<tr>
<td>No DE Courses</td>
<td>13.35</td>
<td>1.863</td>
<td>2576</td>
</tr>
<tr>
<td>Total</td>
<td>13.40</td>
<td>1.846</td>
<td>2845</td>
</tr>
</tbody>
</table>

Evaluations of the assumptions of normality and homogeneity of regression slopes revealed both assumptions were met. The distribution of Time Management scores for non-dual enrollment participants had an approximately normal distribution, normal skew, \( sk = -.41 \), \( kurt = -.43 \). The distribution of Time Management scores for students
completing dual enrollment on a high school campus had an approximately normal distribution, normal skew, $sk = -.36$, $kurt = -.82$. The distribution of Time Management scores for students completing dual enrollment on a college campus had an approximately normal distribution, normal skew, $sk = -.44$, $kurt = -.42$. Therefore, the assumption of normality was met.

The homogeneity of regression slopes assumption was evaluated by testing the interaction between high school GPA and dual enrollment participation. The homogeneity of regression slopes assumption was also evaluated by regressing the Time Management variable on the high school GPA covariate. Figure 4.6 shows the regression lines are approximately parallel; therefore, the assumption of homogeneity of regression slopes was met. No significant interaction between dual enrollment participation and high school GPA effect on Time Management was found, $p = .763$. Therefore, the homogeneity of regression assumption was met. Levene’s test indicated the variances were not equal, thus the equal variance assumption was violated, $p = .002$. 

113
ANCOVA analysis was conducted in SPSS Statistics 25 using the general linear model procedure. High school GPA was used as a covariate to evaluate differences in means for Time Management scores between students who did not complete dual enrollment, students who completed dual enrollment on a high school campus, and students who completed dual enrollment on a college campus. Table 4.17 contains the findings from the ANCOVA analysis. A significant effect was found for dual enrollment participation on the Time Management measure after controlling for high school grade point average, $F(2, 2841) = 6.015, p = .002$. Dual enrollment participation had a small effect size, $\eta^2 = .004$. Thus, I rejected the null hypothesis that there were no differences in adjusted means between groups.

*Figure 4.6. Time Management Scores for Dual Enrollment Completion Groups with High School GPA as a Covariate*
Table 4.17

One way ANCOVA Tests of Between-Subjects Effects for Time Management with High School GPA as a Covariate

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>145.600*</td>
<td>3</td>
<td>48.533</td>
<td>14.445</td>
<td>.000</td>
<td>.015</td>
</tr>
<tr>
<td>Intercept</td>
<td>9853.233</td>
<td>1</td>
<td>9853.233</td>
<td>2932.629</td>
<td>.000</td>
<td>.508</td>
</tr>
<tr>
<td>HSGPA</td>
<td>78.187</td>
<td>1</td>
<td>78.187</td>
<td>23.271</td>
<td>.000</td>
<td>.008</td>
</tr>
<tr>
<td>DE Comp</td>
<td>40.420</td>
<td>2</td>
<td>20.210</td>
<td>6.015**</td>
<td>.002</td>
<td>.004</td>
</tr>
<tr>
<td>Error</td>
<td>9545.372</td>
<td>2841</td>
<td>3.360</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>520298.000</td>
<td>2845</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>9690.972</td>
<td>2844</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* \( R^2 = .015 \) (Adjusted \( R^2 = .014 \))  
** \( p < 0.01 \)

Comparing Adjusted means revealed students who completed dual enrollment at a high school campus had the highest scores (\( M = 13.831 \)) compared to students who did not complete dual enrollment coursework and those who completed dual enrollment coursework at a college campus, \( M = 13.358 \) and \( M = 13.718 \) respectively. Table 4.18 illustrates the estimated adjusted means for the Time Management dependent variable.
Table 4.18

*Estimated Adjusted Means for One-Way ANCOVA for Time Management with High School GPA as a Covariate*

<table>
<thead>
<tr>
<th>COMPDEC</th>
<th>M</th>
<th>SE</th>
<th>95% Confidence Interval</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>13.831(^a)</td>
<td>.167</td>
<td>13.502</td>
<td>14.159</td>
<td></td>
</tr>
<tr>
<td>Main Campus</td>
<td>13.718(^a)</td>
<td>.153</td>
<td>13.418</td>
<td>14.017</td>
<td></td>
</tr>
<tr>
<td>No DE Courses</td>
<td>13.358(^a)</td>
<td>.036</td>
<td>13.287</td>
<td>13.429</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) Covariate appearing in the model was evaluated at the following value: HSGPA = 3.43757.

Pairwise comparisons using Bonferroni correction revealed a significant difference in adjusted means of Time Management scores between students who completed dual enrollment coursework on a high school campus and students who did not complete dual enrollment coursework, \(p = .018\). No significant differences were detected between students who completed dual enrollment coursework at a college campus and students who did not complete dual enrollment coursework. No significant differences were detected between students who completed dual enrollment coursework at a college campus and students who completed dual enrollment coursework at a high school campus. Table 4.19 summarizes the results of pairwise comparisons for the Time Management variable with high school GPA as a covariate.
Table 4.19

Pairwise Comparisons for One-Way ANCOVA for Time Management with
High School GPA as a Covariate

<table>
<thead>
<tr>
<th>(I) DE Comp</th>
<th>(J) DE Comp</th>
<th>Mean Difference (I-J)</th>
<th>SE</th>
<th>Sig.</th>
<th>95% Confidence Interval for Difference</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>Main Campus</td>
<td>.113</td>
<td>.224</td>
<td>1.000</td>
<td>-.425 - .651</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No DE Courses</td>
<td>.473*</td>
<td>.171</td>
<td>.018</td>
<td>.062 - .883</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Campus</td>
<td>High School</td>
<td>-.113</td>
<td>.224</td>
<td>1.000</td>
<td>-.651 - .425</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No DE Courses</td>
<td>.360</td>
<td>.157</td>
<td>.066</td>
<td>-.017 - .736</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No DE Courses</td>
<td>High School</td>
<td>-.473*</td>
<td>.171</td>
<td>.018</td>
<td>-.883 - -.062</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Main Campus</td>
<td>-.360</td>
<td>.157</td>
<td>.066</td>
<td>-.736 - .017</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results based on estimated adjusted means
* The mean difference was significant at the .05 level.

b Adjustment for multiple comparisons using Bonferroni correction

Correlational Study Results

A correlational study was conducted to answer the following research question: Is there a relationship between dual enrollment students’ scores on noncognitive measures of college readiness, the location where students completed their dual enrollment coursework, and their first year college GPA? The dependent, outcome variable was first year college GPA. The independent, predictor variables were high school campus location, college campus location, and six noncognitive college readiness measures taken
from the SmarterMeasure learning readiness survey: (a) academic attributes, (b) help seeking, (c) locus of control, (d) persistence, (e) procrastination, and (f) time management. Four bio-demographic variables were introduced as controls: (a) first generation college student, (b) race, (c) sex, and (d) socioeconomic status. Multiple regression analysis was conducted using a hierarchical regression framework to evaluate whether dual enrollment program location and students’ scores on measures of noncognitive college readiness predicted dual enrollment completers’ first year college GPA.

**Linearity and Multicollinearity Assumptions**

Data were analyzed using SPSS Statistics 25. A matrix scatterplot was created to include the dependent variable, first year college GPA, and the independent variables. The independent variables were high school GPA, dual enrollment program location, race, SES, sex, first generation status, and the six noncognitive measures of college readiness. Examination of the matrix scatterplot illustrated there was no evidence of a non-linear relationship between the outcome variable and predictor variables. Therefore, the assumption of linearity was met.

The mean first year college GPA was 2.83 (.73). The distribution was approximately normal, $sk = -.85$, $kurt = .50$. The frequencies for the categorical independent variables of first generation status, race, socioeconomic status (SES), sex, are presented in Table 4.20. The mean, standard deviation, skew and kurtosis for high school GPA and the noncognitive measures of college readiness are presented in Table 4.21.
Table 4.20

*Sample Bio-demographic Information for Categorical Independent Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Percentage of sample</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First generation status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First generation</td>
<td>99</td>
<td>41.3</td>
</tr>
<tr>
<td>Not first generation&lt;sup&gt;a&lt;/sup&gt;</td>
<td>141</td>
<td>58.8</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>11</td>
<td>4.0</td>
</tr>
<tr>
<td>American Indian</td>
<td>4</td>
<td>1.4</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>10</td>
<td>3.6</td>
</tr>
<tr>
<td>Hispanic</td>
<td>6</td>
<td>2.2</td>
</tr>
<tr>
<td>White</td>
<td>246</td>
<td>88.8</td>
</tr>
<tr>
<td><strong>SES&lt;sup&gt;b&lt;/sup&gt;</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quartile 1</td>
<td>45</td>
<td>16.2</td>
</tr>
<tr>
<td>Quartile 2</td>
<td>38</td>
<td>13.7</td>
</tr>
<tr>
<td>Quartile 3</td>
<td>53</td>
<td>19.1</td>
</tr>
<tr>
<td>Quartile 4</td>
<td>71</td>
<td>25.6</td>
</tr>
<tr>
<td>Quartile 5</td>
<td>37</td>
<td>13.4</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>136</td>
<td>49.1</td>
</tr>
<tr>
<td>Female</td>
<td>141</td>
<td>50.9</td>
</tr>
</tbody>
</table>

<sup>a</sup> A total of 37 cases did not contain data for first generation status

<sup>b</sup> A total of 33 cases did not contain data for SES quartile
Table 4.21

*Descriptive Statistics for Independent Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>Skew</th>
<th>Kurt</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSGPA</td>
<td>277</td>
<td>3.79</td>
<td>.488</td>
<td>-.629</td>
<td>.463</td>
</tr>
<tr>
<td>Academic Attributes</td>
<td>277</td>
<td>13.90</td>
<td>1.69</td>
<td>- .686</td>
<td>.271</td>
</tr>
<tr>
<td>Help Seeking</td>
<td>277</td>
<td>11.47</td>
<td>1.65</td>
<td>- .344</td>
<td>-.252</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>277</td>
<td>10.90</td>
<td>1.76</td>
<td>.088</td>
<td>.088</td>
</tr>
<tr>
<td>Persistence</td>
<td>277</td>
<td>12.11</td>
<td>1.51</td>
<td>.001</td>
<td>.034</td>
</tr>
<tr>
<td>Procrastination</td>
<td>277</td>
<td>11.35</td>
<td>2.39</td>
<td>- .154</td>
<td>-.272</td>
</tr>
<tr>
<td>Time Management</td>
<td>277</td>
<td>13.72</td>
<td>1.80</td>
<td>- .709</td>
<td>.193</td>
</tr>
</tbody>
</table>

Analysis of multicollinearity was evaluated by conducting Pearson product moment correlation tests for the dependent variable and continuous independent variables. Table 4.22 illustrates the correlations between independent and dependent variables. Low to moderate significant correlation coefficients were found between independent variables, ranging from $r = .122, p = .05$ and $r = .481, p = .01$. Examination of VIF values for collinearity revealed all VIF values for each independent variable were less than 5. Thus, no evidence of multicollinearity was identified.

A significant correlation was detected between high school GPA and first year college GPA, $r = .497, p = .01$. A significant correlation was detected between Help Seeking and first year college GPA, $r = .143, p = .05$. A significant correlation was detected between college campus dual enrollment location and first year college GPA, $r = .206, p = .01$. A significant correlation was detected between high school campus dual
enrollment location and first year college GPA, \( r = .206, p = .01 \). A significant correlation was detected between African American race and first year college GPA, \( r = .136, p = .05 \). A significant correlation was detected between the first quartile (lowest) SES and first year college GPA, \( r = .209, p = .01 \). These independent variables were included in the regression analysis.

Table 4.22

Correlations Between Independent Variables and First Year College GPA

<table>
<thead>
<tr>
<th>Variable</th>
<th>FirstYrGPA</th>
<th>HSGPA</th>
<th>AcAtt</th>
<th>HlpSeek</th>
<th>Locus</th>
<th>Persist</th>
<th>Procr</th>
<th>TimeMgt</th>
</tr>
</thead>
<tbody>
<tr>
<td>FirstYrCGPA</td>
<td>-</td>
<td>.497**</td>
<td>-.013</td>
<td>.143†</td>
<td>-.068</td>
<td>.008</td>
<td>.033</td>
<td>.069</td>
</tr>
<tr>
<td>HSGPA</td>
<td>.497**</td>
<td>-</td>
<td>-.054</td>
<td>.069</td>
<td>.071</td>
<td>.040</td>
<td>.023</td>
<td>.049</td>
</tr>
<tr>
<td>AcAtt</td>
<td>-.013</td>
<td>-.054</td>
<td>-</td>
<td>.134*</td>
<td>.005</td>
<td>.124*</td>
<td>.194**</td>
<td>.481**</td>
</tr>
<tr>
<td>HelpSeek</td>
<td>.143*</td>
<td>.069</td>
<td>.134*</td>
<td>-</td>
<td>.157**</td>
<td>.028</td>
<td>.369**</td>
<td>.320**</td>
</tr>
<tr>
<td>Locus</td>
<td>-.068</td>
<td>.071</td>
<td>.005</td>
<td>.157**</td>
<td>-</td>
<td>.134*</td>
<td>.165**</td>
<td>.048</td>
</tr>
<tr>
<td>Persist</td>
<td>.008</td>
<td>.040</td>
<td>.124*</td>
<td>.028</td>
<td>.134*</td>
<td>-</td>
<td>.218**</td>
<td>.122*</td>
</tr>
<tr>
<td>Procrast</td>
<td>.033</td>
<td>.023</td>
<td>.194**</td>
<td>.369**</td>
<td>.165**</td>
<td>.218**</td>
<td>-</td>
<td>.388**</td>
</tr>
<tr>
<td>TimeMgt</td>
<td>.069</td>
<td>.049</td>
<td>.481**</td>
<td>.320**</td>
<td>.048</td>
<td>.122*</td>
<td>.388**</td>
<td>-</td>
</tr>
</tbody>
</table>

** Correlation was significant at the 0.01 level (2-tailed).
* Correlation was significant at the 0.05 level (2-tailed).

Academic Attributes, Locus of Control, Persistence, Procrastination, and Time Management were not significantly correlated with first year college GPA. Still, these
predictor variables were included in the subsequent regression tests. First generation status was not significantly correlated to first year college grade point average and a significant number of cases ($N = 37$) did not contain data for first generation status. Preliminary analyses revealed first generation status did not significantly predict first year college GPA, $p = .939$. Therefore, first generation status was not included as a predictor variable.

**Hierarchical Regression Results**

A three stage hierarchical multiple regression was carried out to examine whether dual enrollment program location and noncognitive college readiness measures predicted first year college GPA. The first model included high school GPA, race, sex, and SES as controls. The second model included college campus and high school campus dual enrollment program locations predictor variables. The third model added the six noncognitive college readiness measures taken from the SmarterMeasure learning readiness survey: (a) academic attributes, (b) help seeking, (c) locus of control, (d) persistence, (e), procrastination, and (f) time management. The hierarchical regression model summary is presented in Table 4.23, the ANOVA table is presented in Table 4.24, and the coefficients of regression for each model are presented in Table 4.25.

The first model revealed high school GPA, sex, race, and SES significantly contributed to the regression model, $R^2 = .299$, $F (11, 276) = 10.262$, $p < .001$. The first model explained 29.9% of the variance in first year college GPA. As can be seen in Table 4.25, high school GPA had a significant positive regression coefficient ($\beta = .484$, $p <$
.001), indicating that students with higher high school GPAs earned significantly higher first year college GPAs.

In the second model, the addition of dual enrollment program location significantly contributed to the regression model, $R^2 = .347$, $F (12, 276) = 11.694, p < .001$. The addition of dual enrollment program location explained an additional 4.8% of the variance in first year college GPA. As can be seen in Table 4.25, the high school campus dual enrollment program location had a significant negative regression coefficient, $\beta = -.224, p < .001$. Results indicated that students who completed dual enrollment coursework on a high school campus earned significantly lower first year college GPAs, controlling for the bio-demographic variables in the model. Conversely, students who completed dual enrollment coursework on a college campus earned significantly higher first year college GPAs. A dual enrollment student’s predicted first year college GPA increased by .327 if the student completed dual enrollment coursework on a college campus. Therefore, I rejected the null hypothesis that no significant correlation existed between the location where students completed their dual enrollment coursework and students’ first year college GPAs.

In the third model, the addition of noncognitive college readiness measures significantly contributed to the regression model, $R^2 = .385$, $F (18, 276) = 8.973, p < .001$. The addition of the noncognitive measures explained an additional 3.8% of the variance in first year college. As can be seen in Table 4.25, Help Seeking had a significant positive regression coefficient, $\beta = .169, p < .01$. Results indicated that students who completed dual enrollment coursework on a high school campus with
higher Help Seeking scores earned significantly higher first year college GPAs, controlling for bio-demographic variables in the model. Locus of Control had a significant negative regression coefficient, $\beta = -.121$, $p < .05$. Results indicated that students with lower Locus of Control scores and who completed dual enrollment coursework on a high school campus earned significantly lower first year college GPAs, controlling for bio-demographic variables in the model.

After adding noncognitive measures as predictor variables, the high school campus dual enrollment program location had a significant negative regression coefficient, $\beta = -.208$, $p < .001$. Results indicated that students who completed dual enrollment coursework on a high school campus earned significantly lower first year college GPAs, controlling for bio-demographic variables in the model. Conversely, students who completed dual enrollment coursework on a college campus earned significantly higher first year college GPAs. A dual enrollment student’s predicted first year college GPA increased by .304 if the student completed dual enrollment coursework on a college campus, accounting for bio-demographic variables and noncognitive measures in the model. Therefore, I rejected the null hypothesis that no significant correlation existed between students’ scores on noncognitive measures of college readiness and students’ first year college GPAs.
Table 4.23

*Hierarchical Regression Model Summary Predicting First Year College GPA*

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>SE of the Estimate</th>
<th>Change Statistics</th>
<th>Sig. Δ F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Δ R²</td>
<td>Δ F</td>
</tr>
<tr>
<td>1</td>
<td>.547a</td>
<td>.299</td>
<td>.270</td>
<td>.622209</td>
<td>.299</td>
<td>10.262</td>
</tr>
<tr>
<td>2</td>
<td>.589b</td>
<td>.347</td>
<td>.317</td>
<td>.601514</td>
<td>.048</td>
<td>19.548</td>
</tr>
<tr>
<td>3</td>
<td>.620c</td>
<td>.385</td>
<td>.342</td>
<td>.590525</td>
<td>.038</td>
<td>2.653</td>
</tr>
</tbody>
</table>

a Predictors: (Constant), Q5, White, SEX, HSGPA, Q2, Q3, American Indian Alaskan, Hispanic, Q1, Asian Pacific, Q4
b Predictors: (Constant), Q5, White, SEX, HSGPA, Q2, Q3, American Indian Alaskan, Hispanic, Q1, Asian Pacific, Q4, High School DE
c Predictors: (Constant), Q5, White, SEX, HSGPA, Q2, Q3, American Indian Alaskan, Hispanic, Q1, Asian Pacific, Q4, High School DE, ACADEMICATT, HELPSEEKING, LOCUS, PERSISTENCE, PROCRAS, TIMEMGT

Table 4.24

*Hierarchical Regression Analysis ANOVA Table Predicting First Year College GPA*

<table>
<thead>
<tr>
<th>Model</th>
<th>SS</th>
<th>df</th>
<th>M²</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Regression</td>
<td>43.701</td>
<td>11</td>
<td>3.973</td>
<td>10.262</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>102.593</td>
<td>265</td>
<td>.387</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>146.295</td>
<td>276</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2b</td>
<td>Regression</td>
<td>50.774</td>
<td>12</td>
<td>4.231</td>
<td>11.694</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>95.520</td>
<td>264</td>
<td>.362</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>146.295</td>
<td>276</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3c</td>
<td>Regression</td>
<td>56.325</td>
<td>18</td>
<td>3.129</td>
<td>8.973</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>89.970</td>
<td>258</td>
<td>.349</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>146.295</td>
<td>276</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
*** $p < .001$

**a** Predictors: (Constant), Q5, White, SEX, HSGPA, Q2, Q3, American Indian Alaskan, Hispanic, Q1, Asian Pacific, Q4

**b** Predictors: (Constant), Q5, White, SEX, HSGPA, Q2, Q3, American Indian Alaskan, Hispanic, Q1, Asian Pacific, Q4, High School DE

**c** Predictors: (Constant), Q5, White, SEX, HSGPA, Q2, Q3, American Indian Alaskan, Hispanic, Q1, Asian Pacific, Q4, High School DE, ACADEMICATT, HELPSEEKING, LOCUS, PERSISTENCE, PROCRAST, TIMEMGT

Table 4.25

**Summary of Hierarchical Regression Predicting First Year College GPA From High School GPA, Race, SES, Sex, Dual Enrollment Program Location, and Noncognitive Measures of College Readiness**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>$SE$</td>
</tr>
<tr>
<td>1$^a$</td>
<td>(Constant)</td>
<td>.010</td>
</tr>
<tr>
<td></td>
<td>HSGPA</td>
<td>.721</td>
</tr>
<tr>
<td></td>
<td>SEX</td>
<td>-.128</td>
</tr>
<tr>
<td></td>
<td>Hispanic</td>
<td>.465</td>
</tr>
<tr>
<td></td>
<td>Asian Pacific</td>
<td>.180</td>
</tr>
<tr>
<td></td>
<td>American Indian Alaskan</td>
<td>.659</td>
</tr>
<tr>
<td></td>
<td>Q1</td>
<td>-.272</td>
</tr>
<tr>
<td></td>
<td>Q2</td>
<td>-.074</td>
</tr>
<tr>
<td></td>
<td>Q3</td>
<td>.057</td>
</tr>
<tr>
<td></td>
<td>Q4</td>
<td>.096</td>
</tr>
<tr>
<td></td>
<td>Q5</td>
<td>.103</td>
</tr>
<tr>
<td></td>
<td>(Constant)</td>
<td>.008</td>
</tr>
<tr>
<td>---</td>
<td>--------------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>HSGPA</td>
<td>.725</td>
</tr>
<tr>
<td></td>
<td>SEX</td>
<td>-.137</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>.255</td>
</tr>
<tr>
<td></td>
<td>Hispanic</td>
<td>.512</td>
</tr>
<tr>
<td></td>
<td>Asian Pacific</td>
<td>.265</td>
</tr>
<tr>
<td></td>
<td>American Indian</td>
<td>.765</td>
</tr>
<tr>
<td></td>
<td>Q1</td>
<td>-.212</td>
</tr>
<tr>
<td></td>
<td>Q2</td>
<td>-.024</td>
</tr>
<tr>
<td></td>
<td>Q3</td>
<td>.134</td>
</tr>
<tr>
<td></td>
<td>Q4</td>
<td>.141</td>
</tr>
<tr>
<td></td>
<td>Q5</td>
<td>.128</td>
</tr>
<tr>
<td></td>
<td>High School DE</td>
<td>-.327</td>
</tr>
<tr>
<td></td>
<td>(Constant)</td>
<td>-.532</td>
</tr>
<tr>
<td></td>
<td>HSGPA</td>
<td>.714</td>
</tr>
<tr>
<td></td>
<td>SEX</td>
<td>-.148</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>.259</td>
</tr>
<tr>
<td></td>
<td>Hispanic</td>
<td>.589</td>
</tr>
<tr>
<td></td>
<td>Asian Pacific</td>
<td>.240</td>
</tr>
<tr>
<td></td>
<td>American Indian</td>
<td>.823</td>
</tr>
<tr>
<td></td>
<td>Alaskan</td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>Estimate</td>
<td>Std. Error</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------</td>
<td>------------</td>
</tr>
<tr>
<td>Q1</td>
<td>-0.185</td>
<td>0.144</td>
</tr>
<tr>
<td>Q2</td>
<td>0.008</td>
<td>0.147</td>
</tr>
<tr>
<td>Q3</td>
<td>0.222</td>
<td>0.135</td>
</tr>
<tr>
<td>Q4</td>
<td>0.231</td>
<td>0.128</td>
</tr>
<tr>
<td>Q5</td>
<td>0.235</td>
<td>0.145</td>
</tr>
<tr>
<td>High School DE</td>
<td>-0.304</td>
<td>0.073</td>
</tr>
<tr>
<td>HELPSEEKING</td>
<td>0.075</td>
<td>0.025</td>
</tr>
<tr>
<td>ACADEMICATT</td>
<td>-0.002</td>
<td>0.025</td>
</tr>
<tr>
<td>LOCUS</td>
<td>-0.050</td>
<td>0.021</td>
</tr>
<tr>
<td>PERSISTENCE</td>
<td>0.001</td>
<td>0.025</td>
</tr>
<tr>
<td>PROCRASTINATION</td>
<td>0.002</td>
<td>0.017</td>
</tr>
<tr>
<td>TIMEMGT</td>
<td>0.013</td>
<td>0.025</td>
</tr>
</tbody>
</table>

Note. The dependent variable was first year college GPA.

a Predictors in Model 1: (Constant), Q5, White, SEX, HSGPA, Q2, Q3, American Indian Alaskan, Hispanic, Q1, Asian Pacific, Q4

b Predictors in Model 2: (Constant), Q5, White, SEX, HSGPA, Q2, Q3, American Indian Alaskan, Hispanic, Q1, Asian Pacific, Q4, High School DE

c Predictors in Model 3: (Constant), Q5, White, SEX, HSGPA, Q2, Q3, American Indian Alaskan, Hispanic, Q1, Asian Pacific, Q4, High School DE, ACADEMICATT, HELPSEEKING, LOCUS, PERSISTENCE, PROCRASTINATION, TIMEMGT

As can be seen in Figure 4.7, the P-P Plot revealed the residuals were approximately normally distributed. Some variation was observed in the middle of the distribution, but the residuals remained close to the regression line. The data met the independence of errors assumption, Durbin-Watson value = 1.870. As can be seen in
Figure 4.8, a scatterplot of standardized residuals revealed roughly similar variability across all values of X. Therefore, the assumption of homoscedasticity was met.

**Figure 4.7.** Normal P-P plot of standardized residuals for the first year college GPA outcome variable
Summary

In this chapter, I presented the results from a two-phased study. In the first phase, ANCOVA analyses were conducted to examine whether differences exist in students’ scores on noncognitive measures of college readiness between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus. In the second phase, hierarchical regression analyses were conducted to examine whether a relationship existed between the campus location where students completed their dual enrollment coursework, students’ scores on noncognitive measures of college readiness, and students’ first year college GPA.
Results from the first phase of the study rejected the hypotheses that significant differences existed between groups for Academic Attributes, Help Seeking, Locus of Control, Persistence, and Procrastination noncognitive measures. A significant difference in Time Management scores was detected between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus. Pairwise comparisons revealed a significant difference in Time Management scores between non-dually enrolled students and dually-enrolled students who completed their coursework on a high school campus.

Results from the second phase of the study supported the hypotheses that a significant correlation existed between dual enrollment program location, noncognitive measures of college readiness, and first year college GPA. Specifically, completing dual enrollment coursework on a college campus significantly predicted first year college GPA. Together, noncognitive measures of college readiness and dual enrollment program location significantly predicted first year college GPA.

In the next chapter, I discuss the findings of the study in relation to existing literature. I present implications for educational policy and practice, limitations of the study, and recommendations for future research.
CHAPTER FIVE
DISCUSSION, IMPLICATIONS, AND CONCLUSION

The final chapter begins with a summary of the study’s purpose, research questions, and methodology. Next, I present a review of the conceptual framework that guided the study. Then, the results obtained from data analyses are discussed with relation to existing literature and I present implications to policy and practice. The chapter concludes with limitations of the study and recommendations for future research.

Summary of the Study

A college degree is the gateway for increased economic opportunity (Carnevale, Smith, & Strohl, 2013), but high school students’ readiness for college continues to be a persistent challenge that leads to low persistence and graduation rates (Barnett, 2011). Low persistence and graduation rates are particularly problematic for community colleges that serve a disproportionate number of students who are not prepared for the rigors of college coursework (Cohen, Brawer, & Kisker, 2014). College readiness is a complex construct, and researchers recognized college readiness included academic behaviors and understanding the context of college in addition to content knowledge (Conley, 2014; Tierney & Sablan, 2014). Consequently, researchers identified cognitive and noncognitive factors as two broad categories of college readiness (Bragg & Taylor, 2014; Porter & Polikoff, 2012; Strayhorn, 2014).

Community colleges have created dual enrollment programs to improve college readiness, student access, and academic outcomes for the over two million students enrolled in one or more dual enrollment courses each year (Thomas, Marken, Gray, &
Dual enrollment programs are purported to improve the transition to college, thereby improving students’ readiness to cope with the rigors of college (Kanny, 2015; Karp, 2012). Researchers have pointed to the effect of dual enrollment program location on students’ college GPAs and college readiness (An, 2013a; Dare, Dare, & Nowicki, 2017; Karp, 2012). The physical location where dual enrollment programs are offered is an important program structure variation (Edwards, Hughes, & Weisberg, 2011).

While proponents asserted dual enrollment improves college readiness, few studies have systematically examined this claim (An, 2013a). Few studies have evaluated the influence of dual enrollment participation and noncognitive dimensions of college readiness (An & Taylor, 2015; Martin, 2013). Dual enrollment programs are not equally effective, partly as a result of variations in program structure and implementation (Taylor, 2015). While researchers asserted dual enrollment coursework on a college campus created the most authentic experience for high school students to develop college readiness knowledge and abilities (Edwards, Hughes, & Weisberg, 2011; Karp, 2012), no studies have evaluated the influence of program location on noncognitive measures of college readiness. Further, no studies have evaluated the influence of dual enrollment program location and noncognitive measures of college readiness on students’ academic performance in college.

Accordingly, this study examined whether differences existed in students’ noncognitive readiness between non-dually enrolled students, dually-enrolled students who completed coursework on a college campus, and dually enrolled students who
completed coursework on a high school campus. Additionally, this study evaluated the relationship between noncognitive college readiness factors, dual enrollment program location, and students’ first year college grade point average.

This study was guided by two research questions.

1. Are there significant differences in scores on noncognitive measures of college readiness between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus?

2. Is there a relationship between dual enrollment students’ scores on noncognitive measures of college readiness, the location where students completed their dual enrollment coursework, and their first year college GPA?

**Conceptual Framework Summary**

This study was guided by a Conley’s (2008; 2014) college readiness framework. In this study, I extended Conley’s (2008; 2014) conceptual model of college readiness to incorporate dual enrollment program location as a key variable influencing college readiness. I incorporated Schlossberg’s (1984) Transition Theory to understand the influence of dual enrollment program location and noncognitive measures of college readiness on students’ academic outcomes and perceptions of their college readiness. A successful transition to college is predicated on a student’s college readiness. Conley (2008; 2014) conceptualized college readiness as a holistic model comprised of four interrelated dimensions, termed keys to readiness. Two dimensions, key transition knowledge and skills and key learning skills and techniques and, constituted noncognitive
college readiness dimensions. Key learning skills and techniques included study skills, time management skills, motivation, and help-seeking behaviors. Key transition knowledge and skills include comprised a student’s ability to successfully navigate the college environment. Navigating the college environment included accessing advising and career counseling resources. The inclusion of key transition knowledge and skills undergirded the interplay of the transition to college and college readiness (Conley, 2008).

Attending college is an important transition experience for students. Transition theory is a three-phased model that can be used to examine students’ transitions in, through, and out of college (Chickering & Schlossberg, 2002). The first phase, approaching transitions, incorporates the student’s perspective regarding the transition and the context of the transition. A student’s attitudes and behaviors influence the outcome of a transition event. The second phase, taking stock of coping resources, forms a system for evaluating a student’s readiness to transition. The third phase, taking charge, represents the extent to which a student uses coping strategies to successfully navigate the transition to college (Anderson, Goodman, & Schlossberg, 2012).

Put another way, a successful transition into college is a complex process involving the use of coping resources to successfully navigate the entry into college. Noncognitive college readiness measures represent resources a dual enrollment student uses to facilitate successful transition to college. Context is an important factor in the transition process; therefore, I used transition theory to understand the influence of the physical environment, namely the physical location of the dual enrollment coursework,
on dual enrollment students’ perceptions of college readiness and their subsequent academic performance in college.

Figure 5.1 depicts the visual representation of the conceptual model for this study. The conceptual model incorporated Transition Theory with Conley’s (2008; 2014) college readiness framework to represent the influence of dual enrollment program location on noncognitive college readiness measures and on academic performance. I used the conceptual model to understand differences in students’ dual enrollment students’ academic outcomes based on program location.

![Conceptual model](image)

**Figure 5.1.** Conceptual model.

**Discussion of Findings**

To answer the first research question, a comparative research design using analysis of covariance (ANCOVA) compared student scores on six noncognitive measures of college readiness. To answer the second research question, a correlational
design using hierarchical multiple regression examined whether a relationship existed between dual enrollment program location, student scores on six noncognitive college readiness measures, and students’ first year college GPAs. In the following sections, I discuss the results from ANCOVA and hierarchical regression analyses within the context of the existing dual enrollment literature.

**Research Question 1: Differences in Noncognitive College Readiness Measures**

The first research question tested whether significant differences existed in scores on noncognitive measures of college readiness between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus? Conley (2008, 2014) conceptualized a comprehensive framework that incorporated noncognitive factors as important components of college readiness. Prior researchers have reported that noncognitive factors significantly contributes to students’ college readiness (Farrington et al., 2012; Robbins et al., 2004; Robbins et al., 2006). With regards to dual enrollment, prior studies found positive correlations between dual enrollment completion and noncognitive college readiness factors (An & Taylor, 2015; Martin, 2013).

To answer the first research question, student scores from the SmarterMeasure college readiness survey were compared using ANCOVA to determine whether significant differences existed between groups, controlling for high school grade point average.
Hypotheses 1a – 1e. The findings from this study revealed no significant differences for the Academic Attributes, Help Seeking, Locus of Control, Persistence, and Procrastination noncognitive measures between students who did not complete dual enrollment coursework, students who completed dual enrollment on a high school campus, and students who completed dual enrollment coursework on a college campus. Consequently, the following research hypotheses were rejected based on ANCOVA analyses presented in Chapter 4.

H1a: Significant differences exist in scores on the Academic Attributes noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

H1b: Significant differences exist in scores on the Help Seeking noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

H1c: Significant differences exist in scores on the Locus of Control noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

H1d: Significant differences exist in scores on the Persistence noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

H1e: Significant differences exist in scores on the Procrastination noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.
completed their coursework on a high school campus, and dually-enrolled
students who completed their coursework on a college campus.

H1e: Significant differences exist in scores on the Procrastination noncognitive
measure between non-dually enrolled students, dually-enrolled students who
completed their coursework on a high school campus, and dually-enrolled
students who completed their coursework on a college campus.

Surprisingly, no significant differences were found for Academic Attributes, Help
Seeking, Locus of Control, Persistence, and Procrastination noncognitive measures
between students who completed dual enrollment coursework at a college campus and
students who completed dual enrollment coursework at a high school campus. These
findings suggest that dual enrollment program location did not significantly influence
students’ perceptions of their college readiness. Further, the results suggest that
completion of dual enrollment coursework provided students learning experiences that
equally impacted students’ perceptions of their college readiness.

These findings are mixed with regards to prior research on the influence of dual
enrollment participation on noncognitive college readiness measures. An and Taylor
(2015) found dual enrollment participants reported significantly higher key learning skills
and techniques measures compared to non-dually enrolled students, but the researchers
did not find significant differences in key transition knowledge and skills measures
between the two groups. The researchers found significant differences between groups
for help seeking, a key learning skill. This study did not find significant differences in the
Help Seeking noncognitive measure between dual enrollment completers and students
who did not complete dual enrollment coursework. Martin (2013) found dual enrollment students reported significantly higher career planning skills, a key noncognitive variable, compared with non-dually enrolled students.

Results from this study revealed that students who completed coursework on a high school campus perceived their readiness similarly to those who completed coursework on a college campus. These findings can be understood in context of prior research. Hoffman, Vargas, and Santos (2009) found dual enrollment participation created an educational environment for students to develop skills and coping strategies that improved their college readiness. Put another way, dual enrollment participation impacted students’ perceptions of college readiness regardless of the physical location where students completed their coursework.

Hypothesis H1f. Significant differences for the Time Management noncognitive measure were found between students that did not complete dual enrollment coursework and students that completed dual enrollment coursework. Consequently, the following research hypothesis were accepted based on ANCOVA analyses presented in Chapter 4.

H1f: Significant differences exist in scores on the Time Management noncognitive measure between non-dually enrolled students, dually-enrolled students who completed their coursework on a high school campus, and dually-enrolled students who completed their coursework on a college campus.

Significantly higher Time Management scores were found between non-dually enrolled students and dual enrollment completers. Pairwise comparisons revealed significantly higher time management scores for high school campus dual enrollment
students compared to non-dually enrolled students. Interestingly, student scores for the Time Management measure were not significantly greater for non-dually enrolled students compared to those who completed dual enrollment coursework at the college campus.

Analyses revealed significant differences in Time Management scores between dual enrollment completers and non-dual enrollment completers, but the differences in adjusted means were quite small. Additionally, the small effect size for dual enrollment participation ($\eta^2 = .004$) suggests a weak strength in the relationship between completing dual enrollment coursework and higher Time Management scores. As can be seen in Table 4.19, the adjusted mean differences between groups were less than one Likert scale. While the differences were statistically significant, the practical significance of a Likert score less than one between groups suggests the significance of these results should be interpreted cautiously.

The finding that significant differences existed for Time Management scores between students who completed dual enrollment at a college campus and non-dually enrolled students was congruent with prior research. Martin (2013) reported significant differences for self-management and resource management skills, including time management, between non-dually enrolled students and dual enrollment completers. An and Taylor (2015) reported significant differences in key learning skills and techniques between dual enrollment participants and non-dual enrollment participants. Time management was included as a key learning skill and technique.
Results from pairwise comparisons were not congruent with prior research. Pairwise comparisons revealed Time Management scores were not significantly higher for dual enrollment students who completed their coursework on a college campus. Lile, Ottusch, Jones, and Richards (2017) found students who completed dual enrollment coursework at a college campus reported better time management skills compared to students that completed dual enrollment coursework at a high school campus.

**Research Question 2: Discussion of Findings**

The second research question asked is there a relationship between dual enrollment students’ scores on noncognitive college readiness measures, the location where students completed their dual enrollment coursework, and their first year college GPA? Prior studies found significantly higher college grade point averages for dual enrollment students compared to non-dually enrolled students (An, 2013a; Ganzert, 2014; Struhl & Vargas, 2012). Prior studies have found significant correlations between noncognitive factors and college GPA (An, 2015; Ozmun, 2013).

Hierarchical regression was performed to evaluate the extent to which dual enrollment program location and scores on noncognitive measures of college readiness predicted students’ first year college grade point average. The following research hypotheses were tested.

**H2a:** A significant positive correlation exists between dual enrollment program location and students’ first year college GPA.

**H2b:** A significant positive correlation exists between scores of noncognitive college readiness and students’ first year college GPA.
The findings from this study revealed a significant relationship between dual enrollment program location and first year college grade point average and a significant relationship between dual enrollment program location, noncognitive college readiness measures, and first year college GPA. Dual enrollment program location and noncognitive measures of college readiness significantly predicted first year college GPA. Consequently, the research hypotheses were accepted based on results presented in Chapter 4. The following two sections provide further discussion of the hierarchical regression results.

**Program location and first year college GPA.** The first regression model included high school GPA, race, socioeconomic status (SES), and sex as control variables. The second model added college campus and high school campus dual enrollment program locations predictor variables. Results showed completing dual enrollment coursework on a college campus significantly predicted students’ first year college GPAs. As can be seen in Table 4.23, results from the second regression model illustrated a significant change in $R^2$ associated the addition of dual enrollment program location, $\Delta R^2 = .048$. The second model explained 34.7% of the variance of first year college GPA. Results revealed the second regression model significantly improved the ability to predict first year college GPA, $p < .001$. As can be seen in Table 4.25, students who completed dual enrollment coursework on a college campus earned significantly higher first year college GPAs, controlling for the bio-demographic variables in the model. A student’s predicted first year college grade point average increased by .327 if the student completed dual enrollment coursework on a college campus.
These findings are congruent with prior studies that evaluated academic outcomes of dual enrollment students after their matriculation to college and support Burns and Lewis’s (2000) concerns that dual enrollment courses at a high school could be less effective in preparing students for college success when compared to dual enrollment courses offered at a college campus. Ganzert (2014) reported a strong positive effect of dual enrollment participation on students’ college GPAs. An (2013a) found dual enrollment participation significantly increased first year college GPAs. D’Amico, Morgan, Robertson, and Rivers (2013) found higher persistence rates for dual enrollment completers who matriculated to a technical college. This study addresses gaps in prior studies that did not evaluate the effect of dual enrollment program location on students’ academic outcomes in college (An, 2013a; Ganzert, 2014). Findings from this study suggest completing dual enrollment coursework at a college campus significantly improved first year college GPA.

Dual enrollment programs aim to improve the transition to college (Karp, 2012). Chickering and Schlossberg (2002) asserted the context in which a transition experience occurs influences whether a student successfully transitions to college, and context includes the physical location where a transition takes place. Through the lens of Transition Theory, these findings suggest completing dual enrollment coursework on a college campus may facilitate the transition to college as evidenced by students earning higher first year college GPAs when completing dual enrollment coursework on a college campus.
Noncognitive measures and first year college GPA. The third regression model included students’ scores from six noncognitive measures of college readiness: (a) academic attributes, (b) help seeking, (c) persistence, (d) procrastination, (e) time management, and (f) locus of control. Results showed the third regression model significantly improved the ability to predict first year college GPA, $p < .001$. As can be seen in Table 4.23, results from the third regression model illustrated a significant change in $R^2$ associated the addition of noncognitive college readiness measures, $\Delta R^2 = .038$. The third regression model explained 38.5% of the variance in first year college GPA. After including noncognitive measures as predictor variables, results suggested students who completed dual enrollment coursework on a college campus earned significantly higher first year college GPAs. Overall, these findings suggest noncognitive measures exerted significant influence on students’ college readiness as measured by first year college GPA.

These findings are congruent with prior studies that evaluated the influence of noncognitive measures on students’ academic outcomes in college. Komarraju, Ramsey, and Rinella (2013) reported academic discipline, a noncognitive factor, accounted for 2% of the variance in college GPA. Robbins et al. (2004) found noncognitive factors explained 26.2% of the variance in college GPA. Kitsantas, Winsler, and Huie (2008) reported self-regulation, academic motivation, and time management were correlated with first year college GPA, accounting for 10 percent of the variance in first year college GPA.
Interestingly, findings suggest varying relationships between noncognitive college readiness measures, completing dual enrollment coursework on a college campus, and first year college GPA. As can be seen in Table 4.7, the mean student score for the Locus of Control measure was higher for students who completed dual enrollment coursework on a high school campus. Results from third regression model showed a negative regression coefficient for Locus of Control. Therefore, high school location dual enrollment students with higher Locus of Control scores earned significantly lower first year college GPAs. In contrast, the Help Seeking measure revealed a positive regression coefficient. As can be seen in Table 4.4, the mean student score for the Help Seeking measure was lower for students who completed dual enrollment coursework on a high school campus. While ANCOVA analyses found no significant differences in the means between these groups, both Help Seeking and Locus of Control significantly contributed to predicting first year college GPA.

The results from this study suggest students who completed dual enrollment coursework on a college campus may have more realistic perceptions of their college readiness compared to students who completed dual enrollment coursework at a high school campus. Results suggest the college campus environment significantly contributed to higher first year college GPAs. This finding supports Conley’s (2008; 2014) assertion that noncognitive dimensions contributed to students’ academic preparedness in college. Prior research also supports completed dual enrollment coursework on a college campus may have more realistic perceptions of their college readiness. Lile, Ottusch, Jones, and Richards (2017) found students who completed dual enrollment coursework on a college
campus reported greater clarity in college expectations and the abilities required to successfully transition to college compared to students who completed dual enrollment coursework at a high school.

**Implications**

The location where dual enrollment students complete their coursework matters, and the findings from this study offer numerous implications for policymakers and education practitioners. Dual enrollment programs can address federal and state pressures to increase student access and success to higher education. States exert control over dual enrollment program structure and funding using state-level policies. The findings from this study can inform changes to dual enrollment policies to promote improved college readiness. Dual enrollment programs offer the opportunity to connect K-12 and higher education systems. As such, educational practitioners can use the findings from this study to create intentional partnership agreements that create alignment and clarify the definition of a college-ready student. The following sections present and discuss implications for policy and practice.

**Policy Implications**

Dual enrollment programs are codified in state-level policies, and state policies vary with regard to access, funding, program structure, and quality. The location where dual enrollment programs are delivered is one significant variation in dual enrollment structure. Across the United States, the majority of dual enrollment coursework is delivered by community colleges on high school campuses. This study found completing dual enrollment coursework on a college campus significantly increased students’ first
year college GPAs, and policymakers should consider the importance of program location when designing dual enrollment policies. Further, policymakers should include assessing program location as a component of broader dual enrollment assessment practices. Accordingly, the following implications and recommendations are offered.

State policies often including funding for dual enrollment coursework. Findings from this study showed completing dual enrollment coursework on a college campus resulted in higher first year college GPAs. Travel to the college campus is a significant barrier to offering dual enrollment coursework on college campus. This barrier is particularly problematic in rural environments. Therefore, state policies should consider expanding funding to include transportation costs for students to complete coursework on a college campus.

This study illustrated the effectiveness of completing dual enrollment coursework on high school students’ subsequent academic performance in college. Legislators and educational policymakers should continue to promote dual enrollment as a pathway to access higher education and improve college readiness. Students of color and students from lower SES categories may differentially benefit from completing dual enrollment coursework at a college campus. When offered at a high school campus, students do not have immediate access to support services, disparately impacting underrepresented communities. Therefore, policymakers should continue to increase access to college campus dual enrollment programs, particularly for underrepresented students that may differentially benefit from participation.
The findings from this study highlighted the paucity of state and national data that includes dual enrollment program location as a key variable. Currently, the National Center for Education Statistics surveys comprise the only available national dual enrollment data sets, and these data sets do not include the location where students completed their dual enrollment coursework. State and federal policymakers should incorporate dual enrollment program location as a key variable to facilitate researchers’ examination of dual enrollment program location on noncognitive variables and academic outcomes. Improvements to data systems would permit researchers to evaluate the effectiveness of dual enrollment in improving college readiness across educational systems.

**Implications for Practice**

Because this study demonstrated that dual enrollment program location and noncognitive factors influence students’ academic outcomes, practitioners should create structured connections using dual enrollment programs to improve college readiness. Community colleges offer the majority of dual enrollment coursework to high school students and students use dual enrollment coursework to get a head start for their bachelor’s degrees. Therefore, three implications are offered for practitioners from K-12 and community colleges to leverage a unique opportunity to improve connections between educational systems that can result in improving college readiness for high school students.

First, community colleges and high schools should create structured dual enrollment partnerships that provide exposure to the college campus and create
opportunities for students to learn the expectations of college in context of a college experience. Structured pathways can serve as a model for community colleges to use to integrate courses, academic support, and student support, resulting in aligned processes and practices. Exposure to the college environment while in high school would provide students opportunities to try on the college role, interact with college students, learn college expectations, and learn to use college resources. These noncognitive behaviors contribute to an effective transition into college and future academic success.

Next, the findings from this study underscore the opportunity of leveraging dual enrollment programs to improve college readiness by creating curricular connections between K-12 and college. The disconnects between K-12 and college contribute to poor college readiness and stagnant academic success outcomes experienced by college students. One reason is high school curricula are not aligned with entry-level college courses. Engaging high school partners in curriculum alignment will ensure students have both the high school credits required to graduate while earning college credit. By completing dual enrollment coursework at a college campus and ensuring alignment between high school courses and college courses, practitioners can increase curricular connections between K-12 and college and improve college readiness for participants.

Third, practitioners should adopt a more holistic program perspective of dual enrollment. Dual enrollment program structure varies across and within states, and much of what is termed dual enrollment consists of courses, not holistic programs. Findings from this study showed completing dual enrollment coursework on a college campus and noncognitive measures significantly predicted higher first year college GPAs.
Community colleges must work collaboratively with high school partners to design dual enrollment programs that create authentic college experiences. An intentional program perspective of dual enrollment would reinforce dual enrollment is not simply earning college credits. By narrowly focusing on coursework, dual enrollment policies appear to disregard a central purpose for which all proponents agree: to successfully transition high school students to college. Therefore, practitioners should adopt a program view of dual enrollment that incorporates support structures and with authentic college classroom experiences. Program structure for dual enrollment should include noncognitive skill development such as time management skills that facilitate students’ academic success in college. Practitioners should strive to create authentic college campus classroom experiences that improve college readiness and facilitate students’ transition from high school to college.

**Limitations**

Several limitations must be acknowledged for this study. To obtain data that included dual enrollment program location, all data in this study were acquired from one rural community college located in the Southeastern United States. Additionally, the racial makeup of the sample in this study was not representative of the dual enrollment population. White students comprise 88.8% of the sample in this study. The United States Department of Education (2019) reported 38% of dual enrollment students nationwide were White. Therefore, the generalizability of the findings from this study to the broader dual enrollment population were limited.
Instrumentation was a significant limitation in the study. Archival data of student responses to the SmarterMeasure learning readiness survey were used in this study. The researcher did not have access to individual student scores for each question in the SmarterMeasure survey. As such, a confirmatory factor analysis could not be conducted to validate the construct validity of each noncognitive measure. The absence of significant differences between dual enrollment completers and non-dually enrolled students is an illustration of the complexity of the college readiness construct and suggests the instrument used in this study may not have measured noncognitive constructs that influence students’ academic outcomes and their perceptions of their readiness.

The study was limited by the timing of the administration of the SmarterMeasure learning readiness survey. Individuals may be biased when reporting their experiences or abilities in surveys (Shadish, Cook, & Campbell, 2002). Students reported their perceptions of their college readiness prior to beginning college, and perceptions of their college readiness may not have reflected their actual abilities for the noncognitive factors that were measured.

Selection-bias may have existed in this study. Students self-selected to participate in dual enrollment coursework. Self-selection into dual enrollment is a significant limitation when assessing the effectiveness of dual enrollment on improving students’ academic outcomes (Speroni, 2012). Dual enrollment participants are often highly motivated students. While all students in the study were motivated to attend college as evidenced by their decisions to enroll in the community college, this study did not assess
academic motivation as a noncognitive measure. Robbins et al. (2004) reported achievement motivation as a significant noncognitive predictor of college readiness.

The sample size \((N = 277)\) used in the correlational study was small given the number of high school students that completed dual enrollment coursework across the United States. Approximately two million students participated in dual enrollment coursework (Thomas, Marken, Gray, & Lewis, 2013). While a priori power analysis indicated adequate sample size, increasing the sample size would have improved the power of the correlational study.

The correlational design used for this study allow only for correlational inferences to be made with regards to the predictor and outcome variables. Causal claims cannot be made using correlational research designs (Creswell, 2014). Therefore, no causal conclusions can be drawn with regards to the influence of dual enrollment program location on students’ first year college grade point average.

**Recommendations for Future Research**

While this study demonstrated that completing dual enrollment coursework at a college campus significantly improved students’ academic outcomes in college, more work should be conducted to evaluate the relationship between dual enrollment program location and students’ academic outcomes. This study revealed mixed results regarding the influence of dual program location on noncognitive college readiness measures; therefore, more research in this area may uncover significant findings to explain the interaction between dual enrollment program location and student’s perceptions of their readiness to enter college. The following recommendations for future research will
continue to address gaps in knowledge that can inform educators and policymakers as they construct and deliver dual enrollment programs to high school students.

1. Findings from this study provided empirical evidence to support the assertion that offering dual enrollment coursework on a college campus differentially improved students’ first year in college grade point averages. Since community colleges often operate within state systems, a study may expand this work by incorporating additional colleges within a state system to evaluate whether these findings persist across institutions.

2. This study used students’ scores on noncognitive measures prior to beginning college. Future work should incorporate additional noncognitive measures to evaluate the influence of program location on additional noncognitive measure of college readiness such as academic motivation.

3. Further research should evaluate the effect of dual enrollment participation on noncognitive measures of readiness once a student is experiencing the transition into college, namely the first year of college. A future study may incorporate a pretest and posttest for noncognitive measures to further evaluate whether dual enrollment participation influences students’ noncognitive college readiness skills.

4. Variations in dual enrollment implementation can result in differential outcomes for disadvantaged students. This study used gender, race, sex, and socioeconomic status as controls to evaluate the influence of dual enrollment program location on dual enrollment student’s academic performance in college. Future studies should evaluate
the influence of completing dual enrollment coursework at a college campus on academic achievement for students of color and students from lower SES categories. 

5. Community colleges offer the majority of dual enrollment programs, and most of the coursework is delivered for students who plan to earn a bachelor’s degree. This study examined the influence of dual enrollment participation on first year college GPA and noncognitive measures for students who matriculated to a community college. Future research should examine the influence of dual enrollment program location on the academic outcomes of students who matriculate directly to a four-year college or university.

Conclusion

The need for a college education continues to increase as the United States economy continues to evolve to focus on knowledge rather than rote skills. As high school students enter college, they are often underprepared for college work. College readiness is a persistent challenge that vexes both secondary and postsecondary educational systems, and poor college readiness contributes to low college persistence and completion rates. These issues are particularly cogent for community colleges who enroll about 40% of the total college student population in the United States. Arguably the greatest strength of community colleges is open access to education. Open access also presents the greatest challenge to community colleges because the majority community college students enroll academically unprepared for the rigors of college work. As a result, policymakers and educators have developed numerous initiatives to improve college readiness with an intentional focus on partnerships between high school and
higher education. Dual enrollment is a quickly expanding partnership program between K-12 and community colleges that aims to improve college readiness and facilitate the transition to college.

Prior studies have shown dual enrollment programs were effective in improving access, persistence, grades, and completion rates. Most studies used academic performance as indirect indicators of college readiness, but college readiness is a complex construct comprised of cognitive and noncognitive dimensions. Few studies have evaluated the relationship between noncognitive dimensions of college readiness and dual enrollment participation. Additionally, studies revealed wide variation existed with regards to how states and colleges implemented dual enrollment programs. The physical location where dual enrollment coursework was delivered has been consistently cited as an important variation of dual enrollment implementation. While researchers have noted offering dual enrollment coursework on a college campus creates the most authentic experience for high school students to develop the abilities and skills to be college-ready, no studies have addressed to what extent dual enrollment program location influences students’ academic performance in college. This study intended to address the gaps in the literature and contribute to the growing knowledge base regarding the effectiveness of dual enrollment programs to improve college readiness. Uniquely, this study incorporated dual enrollment program location and noncognitive measures as predictor variables of first year college grade point average.

This study examined whether differences existed in students’ noncognitive readiness between non-dually enrolled students, dually-enrolled students who completed
coursework on a college campus, and dually enrolled students who completed coursework on a high school campus. This study also evaluated the relationship between noncognitive college readiness factors, dual enrollment program location, and students’ first year college GPA.

Findings from this study contributed to the body of research regarding the effectiveness of dual enrollment in improving students’ academic performance in college. Specifically, regression analyses predicted students that completed dual enrollment coursework on a college campus earned significantly higher first year college GPAs than did students who completed dual enrollment coursework on a high school campus. The addition of noncognitive measures with dual enrollment program location significantly predicted higher first year college GPAs for students that completed dual enrollment coursework on a college campus. Findings were mixed with regard to differences in scores on noncognitive measures between non-dually enrolled students, dually-enrolled students who completed coursework on a college campus, and dually enrolled students who completed coursework on a high school campus. Results showed no significant differences for Academic Attributes, Help Seeking, Locus of Control, Persistence, and Procrastination noncognitive measures, but a significant difference in Time Management scores was found between non-dual enrollment and dual enrollment completers. These findings highlighted the importance of further evaluating the relationship between noncognitive college readiness factors, dual enrollment program location, and academic performance in college.
Policymakers and practitioners should continue to enhance dual enrollment policies and practices to improve high school students’ college readiness and their transition to college. Community colleges and high schools have unique opportunities to leverage a strong history of partnership to design dual enrollment programs that delineate where dual enrollment coursework is offered and how resources are allocated for ensuring access to dual enrollment programs. Policymakers and practitioners must also strive to offer dual enrollment programs that create an authentic, holistic experience that truly facilitates the transition to college and improves students’ college readiness.
Appendix A

SmarterMeasure Individual Attributes Survey Questions (Adkins, 2019)

1. I usually get things done without having to be directed by others.

2. Considering my personal and professional schedule, I can commit 7-10 hours per week to study. Note: The amount of study time per course may vary significantly depending on the school and the specific course.

3. I am likely to delay working on an assignment until it is almost due/near the deadline.

4. When I have an assignment or chore I don’t like, I typically start working on that task and keep at it until it’s done.

5. I think some people are naturally more intelligent than others.

6. I usually finish things I start.

7. Other than work-related activities, I can plan what I want to do and when I do it.

8. I have never dropped out of an academic program (high school or college).

9. I have already thought about how I will need to change my schedule to fit this course in.

10. I am comfortable reading for more than 30 minutes at a time.

11. I am interested in taking college courses to earn a specific degree.

12. I am willing to spend significant time and energy to participate in an online course.

13. I need to have someone set deadlines for me to get things done.

14. I feel that chance has a lot to do with being successful.
15. I like to figure things out on my own.

16. I often have trouble getting things done on time.

17. I agree that school success is mostly a result of one’s socio-economic background.

18. I am concerned about being successful in this program.

19. If I faced a problem I couldn’t solve, I would ask the instructor for help.

20. I am able to express myself well in writing.

21. I usually get things done ahead of time.

22. When I don’t understand something, I am hesitant to ask the instructor for help.

23. I have always completed the courses that I started.

24. I feel that if I set realistic goals, I can succeed no matter what.
Not Human Subjects Research Determination for Donald Galen DeHay's Project

Nalinee Patin <npatin@clemson.edu>

May 10, 2019, 9:08 AM

to Tony, me

Dear Tony,

Based on the information provided in the IRB application and my phone conversation with Mr. DeHay on May 10, 2019, at this time, Clemson researchers will not have access to “identifiable private information or identifiable biospecimens” nor will your team interact with study participants. Therefore, analysis of the data does not involve human subjects as defined in the federal regulations governing the protection of human subjects in research, 45 CFR46.102(e).

Please contact us again if there are any changes to this project that might bring it under the purview of the IRB. It is the responsibility of the Office of Research Compliance to determine whether any specific project falls within the definition of research with human subjects, as provided by federal regulations and institutional policy.

All the best,

Nalinee

Nalinee Patin, CIP
IRB Administrator
OFFICE OF RESEARCH COMPLIANCE
Clemson University, Division of Research
391 College Avenue, Suite 406, Clemson, SC 29631, USA
P: 864-656-0636
www.clemson.edu/research

This message and any attachments contain information which may be confidential and privileged. Unless you are the addressee (or authorized to receive for the addressee), you may not use, copy or disclose to anyone the message or any information contained in the message. If you have received the message in error, please advise the sender by reply e-mail and delete the message.
References


Boswell, K. (2001). State policy and postsecondary enrollment options: Creating seamless systems. In P. Robertson, B. Chapman, & F. Gaskin (Eds.), *Systems for offering concurrent enrollment at high schools and community colleges* (New


review. Chicago, IL: University of Chicago Consortium on Chicago School Research.


170


the college racial-ethnic achievement gap: Evidence from a longitudinal case
9439-6

Mayhew, M. J., Pascarella, E. T., Bowman, N. A., Rockenbach, A. N., Seifert, T. A.,
century evidence that higher education works* (Vol. 3). San Francisco, CA: John
Wiley & Sons.

Nagaoka, J., Farrington, C. A., Roderick, M., Allensworth, E., Keyes, T. S., Johnson, D.
W., & Beechum, N. O. (2013). Readiness for college: The role of noncognitive
factors and context. *Voices in Urban Education, 38*, 45-52

(NCES 2013-037), Grants and Loan Aid to Undergraduate Students.

(NCES 2013-037), Characteristics of Postsecondary Students.

The White House. Retrieved from
https://obamawhitehouse.archives.gov/blog/2011/10/05/renewing-american-dream-college-completion-agenda

Obama, B. H. (2014). *Education: Knowledge and skills for the jobs of the Future.* The
White House. Retrieved from
http://www.whitehouse.gov/issues/education/higher-education


https://doi.org/10.1177/0895904811400410


