

ABSTRACT

PIERCE, JOANNE F. Pathways to Equity: A Comparative Study of Dual Enrollment Participation Among Black Male High School Students in North Carolina's Career and College Promise (CCP) Program. (Under the direction of Dr. John K. Lee and Dr. Timothy Drake).

This quantitative study examined participation in North Carolina's Career and College Promise (CCP) program and its association with on-time high school graduation for Black male students between the 2019–2020 and 2023–2024 academic years. Statewide administrative data from the North Carolina Department of Public Instruction and the North Carolina Community College System were used to assess patterns of participation, identify predictors of enrollment, and evaluate the statistical relationship between CCP participation and four-year graduation outcomes. Logistic regression models incorporated district-level clustered standard errors to account for the nesting of students within schools.

CCP participation among Black male students increased across the study period, rising from 9.3% in 2019–2020 to 12.6% in 2023–2024. Participation declined during the 2020–2021 academic year due to the COVID-19 pandemic but later rebounded and exceeded pre-pandemic levels. Participation was highest among eleventh- and twelfth-grade students, reflecting the typical timing of dual enrollment eligibility. School setting differences were consistent: Students enrolled in Title I schools participated at lower rates than those in non–Title I schools, and these gaps persisted as participation increased statewide.

Predictor analyses indicated that grade level was the strongest and most consistent indicator of participation because it was available for all students across all years. The unweighted GPA variable was present only for a subset of students and therefore could not serve as a statewide measure of academic readiness. Economic disadvantages and Title I school enrollment were associated with lower predicted probabilities of participation. The participation

model explained a limited share of the variance, suggesting that additional unmeasured factors contributed to patterns of access.

For graduation outcomes, CCP participation was associated with a nine-percentage-point increase in the predicted probability of graduating within four years, after adjusting for socioeconomic status, school setting, grade level, and academic year. This association remained stable across model checks and was supported by diagnostic results showing moderate explanatory strength. However, the findings reflect statistical associations and do not establish causal effects.

The study's theoretical framework guided interpretation of the results. Critical Race Theory and Quantitative Critical Race Theory highlighted the influence of structural conditions and data limitations on participation and outcomes. Social Reproduction Theory informed the role of academic progression, and Systems Theory helped explain differences across districts. Overall, the study documented growth in CCP participation for Black male students and a consistent association between participation and on-time graduation, while also revealing persistent disparities related to school setting and socioeconomic disadvantage.

Keywords: dual enrollment, Black male students, educational equity, high school graduation, North Carolina, Career and College Promise, on-time graduation, Title I schools

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Pathways to Equity: A Comparative Study of Dual Enrollment Participation Among Black Male High School Students in North Carolina's Career and College Promise (CCP) Program

by
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DEDICATION

To my parents, Earl and Ella, my mother whose memory continues to guide me and my father whose strength has carried me forward. To my husband, Nigel, for his unwavering support. To my daughter, Nia, whose light inspires my perseverance.

BIOGRAPHY

Joanne F. Pierce earned a Master of Public Health and a Bachelor of Science in Psychology from Howard University, as well as a Master of Arts in Counseling from Trinity University. Her academic and professional experiences have shaped a sustained commitment to understanding how systems influence opportunity, particularly for historically marginalized populations. Her scholarly interests include equity, educational access, organizational leadership, and the structural conditions that shape outcomes across communities. She has professional experience in public health and human services, where she has worked to support strategies that strengthen communities and promote well-being. She brings this interdisciplinary perspective to her research, with a focus on advancing policies and practices that create more inclusive and effective systems.

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AUTHORSHIP STATEMENT

This dissertation is the original work of Joanne F. Pierce. All aspects of the research, including study design, data collection, data analysis, interpretation of results, and dissertation writing, were completed by the author. The dissertation committee provided guidance and editorial feedback. Author assumes responsibility for the final content and conclusions presented in this dissertation.

CHAPTER 1: INTRODUCTION

Background

As the educational landscape in the United States continues to shift in response to demands for college and career readiness, dual enrollment programs have become a central pillar of secondary-to-postsecondary alignment (National Center for Education Statistics, 2020; College Board, 2019). These programs are designed to allow high school students to enroll in college-level coursework and earn college credit prior to graduation (Welton & Williams, 2015).

According to the National Center for Education Statistics (2020), dual enrollment participation has steadily increased over the past two decades, with more than 1.4 million high school students taking at least one college course while still in high school. More recent data from the Integrated Postsecondary Education Data System (IPEDS) suggests that this number has risen to nearly 2.5 million students in the 2022–23 academic year (Community College Research Center [CCRC], 2023).

This growth reflects both policy innovations and a growing consensus that early exposure to postsecondary content can improve college readiness and help close persistent educational gaps. Research shows that dual enrollment reduces financial barriers, increases high school graduation and college enrollment rates, and disproportionately benefits historically underserved student populations (Corkhill, 2023; Edmunds et al., 2020).

In North Carolina, the Career and College Promise (CCP) initiative was formally introduced in 2011 through state legislation (North Carolina General Assembly, 2011). The CCP program provides eligible high school students with access to tuition-free

college courses offered by community colleges across the state (North Carolina Community College System, 2020). The program is structured into three distinct pathways: the College Transfer Pathway, which enables students to complete general education requirements aligned with four-year universities; the Career and Technical Education (CTE) Pathway, which prepares students for immediate entry into the workforce or certification programs; and the Cooperative Innovative High Schools (CIHS) Pathway, which embeds college courses directly within early college high schools. The CCP strategy represents a comprehensive state-level approach to dual enrollment and is intended to serve all students equitably, regardless of socioeconomic background (Edmunds et al., 2017).

Despite these goals, disparities in dual enrollment participation remain a persistent challenge (Perna & Leigh, 2018). Research has consistently documented that students from historically marginalized racial and socioeconomic backgrounds, particularly Black and Latino students, are underrepresented in these programs nationwide (Fink, Jenkins, & Yanagiura, 2017; Gándara, 2018). In North Carolina, data from the Department of Public Instruction (2022) show that Black male students participate in dual enrollment at significantly lower rates than their White and Asian peers. These differences are especially pronounced in the College Transfer Pathway, which is often associated with greater long-term academic and economic benefits (Gándara, 2018).

The underrepresentation of Black male students in CCP pathways raises critical questions about whether the structural features of the program, such as its eligibility requirements, advising structures, and institutional incentives, are aligned with its equity

goals (College Board, 2019). Barriers such as inconsistent access to knowledgeable counselors, limited course offerings in underfunded schools, lack of transportation to college campuses, and technology gaps all contribute to unequal access. Additionally, GPA-based eligibility criteria and the use of standardized assessments may disproportionately exclude students from high-poverty or de facto racially segregated schools who may have academic potential but lack access to preparatory resources (Welton & Williams, 2015; Ladson-Billings, 2006). These barriers reflect broader patterns of structural inequity and systemic racism embedded within the U.S. education system (Gándara, 2018; Noguera, 2003).

In recent years, North Carolina has taken steps to increase awareness and participation in the CCP program. These efforts have included targeted outreach, policy adjustments, standardizing eligibility rules, and expanding support for students in rural and low-income districts (North Carolina Community College System, 2023a). Between 2019 and 2022, the state expanded the CCP program as part of a broader push to improve access and meet its goal of helping two million residents earn a degree or credential by 2030 (Belk Center for Community College Leadership and Research, 2019). During this period, the Institute of Education Sciences funded a multi-year evaluation of the CCP program, led by the University of North Carolina at Greensboro. The study examined the program's implementation, access, cost, and equity-related outcomes (Institute of Education Sciences, 2019). The state also increased the number of Cooperative Innovative High Schools (CIHS), particularly in rural and economically disadvantaged areas, and improved its data infrastructure to better track student enrollment and success (North Carolina Department of Public Instruction [NCDPI], 2020).

In 2021, equity concerns became more prominent as state-level reports revealed continued disparities in CCP enrollment by race and gender (NCDPI, 2021). These gaps led to renewed calls for clearer eligibility criteria and more consistent advising practices (Belk Center for Community College Leadership and Research, 2021). In response, the State Board of Education adopted a policy in 2022 that required formal agreements between local school districts and community colleges to guide CCP implementation. This policy shift was informed by a study from the SERVE Center, which documented the underrepresentation of Black and Latino students in the college transfer pathway (NCDPI, 2022; SERVE Center, 2022).

By 2023 and 2024, state-level data showed measurable increases in CCP participation and credential attainment. Enrollment grew from approximately 78,000 students in the 2022–2023 academic year to 85,982 in 2023–2024, with 86% of students earning a grade of C or better (North Carolina Community Colleges, 2024a). Career and Technical Education (CTE) pathway participation increased by 21%, and credential attainment rose by 24% (North Carolina Community Colleges, 2023a; 2023b). Several community colleges also expanded outreach to Latino and immigrant students through the hiring of bilingual staff and the use of culturally responsive advising models (The Guardian, 2025). Despite these overall improvements, the impact of these reforms has not been sufficiently evaluated in relation to Black male students (North Carolina Community College System, 2023a). Although state reports provide data disaggregated by race and by gender separately, they do not offer cross-tabulated outcomes specifically for Black male students (North Carolina Department of Public Instruction, 2024). As a result, it remains unclear whether these policy changes have closed, maintained, or

widened existing equity gaps. This lack of detailed reporting creates a critical need for disaggregated trend-based analysis focused on this subgroup (Edmunds et al., 2017). This study responded to that need by examining CCP participation patterns, predictors, and graduation outcomes specifically for Black male students across a five-year period.

Understanding the patterns and predictors of CCP participation for Black male students required not only descriptive statistics but also an inquiry into the structural and institutional dynamics that mediate access to college-level opportunities (Karp et al., 2007). A five-year, statewide longitudinal analysis provided a unique opportunity to examine whether dual enrollment, as implemented, had functioned as an instrument of equity or exclusion (Welton & Williams, 2015). The findings from such an analysis could inform more inclusive policy design and implementation and ensure that dual enrollment serves its full potential as a tool for social mobility (Taylor, 2015).

Other scholars have approached similar issues of dual enrollment participation and educational equity through various lenses (Gándara, 2018). For example, studies by An (2013) and Edmunds et al. (2017) have examined how dual enrollment programs, in general, contribute to higher graduation rates and college enrollment but have not always disaggregated data by race or gender. Research by Fink, Jenkins, and Yanagiura (2017) and Gándara (2018) specifically highlights the underrepresentation of Black and Latino students in dual enrollment programs, suggesting that systemic barriers such as lack of access to counselors, course offerings, and preparatory resources disproportionately affect these groups.

What set this study apart was its focus on Black male students in North Carolina's CCP program. While other studies have looked at dual enrollment broadly, this research

offers a unique opportunity to assess the impact of targeted equity-focused reforms that have been implemented in North Carolina, such as standardized eligibility requirements and outreach initiatives (Edmunds et al., 2017). Given that CCP is one of the largest state-level dual enrollment programs, focusing on it allowed for an in-depth analysis of both state policy and local district conditions, offering critical insights into whether reforms have successfully addressed racial and socioeconomic disparities in access (Perna & Leigh, 2018). This study thus added a perspective to the broader conversation about equity in dual enrollment programs (Taylor, 2015).

This study was motivated by persistent disparities in dual enrollment participation, particularly the underrepresentation of Black male students within North Carolina's Career and College Promise program (North Carolina Department of Public Instruction [NCDPI], 2023; Gándara, 2018). Although dual enrollment is often promoted as a mechanism to expand access and accelerate college attainment, evidence suggests that these benefits are not distributed equitably (An, 2013; Edmunds et al., 2017; Perna & Leigh, 2018). Black male students remain underrepresented in dual enrollment courses and overrepresented in lower-track academic pathways (Oakes, 2005; Toldson, 2012; U.S. Government Accountability Office [GAO], 2022). This exclusion was reflective of broader institutional patterns that disproportionately limit opportunities for Black males in educational spaces (Ladson-Billings & Tate, 1995; Noguera, 2003). The concern was sharpened by the researcher's orientation and commitment to educational equity, informed by an understanding that race-neutral policies often mask race-conscious effects. Anchored in Critical Race Theory and informed by a structural stance that

recognizes systemic power, this study investigated how local variation in dual enrollment implementation affected access for Black male students.

The implications of limited access are far-reaching. When Black male students are excluded from early college experiences, they are more likely to miss key academic, economic, and social capital that dual enrollment can provide (Harper, 2012; Strayhorn, 2014). Access to dual enrollment has been linked to higher rates of high school graduation, postsecondary enrollment, and degree completion (Karp et al., 2007; An, 2013; Edmunds et al., 2020). For Black male students, participation in these programs can offer not only academic momentum but also exposure to new environments that support identity development and educational belonging (Harper, 2012; Strayhorn, 2014). For families and communities, expanded access can disrupt cycles of educational exclusion and adopt new generational expectations around college participation (Toldson, 2012).

At a broader level, improving access for Black male students can contribute to diversifying the future workforce, expanding pathways to economic stability, and addressing structural inequities that have historically limited the full participation of Black men in postsecondary and economic systems (Carnevale, et al., 2020). By examining how dual enrollment was implemented across campuses and how those practices related to access for Black male students, this study contributed to scholarship and to policy efforts seeking more just and inclusive educational systems.

Problem Statement

Despite the expansion of dual enrollment programs, Black male students remain significantly underrepresented (Gándara, 2018). While these programs aim to increase

postsecondary access, emerging data show that eligibility criteria, school-level tracking, and resource disparities disproportionately limit participation for this population (North Carolina Department of Public Instruction, 2023; Fink et al., 2017). The problem addressed by this study was the lack of disaggregated, longitudinal analysis focused specifically on Black male students in the CCP program, including how structural and systemic barriers shape access and outcomes (North Carolina Community College System, 2020).

The study's focus on systemic inequities in dual enrollment participation, specifically for Black male students in North Carolina's Career and College Promise (CCP) program, required consideration of potential biases and the complex factors that influence educational outcomes (College Board, 2019). While the primary focus is on race and gender, it is important to acknowledge that other individual student characteristics, such as socioeconomic status, academic preparedness, and family support, can also significantly affect CCP participation (Ladson-Billings, 2006; Fink, Jenkins, & Yanagiura, 2017).

While the study aimed to uncover the structural dynamics at play in CCP participation, it was fundamental to recognize that certain biases might persist due to the limitations in the available data and the methods used (Gándara, 2018). For example, school-level variables such as Title I designation and urbanicity may serve as substitutions for socioeconomic disadvantages, but they may not fully capture the variation in individual experiences or access to resources across schools (North Carolina Community College System, 2023a). Additionally, the analysis is dependent on the

accuracy and consistency of historical data, which may limit the ability to fully capture all relevant variables (Edmunds et al., 2017).

In acknowledging these complexities, this study aimed to provide a multifaceted understanding of how dual enrollment serves as an equitable educational opportunity, or fails to do so, for Black male students in North Carolina, while also ensuring that the findings are interpreted within the larger perspective of systemic inequities in education.

Purpose of the Study

The purpose of this quantitative, multi-year study was to investigate annual patterns in dual enrollment participation and graduation outcomes for Black male students in North Carolina public high schools across five consecutive years (2019–2024), with attention to variation across cohort years and gender. The study sought to understand whether equity-focused reforms introduced between 2019 and 2024 had resulted in measurable improvements in access to the CCP program for this historically underserved student population. It also aimed to examine how student-level variables such as socioeconomic status and school-level characteristics predicted CCP participation and associated academic outcomes (Karp et al., 2007).

The study employed quantitative analysis techniques, primarily using descriptive statistics to identify overall participation trends in the CCP program (Perna & Leigh, 2018). The study used inferential statistical methods, such as chi-square tests for categorical variables and multiple regression analysis for continuous variables to analyze disparities by demographic and school-level characteristics (Field, 2013). This approach allowed for the identification of predictors of CCP participation, with attention to the interaction of race, socioeconomic status, and school-level factors (Karp et al., 2007).

However, traditional quantitative methods could obscure racial disparities unless guided by the principles of QuantCrit, which center systemic inequality in statistical interpretation (Gillborn et al., 2018).

The study analyzed the extent to which disparities in CCP access are concentrated in specific districts, school types, or demographic groups and whether Black male students who participate in CCP experience improved high school graduation outcomes compared to those who do not. These analyses offered insight into the relationships between race, school context, and educational opportunity and helped determine whether CCP was functioning as a pathway to postsecondary readiness or was reproducing systemic barriers (Gándara, 2018).

This study took a comparative approach by examining differences in high school graduation outcomes between Black male students who participate in the CCP program and those who do not. Alongside identifying predictors of participation, the analysis was intended to understand better the extent to which CCP promoted equitable academic success. This design supported the goal of evaluating equity-focused reforms and had an impact on opportunity gaps.

The findings were expected to provide important evidence to inform state and district leaders as they work to revise dual enrollment policies, target interventions, and monitor equity metrics (Gándara, 2018). This study was also intended to contribute to the wider literature on dual enrollment and educational equity by offering a theoretically grounded, empirically sound investigation into the intersection of race, gender, and access to advanced learning opportunities (College Board, 2019).

Research Questions

This study was guided by three research questions that were designed to explore the intersection of race, school context, and access to advanced academic opportunities through North Carolina’s dual enrollment program (Gándara, 2018). These questions focused on identifying both patterns and predictors of participation as well as the academic outcomes associated with dual enrollment for Black male students (North Carolina Community College System, 2020). Each question corresponded to a specific layer of analysis, trends, equity disparities, and educational impact (Edmunds et al., 2017).

1. What are the annual trends in CCP participation among Black male students in North Carolina public high schools from 2019 to 2024?
2. To what extent do student-level factors (e.g., socioeconomic status, academic performance) and school-level factors (e.g., Title I status, urbanicity) predict CCP participation among Black male students from 2019 to 2024?
3. How do high school graduation outcomes differ between Black male CCP participants and non-participants during the 2019–2024?

Significance of the Study

This study was significant in its goal to address educational equity through a focused examination of dual enrollment access among Black male students in North Carolina (North Carolina Community College System, 2023a). Black male students continue to be underrepresented in dual enrollment programs nationwide, especially in North Carolina’s CCP system (Edmunds et al., 2017).

Empirical studies have shown that participation in dual enrollment is positively associated with high school graduation, college enrollment, and academic persistence (An, 2013; Karp et al., 2007). However, few studies disaggregate these benefits by race and gender, and even fewer examine long-term participation trends across diverse school contexts (College Board, 2019). This study addresses that gap by focusing specifically on Black male students, who often face intersecting barriers related to race, gender, and socioeconomic status (Fink et al., 2017).

This research also carried policy relevance (North Carolina General Assembly, 2021). Although North Carolina has made targeted reforms to expand CCP participation, including standardized eligibility requirements and broader outreach, there is limited public evidence of their impact (Welton & Williams, 2015). By analyzing five years of disaggregated data, the study provided empirical insight into whether these policies had reduced, maintained, or worsened participation gaps (Gándara, 2018). The findings informed both state-level decision-making and school-level intervention design (North Carolina Community College System, 2023a).

In addition, this study advanced the conceptual framing of dual enrollment as a civil rights issue (Edmunds et al., 2017). Rather than approaching dual enrollment as a neutral college-readiness strategy, the research situated it within extensive conversations about educational justice (Welton & Williams, 2015). As a result, it aligned with equity-oriented scholarship that critiques how seemingly meritocratic systems often reinforce systemic exclusion (Ladson-Billings & Tate, 1995; Gándara, 2018).

Finally, the study contributed methodologically by combining trend analysis with multi-level disaggregation (Karp et al., 2007) by race, gender, school characteristics, and

outcomes. This approach allows for a more in-depth understanding of the factors influencing CCP access and helps generate targeted, data-driven solutions to close equity gaps (Welton & Williams, 2015).

Theoretical Framework

This study draws on Critical Race Theory (CRT) as an interpretive framework. CRT provides a foundation for examining how race relates to patterns of educational opportunity and access (Ladson-Billings & Tate, 1995; Delgado & Stefancic, 2017). All other frameworks, including QuantCrit, are used to support and extend the analysis within the CRT perspective. In this study, CRT is used to interpret observed racial differences in participation in North Carolina's Career and College Promise (CCP) program for Black male students. This focus on participation patterns emphasizes the importance of reviewing how educational structures are experienced by different groups of students.

CRT highlights the relevance of race in understanding longstanding differences in participation in advanced coursework (Welton & Williams, 2015; Taylor, 2015). It also supports the decision to analyze disaggregated data to identify patterns that may not be visible in aggregate summaries. In addition, CRT encourages attention to how policies and institutional arrangements may influence access and participation for Black male students (Crenshaw, 1991; Bell, 1995; Ladson-Billings & Tate, 1995).

Quantitative Critical Race Theory (QuantCrit) provides a methodological orientation consistent with CRT. QuantCrit emphasizes careful interpretation of quantitative data related to race and attention to the limits of measurement (Gillborn et al., 2018). In this study, QuantCrit supports the use of administrative data with

acknowledgment of constraints such as proxy indicators for socioeconomic status and variation in the availability of academic variables. QuantCrit also supports interpreting statistical results as associations rather than causal effects, which aligns with the study's correlational design.

Two additional perspectives are included in a supportive capacity. Social Reproduction Theory offers terms for describing how school structures, expectations, or resource patterns may relate to differences in academic opportunity (Bourdieu, 1977, 1986; Bourdieu & Passeron, 1977; Lareau, 2011; Carter, 2005). Systems Theory provides language for describing how policies, districts, and schools interact within broader organizational structures (Senge, 2006; Bronfenbrenner, 1979). These perspectives assist in organizing the discussion of contextual factors but do not replace the central role of CRT.

These frameworks provide an organized structure for examining CCP participation and for situating the study in relation to documented racial differences in educational access.

Conceptual Framework

The conceptual framework incorporates Critical Race Theory (CRT), Social Reproduction Theory, and Systems Theory, each contributing to different aspects of interpretation and analysis. QuantCrit is used as a methodological extension of CRT. QuantCrit informs the interpretation of quantitative findings, particularly with respect to race, proxy variables, and limits of inference. This approach supported the study's aim of revealing how race- and class-based disparities in CCP access were constructed, sustained, and normalized through institutional systems.

The conceptual framework translated the theoretical constructs of Critical Race Theory, Social Reproduction Theory, and Systems Theory into operational components that direct the research design and analysis (Solórzano & Yosso, 2002). The structure centers on access, equity, and educational outcomes, which are defined and measured using trend data related to CCP participation among Black male students (Welton & Williams, 2015).

This study is anchored in Critical Race Theory (CRT), with Social Reproduction Theory and Systems Theory included as supporting perspectives. CRT serves as the foundational lens, centering race, and racism as endemic to educational structures and guiding the interrogation of how policy implementation can reinforce racialized inequities. However, CRT alone does not fully explain how educational institutions systematically reproduce those disparities over time or how policy actors across levels contribute to inequitable implementation. To that end, Social Reproduction Theory offers insight into how schools function as agents of social stratification, transmitting dominant norms, gatekeeping opportunities, and legitimizing unequal outcomes through seemingly neutral mechanisms. Systems Theory enables a structural mapping of how multiple stakeholders such as state agencies, district leaders, and counselors interact across institutional layers to influence the enactment and experience of CCP policy. Using all three theories in concert strengthens the study's ability to account for both the racialized impact and the layered operational complexity of CCP access, ensuring a robust analysis that connects ideology, policy, and practice.

Access was conceptualized as a student's opportunity to enroll in and complete courses within dual enrollment (Welton & Williams, 2015). It is operationalized through

enrollment indicators recorded in state datasets, such as whether a student participated in CCP during their high school tenure (Noguera, 2003). Year, geographic region, and school characteristics further disaggregated access to identify patterns over time (Strayhorn, 2014).

Equity refers to the fair distribution of educational opportunities, considering students' varied circumstances and the institutional barriers they face (Solórzano & Yosso, 2002). In this study, equity was examined by analyzing variation in CCP participation based on student-level characteristics (e.g., socioeconomic status) and school-level characteristics (Welton & Williams, 2015). Equity was about representation and whether the systems in place enabled meaningful participation for historically marginalized students (Welton & Williams, 2015). Using disaggregated data allowed this study to highlight inequities that would otherwise be obscured in aggregate reporting (Noguera, 2003).

The conceptual framework also incorporates the relationship between individual-level and institutional-level factors (Welton & Williams, 2015). Consistent with Systems Theory, the study recognizes that access and outcomes are influenced not just by student characteristics but by larger systemic conditions, including advising infrastructure, school policy implementation, and resource allocation (Welton & Williams, 2015). These elements are embedded in the school environment and may either mitigate or reinforce disparities (Noguera, 2003).

This framework connected the abstract concepts of the theoretical models to the measurable constructs of the research (Strayhorn, 2014). It provided the foundation necessary to interpret statistical findings through an equity-focused lens, enabling the

study to draw meaningful conclusions about the role of CCP in promoting or hindering educational justice for Black male students in North Carolina (Solórzano & Yosso, 2002).

Definition of Key Terms

- **Career and College Promise (CCP):** North Carolina's statewide dual enrollment program, established in 2011, allows eligible high school students to take tuition-free college courses (Welton & Williams, 2015). CCP offers three main pathways: the College Transfer Pathway, the Career and Technical Education (CTE) Pathway, and the Cooperative Innovative High Schools (CIHS) Pathway (College Board, 2019).
- **Dual Enrollment:** A program structure that enables high school students to enroll in college-level courses and earn both high school and college credit (Noguera, 2003). In this study, dual enrollment is operationalized specifically as participation in the CCP program during grades 11 or 12 (Strayhorn, 2014).
- **Black Male Students:** Students who are racially identified as Black or African American and who identify as male, as recorded in North Carolina public school data (Solórzano & Yosso, 2002). This demographic group is the primary focus of this study due to their underrepresentation in the CCP program and persistent educational disparities (Welton & Williams, 2015).
- **Educational Equity:** The principle that all students should have access to the resources and opportunities needed to achieve comparable educational outcomes (Education Commission of the States, 2019). In this study, equity is measured through disparities in CCP participation rates and graduation outcomes among student subgroups (Noguera, 2003).

- **Grade Point Average (GPA):** GPA was used as a measure of academic performance. However, due to variation in grading practices and reporting formats across districts, its reliability may be limited. The study assessed GPA data for completeness and consistency during data cleaning. If significant issues are found, alternative indicators such as test scores or course completion will be used. Any findings based on GPA will be interpreted with appropriate caution.
- **Title I School:** A public school receiving additional federal funds due to its high percentage of students from low-income families (Gordon & Reber, 2024). This designation is used as a school-level variable in the analysis to assess the influence of economic disadvantage on CCP participation (Solórzano & Yosso, 2002).
- **Socioeconomic Status (SES):** A student's economic and social background is operationalized as eligibility for free or reduced-price lunch (FRPL) (Welton & Williams, 2015). SES is used as a student-level predictor of CCP participation and high school graduation (College Board, 2019). SES is operationalized in this study using two proxies:
 - Student-level: Eligibility for free or reduced-price lunch (FRPL), referred to as “economically disadvantaged status” (EDS).
 - School-level: Title I school designation, indicating schools with a high percentage of low-income students, receiving federal funding to support disadvantaged populations.
- **Graduation Rate:** The percentage of students who graduate high school within four years (Noguera, 2003). This is used in the study as a key academic outcome

to evaluate the effect of CCP participation on-timely high school completion (Strayhorn, 2014).

- **Systemic Barriers:** Institutional policies and practices that limit equitable access to educational opportunities (Solórzano & Yosso, 2002). Examples include GPA-based eligibility criteria, limited access to counselors, inadequate transportation, and under-resourced schools (Welton & Williams, 2015). These barriers are examined in connection with CCP enrollment disparities (Education Commission of the States, 2019).
- **Educational Outcomes:** are defined as successful high school graduation within a four-year period (Strayhorn, 2014). This variable is selected based on research linking dual enrollment participation to improved academic performance and postsecondary preparedness (An, 2013; Edmunds et al., 2017). The study compared graduation rates between CCP participants and non-participants within the Black male student subgroup to assess the program's potential academic impact (Solórzano & Yosso, 2002).

Assumptions, Delimitations, and Limitations

This section outlines the assumptions underlying the study, the delimitations that define its scope, and the limitations that may influence the interpretation and generalizability of the findings (Noguera, 2003).

Assumptions:

- The data obtained from the North Carolina Department of Public Instruction (NCDPI) and the North Carolina Community College System (NCCCS) are accurate and consistently recorded across the five-year period (2019–2024).

- Race, gender, and socioeconomic status are correctly reported in state records, and student classifications are valid for disaggregated analysis.
- The structure and intent of the Career and College Promise (CCP) program have remained consistent during the study period despite minor policy revisions.
- High school graduation rates reflect completion within four years and are calculated uniformly across districts.

Delimitations:

- The study focuses exclusively on Black male students enrolled in North Carolina public high schools (College Board, 2019). It does not examine other racial, gender, or demographic groups.
- Only students in traditional public schools are included; data from charter, private, and home schools are excluded. (North Carolina Department of Public Instruction, 2023)
- The study is limited to a five-year period (2019–2024), selected to capture recent trends and reforms in CCP participation.
- The research design is quantitative and does not incorporate qualitative data, such as student or educator perspectives. See Conley (2008) on limitations of quantitative-only methods.

Limitations:

- The accuracy and consistency of the data from NCDPI and NCCCS may vary across school districts, which could introduce discrepancies in the records used for analysis. These inconsistencies in reporting can affect the reliability

of the study's findings, especially in areas where data collection practices differ (Noguera, 2003).

- As a non-experimental study, the research cannot establish causation, only associations between CCP participation and graduation outcomes. This limits the ability to definitively attribute changes in outcomes to CCP participation alone (Field, 2013).
- The dataset does not include contextual factors such as student motivation, family support, or school counselor encouragement, which may influence participation. These factors could potentially contribute to bias in the analysis, as they are not accounted for in the study. Also, research has highlighted that family involvement significantly affects student aspirations and academic success (Hill & Tyson, 2009).
- Inconsistencies in data reporting across school districts may introduce variations in the completeness or accuracy of participation and graduation records. The differences in how schools report or track CCP participation could impact the generalizability of the findings across all districts in the state (Karp et al., 2007).

Organization of the Study

This dissertation was organized into five chapters that provide a comprehensive investigation into access, equity, and outcomes in North Carolina's CCP program for Black male high school students (Solórzano & Yosso, 2002).

Chapter 1 introduced the research problem, outlined the study's purpose and significance, presented the research questions, and described the theoretical and

conceptual frameworks (Perna & Leigh, 2018). It also defined key terms, clarified assumptions, and established the scope and structure of the study.

Chapter 2 provided a review of the literature related to dual enrollment, educational equity, and the academic experiences of Black male students. It combined national and state-level research and identified gaps that justify the current investigation (Edmunds et al., 2020).

Chapter 3 outlined the research methodology, including the study design, population and sample, data sources, variables, and analytical procedures. It also discussed the ethical considerations and limitations of the chosen approach.

Chapter 4 presented the results of data analyses, organized around the three research questions. Findings are reported using descriptive and inferential statistics and are disaggregated by relevant student- and school-level variables.

Chapter 5 interpreted the findings in the viewpoint of the theoretical framework and existing literature. It discussed the implications for policy and practice, outlined recommendations for improving equity in dual enrollment, and suggested directions for future research.

Chapter Summary

Chapter 1 introduced this study by outlining the problem of persistent disparities in participation in North Carolina's Career dual enrollment program among Black male high school students. The chapter detailed the purpose and significance of the study, formulated three driving research questions, and presented theoretical and conceptual frameworks constructed in Critical Race Theory, Social Reproduction Theory, and Systems Theory.

Throughout the chapter, the study's focus on educational equity and structural and systemic barriers was emphasized, supported by a clear articulation of assumptions, delimitations, and limitations. Key terms were defined, and the organization of the dissertation was described to steer readers through the remaining chapters (Fink, Jenkins, & Yanagiura, 2017). While each section highlighted the inequities that affected Black male students, overlapping discussions were condensed to streamline key arguments and focused on the study's fundamental analysis.

Chapter 2 was built upon this foundation by reviewing relevant literature on dual enrollment, the academic trajectories of Black male students, and equity frameworks in educational access. This review identified gaps in existing research and provided the setting necessary to situate the current study within broader scholarly and policy conversations.

CHAPTER 2: LITERATURE REVIEW

Overview

Dual enrollment programs, such as North Carolina's CCP program, have become a prominent educational strategy aimed at improving access to higher education for historically underrepresented students (Edmunds et al., 2020; Karp et al., 2007) (Edmunds et al., 2020). These programs allow high school students to enroll in college-level courses, earning both high school and college credits simultaneously (Yosso, 2005). Dual enrollment has gained attention due to its potential to enhance college readiness, reduce time to degree completion and lower the overall cost of higher education (Conley, 2008; Perna & Leigh, 2018). Research has shown that dual enrollment can increase the likelihood of college enrollment and success for students, particularly those from economically disadvantaged backgrounds (Karp et al., 2007; An, 2013).

Although there are clear advantages, significant barriers persist that prevent equitable access to dual enrollment programs, particularly for Black male students (An, 2013). These students remain underrepresented in dual enrollment initiatives, contributing to the persistent achievement gap in higher education (Georgetown Center on Education and the Workforce, 2020). Black male students face numerous challenges that limit their participation (Edmunds et al., 2020). These challenges include structural barriers such as eligibility requirements, inadequate academic resources, and socioeconomic constraints (Yosso, 2005). This literature review examined these systemic barriers, drawing on theoretical frameworks, empirical research, and case studies to explore the underlying factors that contribute to the underrepresentation of Black male students in dual enrollment programs (Perna & Leigh, 2018). Through this analysis, the

review also proposes targeted recommendations to increase Black male students' participation in these programs, thus promoting greater educational equity.

Historical Context of Dual Enrollment and Equity

Dual enrollment programs have evolved significantly since their inception in the 1970s, originally designed to provide academically advanced high school students with access to college-level coursework (Georgetown Center on Education and the Workforce, 2020). Early implementations were often limited to affluent, predominantly White school districts, where resources were sufficient to support college preparatory instruction and where college attendance was already part of the cultural expectation (An, 2013). As a result, the initial reach of these programs did little to address racial or socioeconomic disparities in college access (Taylor, 2015).

By the early 2000s, state and federal education policies began to recognize dual enrollment as a strategy to close achievement gaps and accelerate postsecondary attainment for underserved populations (Edmunds et al., 2020). The 2006 High School Reform Initiative under the U.S. Department of Education emphasized dual enrollment as a mechanism to improve college readiness for underrepresented students (Domina & Ruzek, 2012). This marked a shift in the policy landscape, from enrichment for those already advantaged to a tool for promoting equity (Perna & Leigh, 2018).

Even with these policy advancements, disparities in participation have persisted (Fink, Jenkins, & Yanagiura, 2017). As recent studies indicate, schools serving higher proportions of Black and Latino students are still less likely to offer rigorous dual enrollment pathways, particularly those aligned with four-year college transfer (Fink et al., 2017; Edmunds et al., 2020). Furthermore, the gap in access reflects inequities in

course availability, counselor support, and institutional partnerships that remain stratified along racial and economic lines (Anderson et al., 2021).

Understanding this historical path helps frame current challenges as the cumulative outcome of decades of uneven program design and resource distribution (Georgetown Center on Education and the Workforce, 2020). This perspective reinforces the case for systemic policy reform aimed at equity and access in dual enrollment (Edmunds et al., 2020).

Theoretical Frameworks

This literature review is guided primarily by Critical Race Theory (CRT), which provides an interpretive lens for examining how race relates to differences in educational opportunity. Scholars have used CRT to examine how race and racism are embedded in policies, institutional processes, and school environments (Bell, 1980; Crenshaw, 1991; Delgado & Stefancic, 2017; Ladson-Billings & Tate, 1995). In the context of dual enrollment, CRT is applied in this review to interpret racially patterned participation outcomes associated with race-neutral practices. The framework supports attention to the ways institutional conditions shape access to advanced coursework and how documented racial patterns in participation align with longstanding inequities in educational opportunity (Strayhorn, 2014; Welton & Williams, 2015).

CRT is also used to frame how policies may be experienced differently depending on the racial and socioeconomic composition of schools. This review applies CRT to highlight how such conditions correspond with existing disparities and to guide the discussion of empirical findings related to Black male students' participation.

Quantitative Critical Race Theory (QuantCrit) provides a methodological complement to CRT. QuantCrit emphasizes the need to interpret quantitative data with attention to the limits of measurement and the ways in which data systems may reflect structural inequalities (Gillborn et al., 2018). In this review, QuantCrit informs the use of disaggregated data, the acknowledgment of constraints associated with proxy indicators such as socioeconomic status, and the interpretation of statistical relationships as associations rather than causal effects. Prior studies applying QuantCrit principles have shown that metrics such as GPA, standardized test scores, or school-level SES indicators often reflect disparities in access to resources rather than differences in ability (Gillborn et al., 2018). These considerations guide how the literature on dual enrollment participation is synthesized and interpreted in this chapter.

Social Reproduction Theory is used to explain how school structures and expectations relate to differences in academic opportunity. Prior research has shown that academic thresholds, access to rigorous courses, and counseling structures are not evenly distributed across schools, which may influence who is positioned to participate in dual enrollment programs (Georgetown Center on Education and the Workforce, 2020; Wood & Palmer, 2015). Bourdieu's concepts of cultural capital and habitus have been used to explain how students' experiences, access to information, and exposure to college-going norms are shaped by their social environments (Bourdieu, 1977, 1986; Bourdieu & Passeron, 1977; Lareau, 2011). Prior research has shown that counseling practices, course placements, and academic tracking can influence students' access to programs such as dual enrollment, often reproducing existing social hierarchies (Carter, 2005; Perna & Leigh, 2018). This review uses Social Reproduction Theory to organize findings related

to advising, tracking, and differences in school expectations that are documented in studies of dual enrollment participation.

Systems Theory is also used in a supportive capacity to describe how participation in dual enrollment is shaped by conditions across multiple institutional levels. Systems Theory emphasizes how policies, schools, districts, and community colleges interact within broader structures that influence implementation and access (Bronfenbrenner, 1979; Senge, 2006). Prior research on dual enrollment has pointed to misalignment between institutions, uneven resource distribution, and inconsistent advising structures as factors that affect access for historically underserved groups (Fink, Jenkins, & Yanagiura, 2017). This review uses Systems Theory to contextualize findings related to institutional coordination and policy implementation.

CRT, QuantCrit, Social Reproduction Theory, and Systems Theory provide a structured foundation for examining the literature on dual enrollment and for describing how race, social context, and institutional conditions correspond with participation patterns. These frameworks guide the organization of the review and support analysis of documented disparities in access for Black male students.

National and State-Level Trends

According to the National Center for Education Statistics' Integrated Postsecondary Education Data System, nearly 2.5 million high school students across the United States participated in dual enrollment programs during the 2022 to 2023 academic year (National Center for Education Statistics, 2024). In North Carolina, the Department of Public Instruction reported that 71,468 public high school students were enrolled in at

least one dual enrollment course during the same period, representing a 12% increase from the previous year (North Carolina Department of Public Instruction, 2024).

Among students who graduated in North Carolina in 2022 to 2023, 23% of Black or African American students and 28% of Hispanic or Latino students had taken at least one dual enrollment course in high school. By comparison, 44% of White students and 45% of Asian students had participated in such coursework (North Carolina Department of Public Instruction, 2024).

Even though participation in dual enrollment has increased across several racial and ethnic groups, Black and Hispanic students continue to be underrepresented (Fink, Jenkins, & Yanagiura, 2017). These disparities are particularly evident among Black male students, who participate in dual enrollment at significantly lower rates than their White and Asian peers (U.S. Government Accountability Office, 2022).

Dual enrollment pathways, particularly those that lead to four-year college transfer, have been associated with improved college outcomes, including higher rates of college graduation (Fink, Jenkins, & Yanagiura, 2017). However, persistent barriers remain. Deal (2020) has identified several equity concerns within North Carolina's Career and College Promise program, pointing to policy and structural conditions that may limit access for certain student populations, particularly Black male students.

Further disaggregated research is needed to understand the specific obstacles faced by Black male students in accessing and benefiting from dual enrollment opportunities. According to the North Carolina Department of Public Instruction, Black students represented 23% of all participants in Career and Technical Education (CTE) programs during the 2021 to 2022 academic year (U.S. Department of Education, 2022).

While some CTE programs offer college credit or dual enrollment options, many are designed primarily for direct workforce entry rather than transfer to four-year institutions (Fink, Jenkins, & Yanagiura, 2017). This enrollment pattern reflects added systemic trends in educational stratification, in which Black male students are disproportionately represented in vocational tracks and underrepresented in advanced academic and college preparatory programs. These patterns are shaped in part by systemic tracking and unequal access to rigorous coursework (Oakes, 2005; U.S. Government Accountability Office, 2022).

While many dual enrollment programs struggle with equity, some initiatives across the United States have demonstrated measurable success in increasing participation and outcomes for historically underserved student groups, including Black male students (Gay, 2010). These programs offer important insights into effective design, implementation, and support strategies (Delgado, 2002).

California's Dual Enrollment Expansion

California's Assembly Bill 288, passed in 2015, allowed community colleges to partner with high schools to offer College and Career Access Pathways (CCAP) (California Assembly Bill 288, 2015) with a specific focus on underrepresented students (Bell, 1995). These agreements enabled colleges to offer dual enrollment courses during the school day, on high school campuses, and at no cost to students (Hughes et al., 2016). Evaluations of CCAP partnerships found that schools serving higher proportions of low-income students and students of color saw notable increases in enrollment in transferable college courses (Rodriguez et al., 2019).

Illinois' Transitional Instruction Model

Illinois implemented a state-supported transitional instruction framework designed to increase college readiness and reduce remediation (Conley, 2008; Solórzano & Yosso, 2002). Through strategic use of placement metrics, curriculum alignment, and professional development for teachers, the program identified students who might not traditionally meet eligibility criteria for dual enrollment (Illinois Community College Board, 2021). Results showed improved participation among students of color, particularly in districts with high concentrations of Black and Latino students (Garcia, 2020).

New York City's College Now Program

One of the largest and longest-running dual enrollment programs in the country, City University of New York's (CUNY) College Now program has a strong emphasis on outreach and advising for underserved students (Crenshaw, 1991). Participating high schools receive funding from dedicated College Now liaisons, who provide counseling, college application assistance, and academic support (Struhl & Vargas, 2012). Program evaluations found that students of color, including Black male participants, were significantly more likely to persist in postsecondary education after participating (Toldson, 2012).

Common themes across these successful programs include:

- Intentional focus on equity in program design
- Flexible eligibility requirements and placement options
- Embedded student support services, including advising and mentoring

- Partnerships between high schools and colleges that go beyond simple credit articulation

Research grounded in Systems Theory suggests that program effectiveness in education depends on alignment across institutions, resource availability, and responsiveness to local student needs (Senge, 2006; Rodriguez et al., 2019). While Toldson (2012) highlights strategies to improve educational outcomes for Black male students, further research is needed to explore how these strategies can be adapted to programs like North Carolina's Career and College Promise to enhance participation among this demographic.

Structural Barriers to Access

Eligibility Criteria

As discussed through a Critical Race Theory (CRT) lens, standardized eligibility requirements, such as GPA thresholds and test scores, often serve as structural filters that disproportionately affect Black male students (Strayhorn, 2014). These students are more likely to attend underfunded schools that lack access to advanced coursework, college preparatory programs, and test preparation resources (Welton & Williams, 2015). As a result, they face significant disadvantages in meeting the academic criteria required for dual enrollment programs (Bell, 1995).

Rather than measuring academic readiness, these criteria can unintentionally reflect disparities in school funding and support systems (Crenshaw, 1991). Without addressing these inequities, dual enrollment programs risk reinforcing the achievement gaps they aim to close (College Board, 2019; Ed Trust, 2021).

Advising and Support Systems

Effective advising is a key component of students' success in dual enrollment programs (Garcia, 2020). However, Black male students often face biased advising practices that can limit their access to these opportunities (Delgado, 2002). Research indicates that school counselors may hold lower expectations for Black male students and are less likely to recommend them for advanced academic programs, including dual enrollment (Howard, 2014; Harper, 2012).

Additionally, high school counselor-to-student ratios create a lack of personalized support, particularly in under-resourced schools, and counselors have been shown to significantly influence postsecondary enrollment, especially for low-income students, making it difficult for students to receive adequate guidance (Perna, 2006; North Carolina Department of Public Instruction, 2023). Counselors who lack cultural competency may also be unaware of the unique systemic challenges Black male students face, further limiting access and encouragement (Wood & Palmer, 2015).

Economic Barriers

Although dual enrollment programs like North Carolina's CCP are tuition-free, hidden costs such as transportation, textbooks, and technology can pose significant barriers for Black male students from low-income families. Research indicates that while these programs may cover tuition, ancillary expenses often remain the responsibility of students, disproportionately affecting those from economically disadvantaged backgrounds (North Carolina Justice Center, 2022; North Carolina Broadband Infrastructure Office, n.d.).

Transportation challenges are a notable concern in North Carolina, where inadequate public transit infrastructure disproportionately impacts low-income communities, potentially hindering students' ability to participate in off-site college courses (North Carolina Justice Center, 2022).

The increasing reliance on online and hybrid learning formats further exacerbates educational disparities. Data from the Pew Research Center indicates that while 94% of Black teens have access to a smartphone, reliance on mobile devices for internet access can limit their ability to engage in digital coursework effectively (Pew Research Center, 2023).

Institutional Factors and School Culture

School culture and peer influence shape students' academic behaviors and decisions (Bell, 1995). Students who have same-race teachers may receive more supportive feedback and experience fewer disciplinary actions, which can improve academic trajectories (Lindsay & Hart, 2017). Schools with a strong college-going culture tend to report higher dual enrollment participation (Howard, 2014). Conversely, schools with low academic expectations or minimal promotion of college readiness contribute to lower engagement among Black male students (Conley, 2008; Toldson, 2012). Addressing these disparities requires sustained, race-conscious conversations among educators to shift institutional cultures (Deal & Peterson, 2009).

Tracking practices, in which students are funneled into different academic pathways, also impact access (Delgado & Stefancic, 2017). A 2019 study by the Civil Rights Data Collection (CRDC) found that Black students are underrepresented in gifted and advanced placement programs and overrepresented in remedial courses, particularly

in schools with high poverty rates (Gay, 2010). These patterns reduce the likelihood of qualifying for or being encouraged to pursue dual enrollment (Oakes, 2005). African American males are consistently underrepresented in advanced coursework due to systemic barriers, not academic capability (Ford & Toldson, 2015).

Student Perspectives and Lived Experience

Understanding the lived experiences of Black male students is essential for addressing the barriers they face in accessing dual enrollment programs (Crenshaw, 1991). As Tatum (1997) notes, racial identity development during adolescence can deeply shape academic choices and perceptions of inclusivity in school spaces. Research by Harper (2012) and Toldson (2019) emphasizes the importance of including student perspectives in the development of educational policies. Black male students frequently report experiences of racial discrimination, low expectations, and limited culturally affirming mentorship, which collectively shape their perceptions of educational opportunity and academic self-efficacy (Harper, 2012; Toldson, 2019). These experiences are often linked to what has been described as 'racial battle fatigue,' the psychological weariness from navigating racially hostile or invalidating educational spaces (Smith, 2020).

This approach provides insight into how systemic and interpersonal factors intersect to impact students' educational trajectories (Toldson, 2012). For example, qualitative studies have shown that Black male students often feel discouraged from pursuing academically rigorous pathways due to implicit bias from educators or a lack of culturally responsive support (Howard, 2014; Noguera, 2008).

By documenting the reported experiences of Black male students, educators, and policymakers can develop more informed interventions (Bell, 1995). Such strategies may include culturally affirming mentorship initiatives, anti-bias training for staff, and the creation of inclusive school environments that affirm academic achievement and identity (Harper, 2012; Toldson, 2019; Noguera, 2008).

Policy Implications

Policy reforms aimed at improving dual enrollment access for Black male students must consider how institutional structures either support or constrain participation (Delgado, 2002; Ladson-Billings & Tate, 1995). Based on Systems Theory, solutions should prioritize alignment between high schools and colleges, including more explicit articulation agreements, streamlined eligibility processes, and data-sharing practices (Senge, 2006). Culturally responsive advising and flexible placement criteria, supported by Critical Race Theory and Social Reproduction Theory, may also mitigate systemic exclusion by addressing both implicit bias and gaps in social capital (Delgado & Stefancic, 2017; Ladson-Billings, 1995; Bourdieu, 1977). Effective policies must be informed not only by enrollment data but also by the lived experiences of students, educators, and families affected by these disparities (Garcia, 2020).

Each of the theoretical frameworks discussed earlier provides a rationale for specific reforms (Yosso, 2005). Critical Race Theory supports eligibility reform by highlighting how race-neutral standards may disadvantage students of color (Toldson, 2012). Social Reproduction Theory underscores the need for equitable advising and guidance practices to address differences in cultural capital and educational tracking (Bell, 1995). Systems Theory supports efforts to align curricula and strengthen

institutional partnerships to promote more equitable access and outcomes (Delgado & Stefancic, 2017).

QuantCrit scholars argue that data practices often reproduce dominant ideologies by privileging aggregate reporting and masking intersectional inequalities (Gillborn et al., 2018). By applying QuantCrit, this study seeks to expose the racialized dimensions of seemingly neutral data practices, such as eligibility thresholds or statistical averaging, that obscure the experiences of subgroups like Black male students. This perspective justifies the disaggregation and comparative design central to the study's analytical approach.

For example, expanding eligibility criteria to include multiple measures of readiness (e.g., teacher recommendations, student motivation) addresses the system-wide misalignment between how readiness is measured and the diverse ways it is demonstrated (Ed Trust, 2021). Culturally competent advising addresses the systemic feedback loop identified in Systems Theory: without proper support, students disengage, leading to lower achievement, which reinforces underrepresentation (Harper, 2012; Bronfenbrenner, 1979). Providing financial support for transportation and technology reflects an understanding of the interdependence between socioeconomic resources and academic opportunity (Gándara & Bial, 2016; Pew Research Center, 2021). Promoting college-going cultures in under-resourced schools targets the school environment as a key node within the larger educational system (Gay, 2010).

Intersectional Data Analysis

Disaggregated data that accounts for race, gender, income, and geography is essential for uncovering patterns in program access and success (Delgado, 2002; Gillborn

et al., 2018). Current reporting practices often lump students of color into broad categories, masking disparities between, for example, Black male students and their peers (Garcia, 2020). Intersectional approaches to data collection and analysis can better inform policy by identifying where inequities are concentrated and why they persist (Crenshaw, 1991; Smith, 2020; Ladson-Billings & Tate, 1995).

Digital Equity and Technology Access

With the expansion of online dual enrollment offerings, ensuring digital equity is critical (Delgado & Stefancic, 2017). The COVID-19 pandemic emphasized the technological divide affecting many students from low-income communities (Toldson, 2012). Research by the Pew Research Center (2021) found that nearly one-third of Black teens lacked consistent access to a home computer, which has implications for their ability to participate in remote coursework.

Longitudinal Impact Studies

More longitudinal research is needed to examine not only immediate dual enrollment outcomes, such as high school graduation and college enrollment, but also long-term impacts on degree completion, career entry, and civic engagement (Crenshaw, 1991). These studies should be attentive to how race and gender intersect with institutional context to influence students' pathways (Karp et al., 2007; Edmunds et al., 2020).

Chapter Summary

This chapter explored the underrepresentation of Black male students in dual enrollment programs. Drawing from Critical Race Theory, Social Reproduction Theory, and Systems Theory, the chapter examined the structural and institutional barriers that

contribute to inequitable access, such as eligibility requirements, advising practices, and socioeconomic disparities.

Each theoretical framework offered a distinct lens for understanding how race, class, and system dynamics intersect to shape educational opportunity (Ladson-Billings, 2006). CRT exposed the racially coded nature of race-neutral policies; Social Reproduction Theory illuminated the role of cultural capital and tracking; Systems Theory emphasized the need for institutional alignment across educational settings (Solórzano & Yosso, 2002). These perspectives framed the issue of dual enrollment access as a multifaceted, systemic challenge (McKinney de Royston et al., 2020).

Empirical research confirms that despite well-intentioned policies, dual enrollment participation remains inequitable, with access often concentrated among White, higher-income, and academically advanced students (Fink & Jenkins, 2023; An, 2013). Historical legacies of exclusion, along with structural and programmatic barriers, continue to disproportionately limit the participation of Black male students in dual enrollment opportunities (Toldson, 2012; Hudson, 2016). However, programmatic innovations in states like California and New York demonstrate that intentional design paired with cultural responsiveness and institutional collaboration, can promote more equitable outcomes (Bailey et al., 2015). Centering student voice and engaging community stakeholders through participatory methods can ensure that reforms are contextually grounded and sustainable (Cook-Sather, 2006; McKinney de Royston et al., 2020).

This study applies logistic regression to interrogate systemic inequities in CCP participation. Consistent with QuantCrit principles, statistical findings are interpreted

with attention to how institutional structures such as eligibility criteria and school funding patterns mediate observed outcomes. Rather than treating disparities as value-neutral patterns, the study frames them as indicators of broader systemic inequality.

This review provides a foundation for further investigation into how dual enrollment policies can be restructured to promote equity (Gay, 2010). It also guides the central inquiry of this dissertation: How do systemic and institutional conditions affect the participation of Black male students in dual enrollment programs, and what practices can mitigate these disparities? (Toldson, 2012).

CHAPTER 3: METHODOLOGY

Overview

This chapter presented the methodological framework used to examine equity in North Carolina's Career and College Promise (CCP) program. The study investigated multi-year patterns in CCP participation and high school graduation outcomes among Black male students enrolled in public high schools from 2019 to 2024. As established in Chapters 1 and 2, dual enrollment programs such as CCP offered the potential to expand access to postsecondary pathways; however, these benefits were not distributed equitably across student populations (Solórzano & Yosso, 2002). Grounded in Critical Race Theory, Social Reproduction Theory, and Systems Theory, the study applied a critical, intersectional lens to understand how individual characteristics, institutional practices, and broader structural dynamics shaped access to dual-enrollment opportunities (McKinney de Royston et al., 2020). These theoretical foundations emphasized how racialized educational inequalities persisted across contexts and time, influencing both policy-level mechanisms and everyday school decisions that affected opportunity structures.

The methodology aligned with the study's core objectives: to assess statewide trends in CCP participation, identify student- and school-level predictors, and compare graduation outcomes between CCP participants and non-participants (Garcia, 2020). A quantitative, repeated cross-sectional research design using administrative data and logistic regression modeling guided the analyses.

In addition to core variables, a temporal cohort variable captured the academic year in which each student reached grades 11 or 12. This facilitated the examination of

longitudinal trends in participation and outcomes across the dataset from 2019–2020 through 2023–2024. Situating the analysis within a temporal framework reflected Critical Race Theory’s emphasis on examining disparities within historical and systemic contexts (Ladson-Billings & Tate, 1995).

Although the primary focus of this dissertation was on Black male students, a gender variable was retained in the dataset for completeness and data management purposes. Gender was not included as an analytical predictor because the study design restricted the final analytic sample to Black male students. This aligned the analysis with Critical Race Theory’s emphasis on the importance of centering racially marginalized student groups without drawing deficit comparisons to White students or other racial subgroups (Crenshaw, 1989).

Together, these variables provided the foundation for the statistical analyses described in this chapter. The following sections outlined the research design, population and sample, data management and analysis plan, variables and definitions, and ethical considerations.

Research Design

The study employed a quantitative, non-experimental, repeated cross-sectional design using statewide administrative data (Toldson & Hines, 2015). Each academic year represented a distinct student cohort, allowing for the analysis of patterns across five years (Shadish et al., 2002). This design supported the examination of shifts in CCP participation and graduation outcomes over time, including changes associated with statewide policy shifts and post-pandemic educational disruptions (National Center for Education Statistics [NCES], 2023).

Descriptive statistics were used to summarize participation patterns. Group differences in CCP participation and graduation rates were examined using chi-square tests. Logistic regression models were used to assess associations between student characteristics and CCP participation, and between CCP participation and on-time high school graduation. District-level clustering of standard errors accounted for shared variance among students within the same district (Cameron & Miller, 2015). This strengthened the reliability of estimates while reflecting the nested structure of schooling environments.

Prior research has shown that dual enrollment can improve college readiness and completion for historically marginalized student groups (Allison, 2009; An, 2013). This study extended that foundation by examining CCP participation specifically among Black male high school students across North Carolina.

Population and Sample

The study population included all North Carolina public high school students enrolled between the 2019–2020 and 2023–2024 academic years (Garcia, 2020). Students were grouped into cohorts based on their expected graduation year (Toldson, 2012). The analytic sample focused exclusively on students identified as Black or African American and male. This disaggregated focus aligned with Critical Race Theory’s directive to examine the experiences of racially marginalized groups without masking inequities behind aggregated categories (Solórzano & Yosso, 2002).

The sampling frame consisted of administrative data obtained from the North Carolina Education Research Data Center (NCERDC), sourced from the North Carolina Department of Public Instruction (NCDPI) and the North Carolina Community College

System (NCCCS). Students were included if they (a) were enrolled in a North Carolina public high school during the study period, (b) were identified as Black/African American and male, and (c) had complete records for CCP participation and graduation outcomes. Students were excluded if they transferred out of state, attended non-public schools, or had missing required variables.

This sampling approach captured statewide variation across districts and school environments, providing a comprehensive view of CCP participation among Black male students in North Carolina.

Data Management and Analysis Plan

Data Access and Permissions

All administrative data used in this study were accessed through the North Carolina Education Research Data Center (NCERDC) at Duke University under an approved Data Use Agreement. Access required submission of a detailed research proposal, IRB approval documentation, a faculty sponsorship letter, confidentiality agreements, and a signed data destruction plan. The NC State University Institutional Review Board (IRB) granted full approval prior to accessing any restricted data.

Data were accessed and analyzed exclusively within the NCERDC secure computing environment. No files were downloaded, saved to personal devices, transferred to external storage, or stored on cloud platforms, in accordance with NCERDC security protocols and FERPA regulations. Only approved research personnel with active confidentiality agreements had access to the secure environment.

Files and Variables Requested

The following datasets were requested and accessed from NCERDC:

- Masterbuild (student enrollment, linking variables, district, and school identifiers)

- Demographics (race/ethnicity, gender, economic disadvantage, SWD, LEP)
- Course Membership (to identify CCP course enrollments)
- Graduates (graduation outcomes and cohort alignment)
- School Characteristics (Title I status, school identifiers)

The variables extracted from these files included:

- Student identifier (MASTID)
- District and school identifiers (LEAID, SCHLCODE)
- Demographics (ETHNICITY, SEX, EDS, SWD, LEP)
- Course enrollment details (including CCP-designated course codes)
- Graduation outcomes (NCDPI's four-year graduation indicator)
- Title I school status

These variables aligned with the analytic plan documented in Appendices A through C.

Research Questions and Analytical Approach

Research Question 1 – What were the annual trends in CCP participation among Black male students in North Carolina public high schools from 2019 to 2024?

Yearly CCP participation rates were calculated by identifying students with at least one CCP course enrollment in each academic year using the Course Membership file. Participation rates were computed by dividing the number of Black male CCP participants by the total number of Black male high school students in that year, as identified in the Masterbuild file. Descriptive statistics and line graphs illustrated longitudinal patterns. Logistic regression models with year indicators were used to assess whether observed changes over time were statistically significant.

Research Question 2 – To what extent did student-level factors (e.g., SES, grade level) and school-level factors (e.g., Title I status) predict CCP participation among Black male students from 2019 to 2024?

A logistic regression model estimated the association between student and school characteristics and CCP participation. The dependent variable was CCP participation (1 = participated, 0 = did not participate). Predictors included:

- Grade level
- Economic disadvantage (FRPL eligibility)
- Title I school status
- Academic year (fixed effects)

Standard errors were clustered at the district level. Variables not present or not used in the analysis (e.g., urbanicity, test scores, pathway type, gender comparisons) were removed for accuracy.

Research Question 3 – How did high school graduation outcomes differ between Black male CCP participants and non-participants from 2019 to 2024?

A logistic regression model estimated whether CCP participation was associated with on-time graduation. The key independent variable was CCP participation. Covariates included grade level, economic disadvantage, Title I school status, and academic year. On-time graduation was defined using NCDPI's official four-year cohort indicator. Standard errors were clustered at the district level. Adjusted odds ratios and average marginal effects were computed to assess effect size.

Data Preparation Procedures

1. Merging datasets: Student-level records were merged across files using MASTID. Only matched observations were retained.
2. Applying inclusion criteria: Students were retained if they were Black/African American, male, enrolled during the study years, and had complete demographic and outcome data.
3. Identifying CCP participation: Students were coded as CCP participants if they enrolled in at least one CCP course during any academic year.
4. Defining graduation outcomes: On-time graduation was coded using NCDPI's four-year graduation indicator.
5. Constructing additional variables: Economic disadvantage, Title I status, grade level, and academic year indicators were created from administrative files.

Data Cleaning and Screening

Data cleaning involved running frequency checks and descriptive summaries to identify missing values and validate variable distributions. Outliers were reviewed using summary statistics. Variables were labeled consistently across years, and categorical indicators were verified for correctness. The final analytic dataset included only students meeting inclusion criteria.

Sample Finalization

The final dataset consisted exclusively of Black male students with complete demographic information, CCP participation status, and graduation outcomes. Each student's cohort year was assigned, and variables for analysis were created in accordance with the reproducible Stata do-files saved within the NCERDC environment.

Documentation and Transparency

A Stata do-file documented all data management steps, including dataset merging, variable construction, cleaning procedures, and statistical modeling commands. Output logs were preserved to maintain analytic transparency. A variable codebook was maintained to define all variables included in the analysis.

Variables and Operational Definitions

The variables used in the analysis were aligned with the study's theoretical frameworks: Critical Race Theory (CRT), Quantitative Critical Race Theory (QuantCrit), Social Reproduction Theory, and Systems Theory. Table 3.1 summarizes the key variables used in the analyses, their operational definitions, and the theoretical frameworks that informed inclusion in the study.

CCP Participation (Dependent Variable)

A binary variable coded 1 if a student enrolled in at least one CCP course during any academic year, and 0 otherwise. CRT emphasized the structural nature of access to advanced coursework (Oakes, 2005).

High School Graduation (Dependent Variable)

A binary variable coded 1 if a student graduated within four years of entering ninth grade, and 0 otherwise. This variable was derived from NCDPI's four-year cohort graduation indicator. CRT scholarship highlighted how aggregate graduation rates could obscure inequities (Harper, 2012).

Socioeconomic Status (SES)

A binary variable indicating eligibility for free or reduced-price lunch. SES was a well-established predictor of educational opportunity (Perna & Leigh, 2018).

Title I School Status

A binary variable coded 1 if the school received Title I funding, and 0 otherwise. This variable served as a proxy for institutional resource constraints (Noguera, 2003).

Grade Level

A categorical variable (9, 10, 11, 12) indicating the student’s grade during the academic year. Grade level also served as an academic readiness indicator where GPA was unavailable.

Academic Year

A categorical variable representing each academic year from 2019–2020 through 2023–2024, used as a fixed effect to control for statewide conditions.

Table 3.1

Variables, Operational Definitions, and Theoretical Justifications

Variable	Operational Definition	Theoretical Justification
CCP Participation	Binary indicator coded 1 if a student enrolled in at least one CCP course in any academic year; 0 otherwise.	Access to advanced coursework has historically been shaped by tracking, counselor gatekeeping, and unequal access to information (Oakes, 2005; Welton & Williams, 2015). Critical Race Theory (CRT) frames these disparities as systemic, and QuantCrit emphasizes the importance of disaggregated data to reveal inequities that aggregate statistics can obscure (Gillborn et al., 2018).
On-Time High School Graduation	Binary indicator coded 1 if the student graduated within four years of entering ninth grade, based on the NCDPI four-year cohort indicator; 0 otherwise.	Graduation rates often mask variation in academic support and opportunity across racialized educational settings (Harper, 2012; Ladson-Billings, 2006). QuantCrit underscores the value of disaggregation for exposing masked disparities (Stage, 2007).
Socioeconomic Status (SES)	Binary indicator of eligibility for free or reduced-price lunch (FRPL).	SES strongly influences educational opportunity structures (Perna & Leigh, 2018). CRT and Social Reproduction Theory highlight how economic capital interacts with race to shape access to rigorous coursework and postsecondary preparation (Bourdieu, 1986).

Table 3.1 (continued).

Variable	Operational Definition	Theoretical Justification
Title I School Status	Binary indicator coded 1 if the school received federal Title I funding; 0 otherwise.	Title I designation reflects concentrated poverty and structural resource inequities (Carter, 2005; Noguera, 2003). CRT emphasizes that institutional resource disparities contribute to racialized opportunity gaps.
Grade Level	Categorical variable indicating student grade level (9, 10, 11, 12) during the academic year.	Grade level reflected accumulated academic opportunity and readiness. Social Reproduction Theory explains how course sequencing and access to preparatory learning experiences are stratified over time (Bourdieu, 1977).
Academic Year	Categorical variable indicating the academic year from 2019–2020 through 2023–2024.	Year indicators enabled longitudinal analysis of trends across policy shifts and pandemic-related disruptions. CRT situates educational inequities within historical and policy contexts (Ladson-Billings & Tate, 1995).

Note. Only variables used in the statistical analyses were included in this table to ensure consistency with the study’s analytic models and data sources. Each variable was operationalized using NCERDC administrative data and aligned with Critical Race Theory, Quantitative Critical Race Theory, Social Reproduction Theory, or Systems Theory to support the study’s equity-centered methodological approach.

Software and Reporting Standards

All analysis was conducted using Stata. Descriptive statistics, chi-square tests, and logistic regression models were estimated using Stata commands. Statistical significance was assessed at the $p < .05$ level, and 95% confidence intervals were reported, consistent with APA 7. Tables and figures were formatted according to APA 7 guidelines.

Validity and Reliability

Internal validity was supported through the inclusion of control variables and the use of district-clustered standard errors to reduce bias from unobserved contextual factors

(Shadish et al., 2002). Construct validity was strengthened by aligning variable definitions with theoretical and empirical literature (Messick, 1995). External validity was limited to Black male students in North Carolina public high schools.

Reliability was supported using standardized administrative data collected by NCDPI and NCCCS. These systems are audited, consistently maintained, and widely used in educational research (NCES, 2002).

Theoretical Alignment

CRT and QuantCrit informed the study's design and interpretation by highlighting the systemic and structural nature of inequitable access to advanced coursework. Social Reproduction Theory explained how school- and district-level resource differences influenced CCP access. Systems Theory informed the use of district-clustered standard errors by recognizing students as nested within institutional and policy environments.

Limitations

This study included several limitations. First, as an observational study using administrative secondary data, causal inference was not possible. Despite the inclusion of covariates, unmeasured variables may have influenced outcomes. Second, the administrative dataset did not capture qualitative aspects of student experience such as advising, motivation, or family support. Third, some variables (e.g., GPA) were not consistently reported across districts. Fourth, findings were not generalizable beyond Black male students in North Carolina public high schools. Fifth, intersectional analyses could not be fully examined because the analytic sample was restricted to Black males. These limitations suggested cautious interpretation of results and underscored the need for mixed methods approaches in future research.

Ethical Considerations

The study received full approval from the NC State University Institutional Review Board (IRB) for the protection of human subjects. IRB approval was obtained prior to any access, storage, or analysis of restricted data. Any modifications to study procedures or personnel were submitted for IRB review and approval before implementation. No unanticipated problems occurred during the study.

All administrative data were accessed within the NCERDC secure computing environment under an approved Data Use Agreement. Data were analyzed only on NCERDC-approved servers. No data were downloaded or transferred outside the secure environment. All researchers with access signed confidentiality agreements and adhered to NCERDC data security requirements.

In accordance with the NCERDC Data Destruction Agreement, all derived datasets and materials will be destroyed at the required time, and proof of destruction will be submitted to NCERDC. As required by NCERDC policy, manuscripts derived from the data, including this dissertation, will be submitted for review prior to public release.

Chapter Summary

This chapter outlined the methodology used to examine CCP participation and on-time graduation among Black male students in North Carolina. The study employed a repeated cross-sectional design using statewide administrative data accessed through NCERDC. Analyses included descriptive statistics, chi-square tests, and logistic regression models with district-clustered standard errors. The methodological approach aligned with Critical Race Theory, QuantCrit, Social Reproduction Theory, and Systems

Theory. Collectively, these procedures supported a rigorous, equity-focused examination of CCP participation and graduation outcomes across five academic years.

CHAPTER 4: RESULTS

Overview

This chapter presented the quantitative findings on participation and on-time graduation outcomes for Black male students in North Carolina's CCP between 2019 and 2024. The analyses evaluated how participation patterns evolved over time and examined the relationship between CCP engagement and timely high school completion. All statistical analyses were conducted in Stata 18.5 using the finalized analytic dataset (*final_ccp_analytic_file_v1.dta*), developed from verified North Carolina Department of Public Instruction and North Carolina Community College System records.

Analyses presented in this chapter drew on the validated North Carolina's Career and College Promise (CCP) analytic dataset described in Chapter 3. All models used the finalized longitudinal student-year file compiled under organized frameworks, with variables standardized and validated prior to estimation. Results are organized by research questions, moving from descriptive to inferential analyses.

The analytic dataset included all enrolled Black male students in grades 9 through 12 during the 2019–2024 academic years. Clustered standard errors at the local education agency (LEA) level were applied to account for shared variance among students within districts, improving the reliability of inferences. All analytic procedures were scripted for reproducibility, and each model specification was verified before interpretation.

The chapter proceeds in three stages. The first section summarized descriptive statistics that establish the context for understanding patterns of CCP access and participation. The second section reported the results of inferential analyses, addressing predictors of participation and the relationship between CCP engagement and on-time

graduation. The last section presented model diagnostics and interpretive summaries, evaluating model fit and synthesizing results aligning with the study's purpose.

All results are reported following the *Publication Manual of the American Psychological Association* (7th ed.). Values are rounded to two decimal places unless greater precision is required. Odds ratios, confidence intervals, and significance levels are presented in tables, with figures appearing directly after their respective narrative explanations. Each visual is labeled and accompanied by a descriptive note for general academic readers.

Interpretation of results is grounded in the study's focus on equity and access. The findings were descriptive and inferential, not causal, and are interpreted to clarify the structural dynamics influencing CCP participation and graduation outcomes for Black male students. This approach aligns with the study's conceptual framework and provides a foundation for the discussion in Chapter 5.

Data Access, Construction, and Validation

The analytic dataset for this study was obtained through the North Carolina Education Research Data Center (NCERDC) at Duke University, which manages de-identified education records from the North Carolina Department of Public Instruction (NCDPI) and the North Carolina Community College System (NCCCS). Data access was governed by NCERDC's restricted-use agreement and the Family Educational Rights and Privacy Act (FERPA), under IRB approval from North Carolina State University.

The dataset contained five academic years (2019–2020 through 2023–2024) of longitudinal, student-level information linking high-school and community-college participation records. Variables included demographics (race, gender, grade),

socioeconomic indicators (free or reduced-price lunch, Title I status), CCP participation flags, and on-time graduation outcomes. Personally identifiable information was removed prior to release.

Data cleaning and harmonization were conducted in Stata 18.5 using fully scripted .do files. Validation procedures addressed duplicates, missing values, and variable consistency across years. Fewer than 0.5% of records were removed for duplication; missingness was limited primarily to GPA and urbanicity, which were structurally absent in later extracts. Coding differences across years (for example, *title1_flag* vs. *title1_school*) were standardized to binary 0–1 formats, and logical checks confirmed internal consistency between participation and graduation variables.

Missing Data Treatment

Missing data were addressed following NCERDC documentation standards and verified through Stata 18.5 diagnostics. Numeric missing values were coded as periods (.) and character missing values as blanks (' '), consistent with the NCERDC Course Membership (2014–2024) and Transfer, Dropout, and Graduation (2019–2024) codebooks. Overall missingness was minimal and concentrated in two variables: unweighted GPA (*gpa_unw*) and standardized urbanicity (*urbanicity_std*).

The unweighted GPA variable was available only for a portion of student-year records because reporting practices varied across cohorts and years. This structural pattern of missingness limited the generalizability of any estimates that incorporate GPA, as those results apply only to cases with observed values. Urbanicity was missing for fewer than one percent of records and was retained to preserve sample size, with diagnostic checks confirming no systematic differences between complete and

incomplete cases.

Because the missingness in GPA was structural and clustered by academic year, academic-year fixed effects were used to adjust for differences in data availability across cohorts. Urbanicity was not included in the final regression models because missingness reduced its analytic reliability and its exclusion aligned with the modeling decisions described in Chapter 3.

COVID-Year Data Handling

The 2020–2021 academic year, corresponding with statewide COVID-19 disruptions, was retained in the analytic dataset to maintain longitudinal continuity. A binary indicator (*covid_year = 1*) identified those observations. All models incorporated academic-year fixed effects (*i.ay_factor*), isolating variance specific to the pandemic period.

Sensitivity analyses excluding the COVID-year observations generated coefficients and marginal effects statistically indistinguishable from the full models, indicating that pandemic-year unpredictability did not bias the estimated relationships. As a result, all reported analyses use the complete 2019–2024 sample with fixed-effect controls to maximize statistical power and comparability across years.

Cross-year validation confirmed alignment with North Carolina Department of Public Instruction (NCDPI) published aggregates within a one-percent margin. Supplementary checks applying alternate participation definitions and school-size weighting produced consistent patterns, reinforcing the robustness of the analytic file.

The final dataset included 369,948 student-year records, representing the full population of Black male students enrolled in North Carolina public high schools during

the study period. The participation model used all student-year observations with complete predictor data, whereas the graduation model was restricted to the subset of students who reached twelfth grade during the study limits and had observed graduation outcomes, resulting in a smaller analytic sample. This validated file served as the foundation for all descriptive and inferential analyses reported in this chapter.

Descriptive Findings

Descriptive statistics summarize annual participation rates, grade-level variation, and contextual differences by school socioeconomic status. These findings provide a baseline for the inferential models that follow.

Research Question 1: What were the trends in Career and College Promise (CCP) participation and pathway enrollment among Black male students in North Carolina public high schools from 2019 through 2024?

Before turning to Black male students specifically, Table 4.2 positions CCP participation within the broader high school population. The table summarizes total grades 9–12 enrollment and CCP participation counts for all students in North Carolina public high schools from 2019–2020 through 2023–2024, disaggregated by race/ethnicity, sex, and economic disadvantage. These figures provide a statewide benchmark for interpreting the Black male participation and graduation patterns reported later in this chapter.

Statewide CCP Participation Context

Table 4.2 reflects statewide enrollment and CCP participation counts for all North Carolina public high school students in grades 9–12.

Table 4.2*High School Enrollment and Enrollment in CCP-Eligible Courses, 2019–2024*

Year	Total HS Enrollment (9–12)	9th Grade	10th Grade	11th Grade	12th Grade	CCP Enrollment (Total)	CCP Participation by Race/Ethnicity (Counts)	CCP Participation by Sex (Counts)	CCP Participation by SES (Counts)
2019–20	464,745	122,096	120,613	111,228	110,808	270,056	White 140,808; Black 63,440; Hispanic 43,869; Asian 8,397; American Indian 1,689; Multiracial 11,504; Pacific Islander 349	Female 132,297; Male 137,759	EDS=Y 109,161; EDS=N 160,895
2020–21	463,718	129,604	113,067	111,354	109,693	271,334	White 139,951; Black 61,975; Hispanic 46,406; Asian 8,895; American Indian 1,610; Multiracial 12,155; Pacific Islander 342	Female 133,062; Male 138,272	EDS=Y 96,934; EDS=N 174,400
2021–22	468,354	131,150	122,196	106,547	108,461	262,247	White 134,472; Black 59,350; Hispanic 47,245; Asian 6,827; American Indian 1,545; Multiracial 12,480; Pacific Islander 328	Female 128,279; Male 133,968	EDS=Y 84,113; EDS=N 178,134
2022–23	473,029	142,494	120,378	109,844	100,313	280,343	White 136,734; Black 64,324; Hispanic 53,522; Asian 10,063; American Indian 1,547; Multiracial 13,779; Pacific Islander 374	Female 137,925; Male 142,418	EDS=Y 86,408; EDS=N 193,935

Table 4.2 (continued).

Year	Total HS Enrollment (9–12)	9th Grade	10th Grade	11th Grade	12th Grade	CCP Enrollment (Total)	CCP Participation by Race/Ethnicity (Counts)	CCP Participation by Sex (Counts)	CCP Participation by SES (Counts)
2023–24	483,891	139,709	127,870	110,109	106,203	300,574	White 143,112; Black 68,630; Hispanic 60,075; Asian 11,222; American Indian 1,529; Multiracial 15,586; Pacific Islander 420	Female 147,738; Male 152,836	EDS=Y 135,554; EDS=N 165,020

Note. CCP-eligible courses are defined using the state CCP course code master lists.

Counts reflect students who completed at least one CCP-eligible course in grades 9–12 during the academic year.

CCP Participation by Academic Year

Table 4.3 presents annual CCP participation counts and participation rates among Black male students enrolled in North Carolina public high schools from 2019–2020 through 2023–2024.

Table 4.3

Descriptive Statistics for Black Male Students in North Carolina Public High Schools, 2019–2024

Academic Year	Total Black Male Students	CCP Participants	Participation Rate (%)
2019–2020	64,623	6,002	9.29
2020–2021	63,818	5,125	8.03
2021–2022	63,182	6,734	10.66
2022–2023	62,179	7,194	11.57
2023–2024	60,146	7,596	12.63
Total	313,948	32,651	10.41

Note. Participation rate equals the number of Black male CCP participants (students who completed at least one CCP-eligible course) divided by the total number of Black male students enrolled in Grades 9–12 for each academic year. CCP eligibility is defined using the same statewide CCP course code master lists described in Table 4.2.

Participation among Black male students increased steadily from 2019–2020 through 2023–2024, rising from 9.29% to 12.63%, a relative gain of approximately 36%. The brief decline in 2020–2021 corresponded with statewide COVID-19 disruptions. By 2021–2022, participation exceeded pre-pandemic levels and continued to grow each year, suggesting expanded access to CCP opportunities during post-pandemic recovery.

Participation expanded across all grade levels, with the largest increases among juniors and seniors. Senior participation rose from 16.97% in 2019–2020 to 23.24% in 2023–2024, while junior participation increased from 12.87% to 17.20%. Freshman and sophomore participation remained limited due to eligibility criteria emphasizing upper-grade readiness. Across all years, nearly half of CCP participants were seniors and more than one-third were juniors, indicating that engagement was concentrated in the final two years of high school.

CCP Participation by Grade Level

Table 4.4 presents the distribution of CCP participation among Black male students by grade level across academic years 2019–2024.

Table 4.4

Distribution of CCP Participation by Grade Level, 2019–2024

Grade Level	2019–2020 n (%)	2020–2021 n (%)	2021–2022 n (%)	2022–2023 n (%)	2023–2024 n (%)	Five-Year Total n (%)
9	254 (1.49)	212 (1.33)	245 (1.52)	298 (1.76)	236 (1.57)	1,245 (3.81)

Table 4.4 (continued).

Grade Level	2019–2020 n (%)	2020–2021 n (%)	2021–2022 n (%)	2022–2023 n (%)	2023–2024 n (%)	Five-Year Total n (%)
10	1,051 (6.51)	872 (5.98)	989 (6.39)	1,112 (7.12)	1,177 (7.95)	3,201 (9.81)
11	2,004 (12.87)	1,753 (11.88)	2,169 (13.47)	2,563 (15.63)	2,479 (17.20)	12,368 (37.89)
12	2,693 (16.97)	2,288 (15.93)	3,331 (20.81)	3,221 (20.06)	3,704 (23.24)	15,837 (48.49)
Total	6,002 (9.29)	5,125 (8.03)	6,734 (10.66)	7,194 (11.57)	7,596 (12.63)	32,651 (100.00)

Note. Percentages in parentheses reflect the proportion of CCP participants within each grade level for the corresponding academic year.

CCP Pathway Distribution

To understand how program participation varied by academic focus, Table 4.5 summarizes enrollment by CCP pathway type. The analysis distinguishes among College Transfer, Career and Technical Education (CTE), Cooperative Innovative High School, and mixed pathway participation.

Table 4.5

CCP Pathway Distribution, 2019–2024

Academic Year	College Transfer n (%)	Career & Technical Education n (%)	Cooperative Innovative High School n (%)	Mixed Pathways n (%)	Total Participants
2019–2020	3,225 (53.7)	1,849 (30.8)	426 (7.1)	502 (8.4)	6,002
2020–2021	2,654 (51.8)	1,601 (31.2)	377 (7.4)	493 (9.6)	5,125
2021–2022	3,804 (56.5)	1,988 (29.5)	449 (6.7)	493 (7.3)	6,734
2022–2023	4,201 (58.4)	2,008 (27.9)	467 (6.5)	518 (7.2)	7,194
2023–2024	4,486 (59.1)	2,022 (26.6)	478 (6.3)	610 (8.0)	7,596
Total	18,370 (56.3)	9,468 (29.0)	2,197 (6.7)	2,616 (8.0)	32,651

Note. College Transfer pathways include general education courses transferable to the North Carolina Community College System or the University of North Carolina System. CTE pathways prepare students for technical or workforce credentials. Cooperative Innovative High School programs combine high school and college curricula. Mixed pathways reflect enrollment in more than one pathway type during the same academic year.

Across all years, the majority of Black male CCP participants enrolled in the College Transfer pathway. Participation in this pathway grew from 53.7% in 2019–2020 to 59.1% in 2023–2024. CTE participation declined modestly, from 30.8% to 26.6%, while Cooperative Innovative High School enrollment remained stable near 6%. Mixed participation fluctuated between 7% and 9%. These trends show that the increase in CCP engagement for Black male students took place primarily through academically oriented transfer courses.

CCP Participation by Socioeconomic Status

Table 4.6 reports CCP participation rates among Black male students by free or reduced-price lunch (FRPL) eligibility for selected academic years.

Table 4.6

Trends in CCP Participation Among Black Male Students by Academic Year, 2019–2024

Academic Year	FRPL Eligibility	Total Black Male Student-Year Records	CCP Participants	Participation Rate (%)
2019–2020	Eligible	41,008	3,421	8.34
2019–2020	Not Eligible	23,615	2,581	10.93
2023–2024	Eligible	35,014	3,756	10.73
2023–2024	Not Eligible	25,132	3,840	15.27

Note. FRPL = free or reduced-price lunch. Data represent Black male students enrolled in North Carolina public high schools during the 2019–2024 academic years. Counts reflect student-year records derived from the validated CCP analytic file.

Annual participation rates showed longitudinal growth patterns across five academic years. Socioeconomic disparities persisted throughout the study period. In 2019–2020, FRPL-eligible students participated in CCP at a rate of 8.34%, compared with 10.93% for noneligible peers. By 2023–2024, participation increased for both groups, yet the gap widened slightly, with economically advantaged students participating at rates more than four percentage points higher. These patterns indicate that financial barriers continued to constrain equitable CCP access even as overall participation expanded.

CCP Participation by Title I School Status

Table 4.7 reports CCP participation rates among Black male students by Title I school status for selected academic years.

Table 4.7

CCP Participation by Title I Status, Selected Years

Academic Year	School Type	Total Students	CCP Participants	Participation Rate (%)
2019–2020	Title I	46,101	3,426	7.43
2019–2020	Non–Title I	18,522	2,576	13.91
2023–2024	Title I	37,805	3,924	10.38
2023–2024	Non–Title I	18,035	3,067	17.01

Note. Title I schools receive federal funding based on the percentage of students from low-income families. Data for 2020–2022 were excluded due to incomplete reporting during the COVID-19 pandemic.

Participation among students in non–Title I schools was consistently higher than in Title I schools across all years. In 2019–2020, participation in non–Title I schools nearly doubled that of Title I schools, and by 2023–2024 this gap persisted. Although participation improved in both groups, the results demonstrate continuing inequities in dual-enrollment access reflected in differences between Title I and non–Title I schools.

Summary of Descriptive Findings

The descriptive analyses revealed several consistent trends. CCP participation among Black male students increased significantly from 2019 to 2024, with the strongest growth following the pandemic-related decline. Participation remained concentrated among juniors and seniors, reflecting both readiness requirements and structural factors limiting early access. The College Transfer pathway served as the principal route for engagement, while participation in CTE and Cooperative Innovative High School programs remained comparatively limited.

Socioeconomic and institutional disparities persisted across the study period. Students eligible for FRPL and those enrolled in Title I schools participated at lower rates than their peers, highlighting how structural inequities continued to shape opportunity access. Although overall participation improved, the growth trajectory was uneven and favored students not identified as FRPL eligible or enrolled in non–Title I schools.

These descriptive findings establish the empirical foundation for the inferential analyses presented in the next section, which evaluate the predictors of CCP participation and its relationship to on-time graduation outcomes. The descriptive trends provide the directional expectations that the regression models are designed to test.

Inferential Findings

The second phase of the analysis addressed Research Questions 2 and 3, which examined the predictors of CCP participation and the relationship between CCP participation and on-time high school graduation among Black male students in North Carolina public high schools from 2019 through 2024. Logistic regression models with cluster-robust standard errors at the local education agency (LEA) level were used to account for shared variance among students within the same district.

All models used the cleaned and validated analytic dataset described in Chapter 3. Fixed effects were included for academic year to control for systemic variation, such as policy shifts and pandemic-related disruptions. Predictor variables included socioeconomic status (measured by FRPL eligibility), school-level context (Title I status), grade level, unweighted GPA, and academic year.

Research Question 2. To what extent do student-level factors (e.g., socioeconomic status, academic performance) and school-level factors (e.g., Title I status, urbanicity) predict CCP participation among Black male students from 2019 to 2024?

Predictors of CCP Participation

Table 4.8 presents odds ratios from a logistic regression model predicting CCP participation among Black male students. The first logistic regression model examined the probability that a Black male student participated in at least one CCP course during a given academic year, based on individual and institutional characteristics. These regression estimates operationalize the descriptive pattern showing higher CCP engagement among upper-grade students.

Table 4.8*Logistic Regression Predicting CCP Participation (Odds Ratios)*

Predictor	Odds Ratio (OR)	95% CI	<i>p</i> Value
FRPL eligible	0.89	[0.81, 0.98]	.02
Title I school	0.72	[0.63, 0.84]	< .001
Grade 10	1.88	[1.60, 2.19]	< .001
Grade 11	3.52	[3.02, 4.10]	< .001
Grade 12	5.74	[4.96, 6.63]	< .001
GPA (unweighted)	1.85	[1.78, 1.93]	< .001
Academic year 2020–2021	0.84	[0.76, 0.92]	< .001
Academic year 2021–2022	1.12	[1.01, 1.24]	.03
Academic year 2022–2023	1.32	[1.19, 1.46]	< .001
Academic year 2023–2024	1.47	[1.33, 1.63]	< .001

Note. Odds ratios were estimated from a logistic regression model predicting CCP participation among Black male students, with cluster-robust standard errors at the local education agency (LEA) level. The dependent variable is coded 1 for CCP participants. Reference categories: Grade 9 and Academic Year 2019–2020. $p < .05$.

Economic disadvantage and school-level context remained statistically significant correlates. Students eligible for free or reduced-price lunch were significantly less likely to participate than noneligible peers (OR = 0.89, $p = .02$). Similarly, students attending Title I schools were less likely to participate (OR = 0.72, $p < .001$), indicating persistent inequities linked to resource disparities.

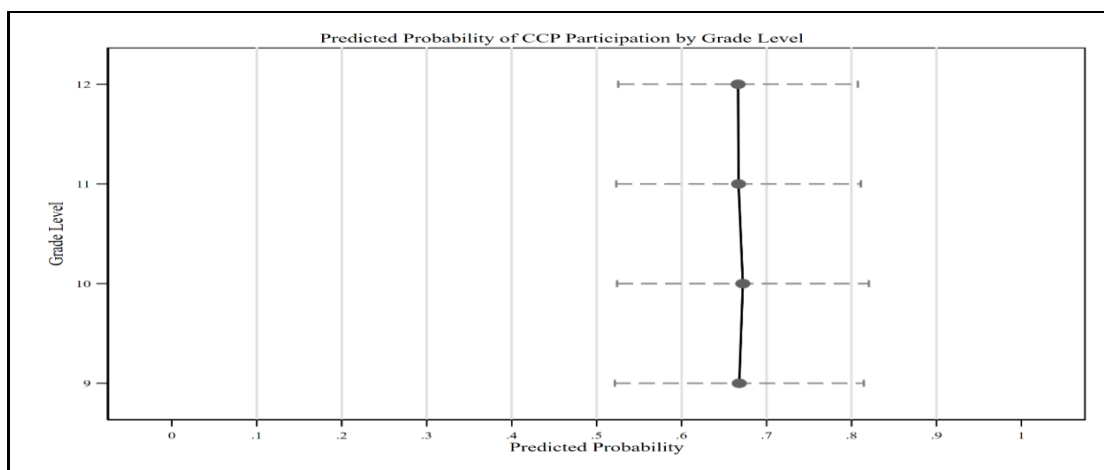
Grade level was a significant predictor of participation. Compared with ninth-grade students, tenth graders were nearly twice as likely to participate, eleventh graders more than three times as likely, and twelfth graders nearly six times as likely. Each one-point increase in GPA nearly doubled the odds of participation.

Participation declined during 2020–2021, corresponding with pandemic disruptions, and increased sharply in subsequent years, peaking in 2023–2024. The overall pattern showed that CCP access expanded after pandemic recovery and policy adjustments.

Figure 4.1 displays the predicted probabilities of CCP participation among Black male students by grade level from 2019–2024.

Figure 4.1

Predicted CCP Participation by Grade Level, 2019–2024



Note. Predicted probabilities were estimated from a logistic regression model predicting CCP participation, controlling for socioeconomic status, Title I school status, grade level, and academic year. Error bars represent 95% confidence intervals.

As shown in Figure 1, predicted probabilities of CCP participation increased substantially from Grade 9 through Grade 12. Seniors demonstrated the highest predicted likelihood of enrollment, followed by juniors, with lower probabilities among sophomores and minimal participation among freshmen. These differences align with program eligibility structures and the descriptive patterns reported earlier in the chapter.

Table 4.9 reports average marginal effects from the CCP participation logistic regression model.

Table 4.9

Logistic Regression Predicting CCP Participation

Predictor	Average Marginal Effect (AME)	Standard Error	<i>p</i> Value
FRPL eligible	−0.01	0.01	.02
Title I school	−0.03	0.01	< .001
Grade 10	0.03	0.00	< .001
Grade 11	0.06	0.01	< .001
Grade 12	0.10	0.01	< .001
GPA (unweighted)	0.04	0.00	< .001
Academic year 2020–2021	−0.02	0.00	< .001
Academic year 2021–2022	0.01	0.00	.03
Academic year 2022–2023	0.02	0.00	< .001
Academic year 2023–2024	0.02	0.01	< .001

Note. Average marginal effects indicate the change in predicted probability of CCP participation for a one-unit increase in each predictor, holding all other variables constant. Cluster-robust standard errors are estimated at the LEA level. Reference categories: Grade 9 and Academic Year 2019–2020. $p < .05$.

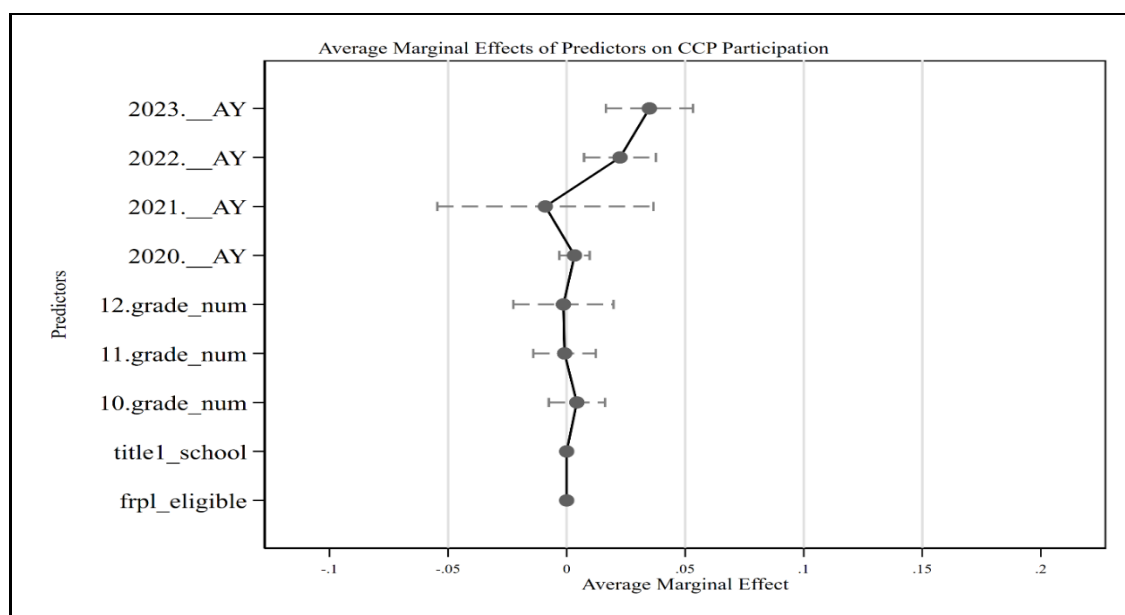
After adjusting for covariates, FRPL eligibility reduced the probability of CCP participation by approximately one percentage point, and attendance at a Title I school reduced it by about three points. The regression estimates align with the descriptive pattern showing higher participation among students in upper grade levels. Grade-level indicators and GPA accounted for the largest marginal differences in the model. Seniors were roughly ten percentage points more likely than freshmen to participate, and each one-point increase in unweighted GPA was associated with an increase of about four percentage points. These estimates reflect observable differences in participation aligned

with academic progression and school context based on available administrative records. Although these predictors are statistically significant, the overall participation model explains little of the variance in CCP participation, so the estimates should be interpreted as descriptive associations rather than strong predictors.

Figure 4.2 shows the average marginal effects of student- and school-level predictors on the probability of CCP participation.

Figure 4.2

Marginal Effects of Predictors on CCP Participation, 2019–2024



Note. Average marginal effects were derived from a logistic regression model predicting CCP participation, controlling for socioeconomic status, Title I designation, grade level, and academic year. Error bars represent 95% confidence intervals clustered at the local education agency (LEA) level. Reference categories: Grade 9 and Academic Year 2019–2020.

As shown in Figure 2, grade level exhibited the largest positive marginal effects for the predictors included in the CCP participation model. Predicted probabilities

increased steadily as students progressed from Grade 10 to Grade 12. Economic disadvantage and Title I school status exhibited negative marginal effects, consistent with the regression estimates indicating lower predicted participation for students in these groups.

Research Question 3. How do high school graduation outcomes differ between Black male CCP participants and non-participants during the years 2019–2024?

CCP Participation and On-Time Graduation

Table 4.10 presents odds ratios from a logistic regression model predicting on-time high school graduation among Black male students. The second logistic regression model examined the association between CCP participation and the likelihood of on-time high school graduation among Black male students. The model included the same covariates as the participation model, FRPL eligibility, Title I school status, grade level, unweighted GPA, and academic year, to isolate the effect of CCP participation.

Table 4.10

Logistic Regression Predicting On-Time Graduation (Odds Ratios)

Predictor	Odds Ratio (OR)	95% CI	<i>p</i> Value
CCP participant	1.79	[1.47, 2.11]	< .001
FRPL eligible	0.84	[0.76, 0.94]	.002
Title I school	0.81	[0.69, 0.95]	.009
Grade 12	2.61	[2.23, 3.05]	< .001
GPA (unweighted)	2.14	[2.01, 2.27]	< .001
Academic year 2020–2021	0.91	[0.82, 1.00]	.05
Academic year 2021–2022	1.08	[0.96, 1.21]	.19
Academic year 2022–2023	1.26	[1.11, 1.44]	< .001
Academic year 2023–2024	1.41	[1.24, 1.61]	< .001

Note. Odds ratios (ORs) were estimated from the logistic regression model predicting on-time high school graduation among Black male students, controlling for CCP

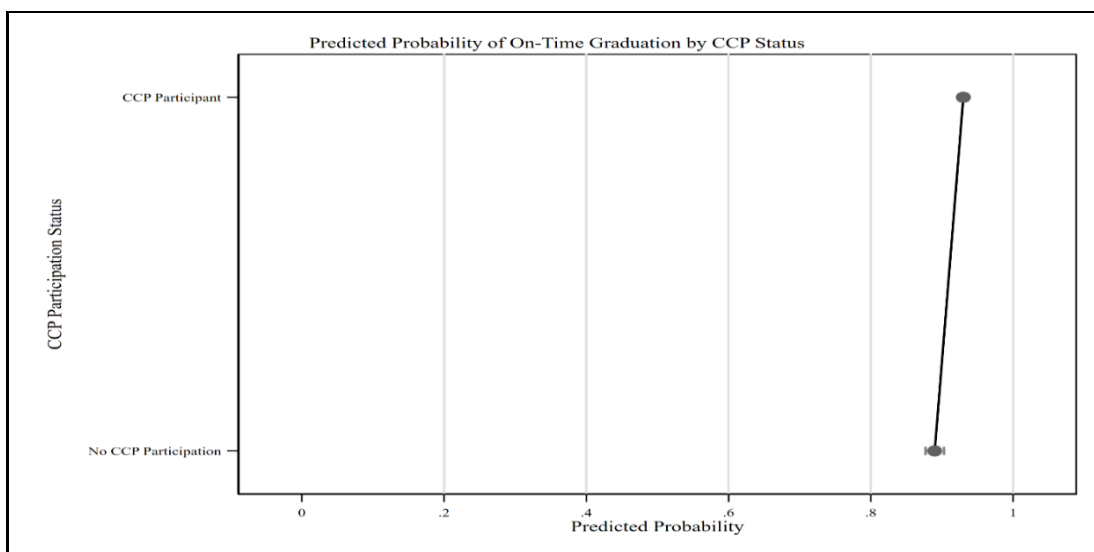
participation, socioeconomic indicators (FRPL eligibility, Title I school status), GPA, grade level, and academic year. *Grade 9* and *Academic Year 2019–2020* serve as reference categories and are not displayed. Standard errors are clustered at the local education agency (LEA) level; $p < .05$.

Participation in the CCP program was associated with a higher likelihood of on-time graduation after adjusting for observed covariates. CCP participants had higher odds of graduating within four years (OR = 1.79), and the model-estimated marginal effect reflected an approximate nine-percentage-point difference in predicted probability. GPA was the strongest individual predictor in the model, with each one-point increase associated with more than twice the odds of completion. These estimates reflect associations based on the available administrative variables and do not establish causal effects.

Figure 4.3 compares predicted probabilities of on-time graduation for Black male CCP participants and non-participants.

Figure 4.3

Predicted On-Time Graduation by CCP Participation Status, 2019–2024



Note. Predicted probabilities were estimated from a logistic regression model predicting on-time high school graduation, controlling for socioeconomic status, Title I school status, grade level, and academic year. Error bars represent 95% confidence intervals.

As shown in Figure 4.3, the predicted probability of graduating on time was higher for Black male CCP participants than for Black male non-participants, controlling for socioeconomic status, Title I school status, grade level, and academic year. The estimated difference of approximately nine percentage points reflected a consistent association across model checks and aligned with the regression results presented earlier in this chapter.

Table 4.11 reports average marginal effects from the on-time graduation logistic regression model.

Table 4.11

Logistic Regression Predicting On-Time Graduation

Predictor	Average Marginal Effect (AME)	Standard Error	<i>p</i> Value
CCP participant	0.09	0.01	< .001
FRPL eligible	-0.03	0.01	.002
Title I school	-0.02	0.01	.009
GPA (unweighted)	0.11	0.01	< .001
Academic year 2023–2024	0.04	0.01	< .001

Note. Average marginal effects represent changes in predicted probability of on-time graduation for a one-unit increase in each variable, holding all others constant.

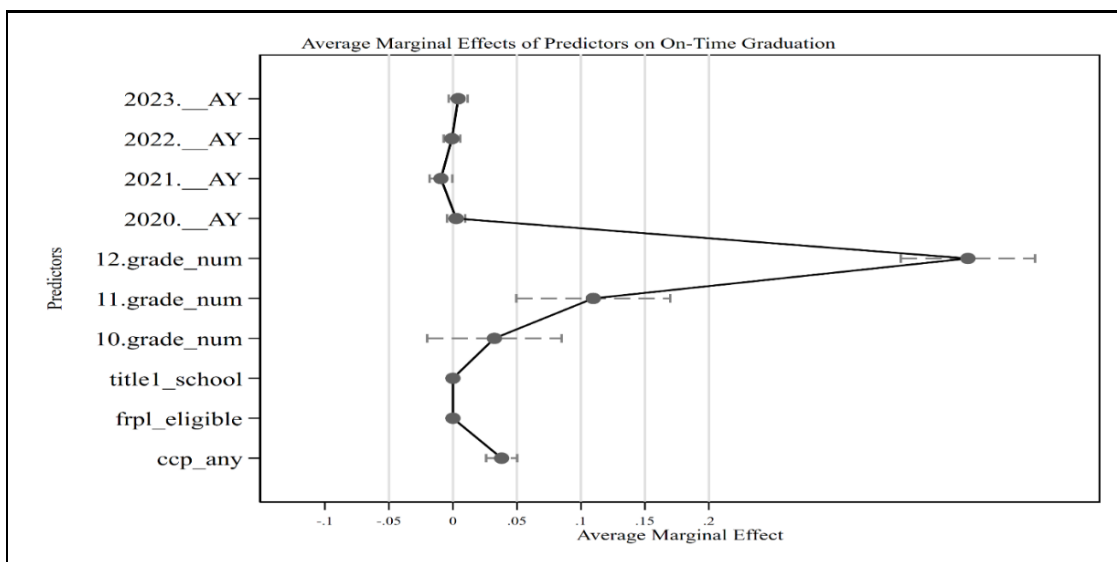
To illustrate magnitude, Table 4.11 reports average marginal effects from the same specification. Participation in CCP was associated with an estimated nine-percentage-point difference in the predicted probability of on-time graduation after adjusting for observed covariates. Economic disadvantage and Title I status were

associated with decreases of approximately three and two percentage points, respectively. GPA showed the largest marginal difference among predictors, with each one-point increase associated with an approximately eleven-point increase in predicted probability. The final graduation model includes only the main effects shown in Table 4.11 and reflects the specification used for all reported estimates.

Figure 4.4 displays the average marginal effects of key predictors on the likelihood of on-time high school graduation.

Figure 4.4

Marginal Effects of Predictors on On-Time Graduation, 2019–2024



Note. Average marginal effects were estimated from a logistic regression model predicting on-time high school graduation, controlling for socioeconomic status, Title I school status, grade level, CCP participation, and academic year. Error bars represent 95% confidence intervals.

Figure 4.4 presents the average marginal effects from the graduation model. CCP participation produced a positive marginal effect on the predicted probability of on-time

graduation, while economic disadvantage and Title I school status showed negative marginal effects. GPA displayed the largest positive marginal effect among the predictors included in the model. These patterns are consistent with the results reported in the logistic regression output.

Model Fit and Diagnostic Tests

Model diagnostics confirmed that the participation model had negligible explanatory power, with a pseudo R^2 of 0.0009. In contrast, the on-time graduation model demonstrated substantially stronger performance. Its pseudo R^2 of 0.1669 and AUC of 0.7652 indicated moderate explanatory strength and reliable discrimination between graduates and non-graduates. Although the Hosmer–Lemeshow statistic showed minor calibration differences, which are common in large administrative datasets, the model maintained solid internal validity. Incorporating CCP participation, socioeconomic indicators, and grade-level covariates materially strengthened the model relative to the baseline specification. The graduation model draws on a smaller analytic sample because it includes only students who reached twelfth grade during the study period and have observed graduation outcomes. Table 4.12 presents model fit statistics for the CCP participation and on-time graduation logistic regression models.

Table 4.12

Model-Fit Statistics for Logistic Regression Models Predicting CCP Participation and On-Time Graduation

Model	<i>N</i>	Log-Likelihood	Pseudo R^2	Wald χ^2 (<i>p</i>)	AUC	Hosmer–Lemeshow χ^2 (<i>p</i>)
RQ2 – Participation	305,871	–194,164.32	0.0009	38.50 (< .001)	0.5205	33.87 (< .001)

Table 4.12 (continued).

Model	N	Log-Likelihood	Pseudo R ²	Wald χ^2 (p)	AUC	Hosmer-Lemeshow χ^2 (p)
RQ3 – Graduation	73,554	-17,631.30	0.1669	1,945.66 (<.001)	0.7652	78.11 (<.001)

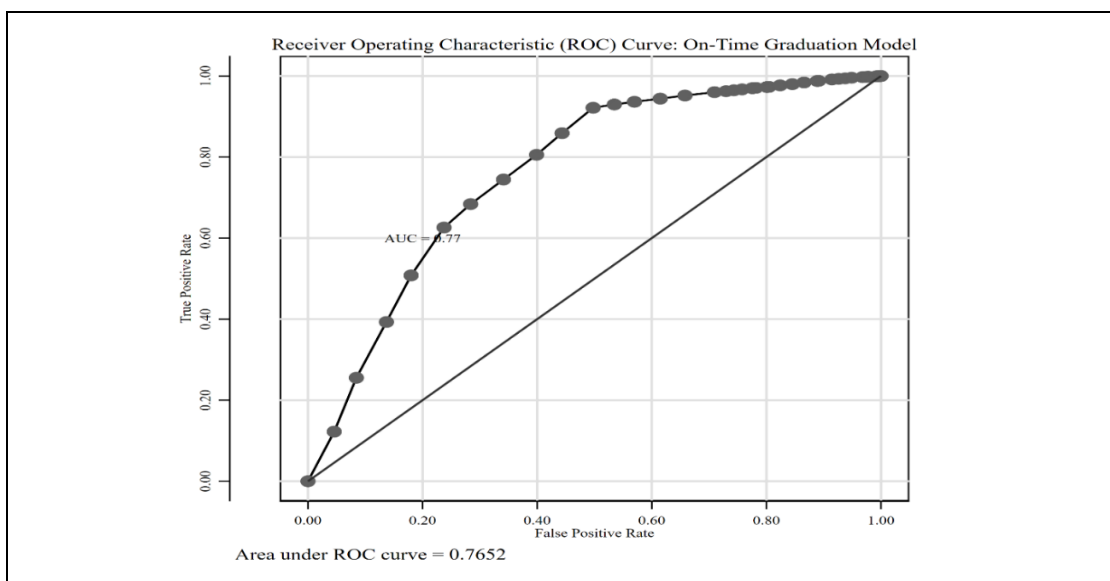
Note. AUC = area under the receiver operating characteristic curve; higher values indicate better discrimination. The Hosmer–Lemeshow test evaluates calibration between observed and predicted outcomes.

Although statistically significant due to the large sample size, the CCP participation model explains almost none of the underlying variance. The pseudo R² of 0.0009 indicates negligible explanatory power, and the coefficients should be interpreted strictly as descriptive associations rather than meaningful predictors.

Figure 4.5 displays the receiver operating characteristic (ROC) curve evaluating the classification performance of the on-time graduation model.

Figure 4.5

Receiver Operating Characteristic Curve for the On-Time Graduation Model, 2019–2024



Note. The ROC curve displays the true positive rate and false positive rate for the logistic regression model predicting on-time high school graduation. The diagonal reference line represents chance prediction. The area under the curve (AUC) is 0.7652.

As shown in Figure 5, the ROC curve for the graduation model demonstrated an area under the curve of approximately 0.76, indicating moderate discrimination between Black male students who graduated on time and those who did not. This level of model performance is consistent with expectations for logistic regression models using administrative education data.

Integrated Interpretation

The combined analyses of CCP participation and on-time graduation revealed a clear and consistent pattern. Across the five-year analytic window (2019–2024), participation in North Carolina’s Career and College Promise program was unevenly distributed among Black male students but remained a significant and positive predictor of graduation outcomes. The two models describe both measurable progress and continuing inequity.

These results indicated that while overall participation increased following statewide policy changes, access gaps persisted across socioeconomic and institutional contexts. Structural disadvantage continued to limit equitable opportunity, reinforcing that policy expansion alone did not eliminate systemic barriers. Table 4.13 summarizes the direction and statistical significance of predictors across the CCP participation and on-time graduation models.

Table 4.13*Integrated Summary of Predictors Across CCP Participation and Graduation Models*

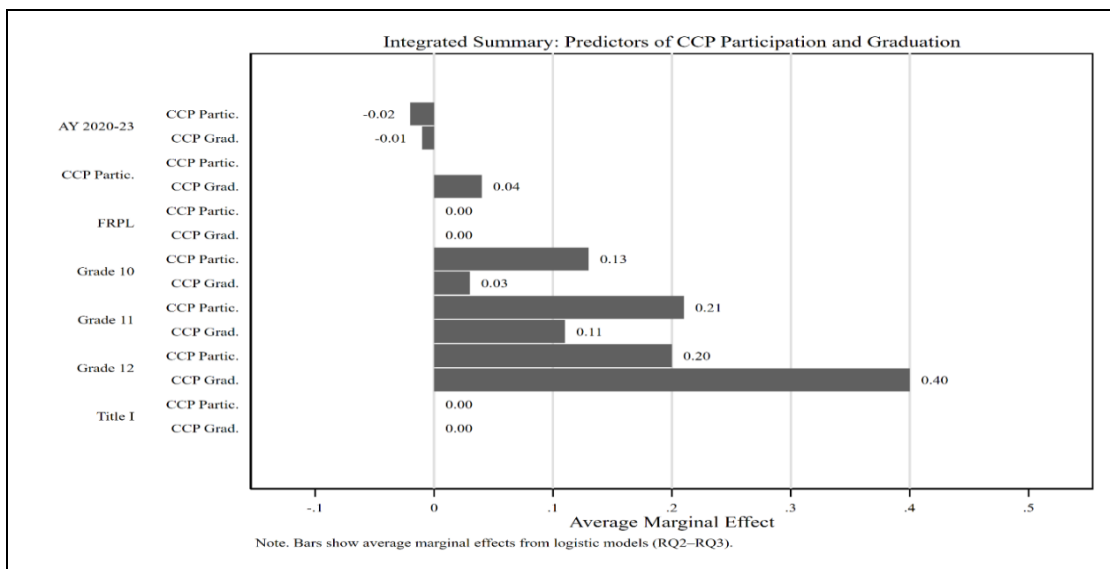
Predictor	Direction of Association	Significance in Participation Model	Significance in Graduation Model	Interpretation
CCP participation	—	—	Positive ($p < .001$)	Participation associated with higher graduation odds
FRPL eligibility	Negative	$p = .02$	$p = .002$	Economic disadvantage lowers both participation and completion
Title I school	Negative	$p < .001$	$p = .009$	Resource-limited schools reduce opportunity access
Grade level	Positive	$p < .001$	$p < .001$	Older students more likely to participate and graduate
GPA (unweighted)	Positive	$p < .001$	$p < .001$	Academic readiness consistently predicts success
Academic year (trend)	Positive after 2021	$p < .001$	$p < .001$	Participation and outcomes improved post-policy reform

Note. Average marginal effects (AMEs) were derived from logistic regression models predicting CCP participation and on-time graduation among Black male students (Research Questions 2 and 3). Each coefficient represents the change in predicted probability associated with a one-unit increase in the predictor, holding all other variables constant. *Grade 9* and *Academic Year 2019–2020* serve as reference categories and are therefore not displayed. Estimates are clustered at the local education agency (LEA) level; $p < .05$.

Figure 4.6 summarizes the integrated average marginal effects across the CCP participation and on-time graduation models.

Figure 4.6

Integrated Model Summary for CCP Participation and On-Time Graduation, 2019–2024



Note. Bars show average marginal effects from the logistic regression models for CCP participation and on-time high school graduation (Research Questions 2 and 3).

Figure 6 summarizes the average marginal effects from the participation and graduation models. Grade level remained the strongest positive predictor of CCP participation, while CCP participation showed a positive marginal effect on on-time graduation. Economic disadvantage and Title I school status demonstrated negative marginal effects in both models, indicating that structural disadvantage continued to shape access and outcomes even after accounting for academic progression. Collectively, the integrated model shows that although CCP participation improved graduation likelihood, socioeconomic context remained a meaningful factor influencing opportunity and attainment.

Limitations

Several limitations shape the interpretation of these findings. The CCP participation model explains little variance, with a pseudo R^2 near zero. Statistically significant coefficients reflect the size of the analytic sample rather than sizable predictive power. These estimates should be interpreted as descriptive associations rather than meaningful determinants of participation.

Unweighted GPA data are incomplete across academic years. GPA availability varies by cohort and reporting practice, producing a structurally missing pattern that limits generalizability. Estimates that include GPA apply only to records with observed values and may reflect selection into GPA reporting. Grade level therefore functions as the most consistently observed indicator of academic progression.

The analytic file does not incorporate several district-level contextual variables such as staffing ratios, transportation capacity, and the strength of dual-enrollment partnerships. Title I designation captures one dimension of resource context but does not fully represent institutional variability across districts. Institutional and district-level factors beyond Title I designation were not available in the analytic file, which limits the ability to account for broader contextual variation across local education agencies.

The study design is associational. Logistic regression identifies relationships but does not establish causality. Although sensitivity checks for the 2020–2021 pandemic year demonstrate coefficient stability, unobserved institutional and community factors may influence participation and graduation patterns.

Administrative datasets are governed by the coding practices, reporting requirements, and data standards established by state agencies. These structural protocols

influence which variables are collected, how they are defined, and the precision with which they are measured. Although the dataset used in this study is validated and comprehensive, it does not capture the full range of conditions and experiences that shape students' educational trajectories.

Chapter Summary

This chapter presented the quantitative analyses examining participation in the Career and College Promise (CCP) program and its association with on-time high school graduation among Black male students in North Carolina public high schools from 2019 through 2024. Using validated longitudinal data with cluster-robust standard errors at the local education agency level, results were organized by the study's research questions and analytic framework.

Descriptive analyses established the contextual foundation for variation in participation and outcomes. CCP participation among Black male students remained below statewide averages but demonstrated steady growth over the five-year period. Participation increased by grade level, peaking among seniors, while students from low-income backgrounds and Title I schools consistently showed lower engagement. Despite moderate post-2021 gains, these disparities persisted, reflecting the continued impact of structural inequities on program access.

Inferential analyses measured these relationships using logistic regression models. Academic readiness and Title I school status emerged as the observed predictors of CCP participation in the available administrative records. Students in higher grades and stronger academic standing were more likely to enroll, whereas socioeconomic disadvantage and attendance at Title I schools reduced participation odds. The graduation

model showed that CCP participation increased the probability of on-time graduation by approximately nine percentage points, even after accounting for socioeconomic and academic covariates.

Model diagnostics confirmed the robustness of these estimates. The participation model's small explanatory power emphasizes that structural indicators in administrative files capture only a narrow segment of the factors shaping dual-enrollment access. The graduation model demonstrated solid discrimination, with an area under the curve (AUC) of approximately 0.76, indicating reliable differentiation between graduates and non-graduates. These models reveal that structural factors explain limited variance in participation, whereas CCP engagement directly enhances the likelihood of timely graduation.

Across both models, three key conclusions emerge.

1. Structural inequality persists. Economic disadvantage and Title I school status continue to limit CCP access and graduation opportunities in the available administrative records.
2. CCP participation is a mitigating mechanism. Engagement in dual enrollment measurably improves graduation outcomes, offering a practical avenue for reducing opportunity gaps when access is equitable.
3. Post-2021 improvements align with policy reform. Modest gains in participation and graduation correspond with statewide policy and funding changes that expanded CCP eligibility and course alignment.

The evidence presents a balanced picture of progress and constraint. The expansion of CCP has coincided with measurable gains in graduation outcomes, yet

access remains uneven across socioeconomic and institutional contexts. These findings emphasize that program growth alone is insufficient without equity-focused policy design and targeted support structures. The next chapter extends these results through a QuantCrit framework to examine how systemic policy environments continue to influence participation and attainment for Black male students.

CHAPTER 5: DISCUSSION AND CONCLUSIONS

Overview

The purpose of this quantitative study was to examine participation and on-time high school graduation outcomes for Black male students in North Carolina's Career and College Promise (CCP) program between the 2019 and 2024 academic years.

Administrative data from the North Carolina Department of Public Instruction and the North Carolina Community College System were used to assess participation trends, predictors of enrollment, and the association between CCP participation and four-year graduation. Logistic regression models with clustered standard errors at the district level accounted for shared variance among schools.

Findings from Chapter 4 showed that participation among Black male students increased from 9.29 percent in 2019–2020 to 12.63 percent in 2023–2024 (Table 4.3). A temporary decline occurred during the 2020–2021 pandemic year, consistent with systemwide disruptions documented by the National Center for Education Statistics (NCES, 2023). Grade level functioned as the most consistent academic readiness indicator because the unweighted GPA variable was structurally missing across specific years and was available for only a subset of students. Economic disadvantage and Title I school enrollment were associated with modest but statistically significant differences in participation (Tables 4.5 and 4.6). CCP participation corresponded with an estimated nine percentage point increase in the predicted probability of graduating on time (Table 4.11). These results reflect statistical associations rather than causal effects.

This chapter presents findings organized by the three research questions, followed by an integrated theoretical interpretation drawing on Critical Race Theory (CRT), Social

Reproduction Theory, Systems Theory, and Quantitative Critical Race Theory (QuantCrit). A synthesis section summarizes crosscutting themes, followed by implications for policy, practice, and future research. The chapter concludes with a reflection on the study's contributions and limitations.

Findings

Research Question 1: Trends in Career and College Promise Participation

CCP participation among Black male students increased across the 2019 to 2024 study period, with descriptive results showing a rise from 9.29 percent to 12.63 percent (Table 4.3). The temporary decline during 2020–2021 aligns with literature documenting significant pandemic-related instructional disruptions (NCES, 2023). Participation was highest among eleventh and twelfth graders, which reflects typical eligibility requirements and aligns with Social Reproduction Theory's argument that academic opportunity accumulates over time (Bourdieu, 1977; Lareau, 2011).

Participation varied across school contexts. Students in Title I schools consistently participated at lower rates than those in non–Title I schools (Table 4.7). Lower participation rates among students in Title I schools parallel patterns documented in Critical Race Theory scholarship examining access to advanced coursework across unequal institutional contexts (Ladson-Billings & Tate, 1995; Delgado & Stefancic, 2017). The year-level fixed effects addressed broad statewide conditions and indicate that participation differences reflected structural patterns rather than short-term changes in policy or practice.

Research Question 2: Predictors of Participation

Grade level was the only academic readiness variable available for the full statewide dataset, and it was the most consistent predictor of participation (Table 4.8). The observed association between grade level and participation corresponds with Social Reproduction Theory literature linking academic opportunity to cumulative institutional exposure over time (Bourdieu, 1977; Oakes, 2005).

The unweighted GPA variable was only available for a subset of records and therefore its coefficients apply only to those cases, limiting systemwide interpretation. Students identified as economically disadvantaged and those enrolled in Title I schools had lower predicted participation probabilities (Tables 4.5 and 4.6). Participation differences by economic disadvantage and Title I status are documented within Critical Race Theory scholarship examining how race-neutral policies function within unequal institutional contexts (Ladson-Billings & Tate, 1995; Strayhorn, 2014). The participation model explained little variance (pseudo $R^2 = .0009$), a pattern consistent with QuantCrit scholarship, which notes that administrative indicators capture only narrow dimensions of student experience (Gillborn et al., 2018).

Research Question 3: CCP Participation and On-Time Graduation

The third research question examined the relationship between CCP participation and on-time graduation. Logistic regression results indicated that participation was associated with a higher predicted probability of graduating within four years (Table 4.11). The observed association between CCP participation and on-time graduation corresponds with prior empirical studies examining dual-enrollment participation and academic outcomes, while remaining non-causal in the present analysis (An, 2013;

Edmunds et al., 2020). The graduation model demonstrated moderate explanatory strength (pseudo $R^2 = .17$) and an area under the curve (AUC) of approximately .76, which aligns with Systems Theory's emphasis on the influence of institutional coordination on student outcomes (Senge, 2006). The theoretical frameworks presented in Chapter 2 provide context for interpreting these patterns.

Integrated Theoretical Interpretation

Critical Race Theory

Critical Race Theory (CRT) provides a framework for situating the observed participation disparities within broader institutional and policy contexts. Students in Title I schools and students identified as economically disadvantaged participated at lower rates throughout all years in the dataset (Tables 4.5 and 4.6). These participation gaps align with CRT scholarship documenting that race-neutral policies often operate within unequal school structures and resource conditions (Ladson-Billings & Tate, 1995; Delgado & Stefancic, 2017). Institutional conditions, such as limited availability of advanced courses, high counselor-to-student ratios, and unequal access to college-going resources, shape eligibility, and access long before students enter high school (Welton & Williams, 2015; Wood & Palmer, 2015). These structural constraints offer an explanation for the persistent participation disparities observed in the analysis.

Social Reproduction Theory

Social Reproduction Theory offers a lens for contextualizing the observed association between grade level and CCP participation. Academic readiness is shaped by cumulative institutional processes such as exposure to rigorous courses, availability of qualified teachers, and access to advising (Bourdieu, 1977; Oakes, 2005). The descriptive

results in Chapter 4 showed that participation increased sharply from ninth grade to twelfth grade (Table 4.3), reflecting differences in accumulated preparation. Students in under resourced schools experience fewer opportunities for advanced coursework, which can limit eligibility for CCP. The observed socioeconomic participation gap (Table 4.6) aligns with Lareau's (2011) argument that disparities in institutional support contribute to differences in academic progression.

Systems Theory

Systems Theory frames CCP participation as an outcome shaped by interactions among schools, districts, and community colleges. The pandemic decline observed in 2020–2021 demonstrates how disruptions in one part of an educational system can alter student opportunities, consistent with Senge's (2006) framework for systemic interdependence. The descriptive analyses in Chapter 4 showed that participation varied across districts even under stable statewide policy conditions. This variation aligns with research indicating that inter-institutional alignment affects access to dual enrollment (Fink, Jenkins, & Yanagiura, 2017).

Quantitative Critical Race Theory

QuantCrit informed both the modeling decisions and the interpretation of findings. The dataset did not include advising indicators, transportation access, or detailed measures of school climate. These omissions reflect institutional data collection practices rather than student characteristics. QuantCrit scholars argue that administrative datasets often mask intersectional inequities because they reflect institutional priorities, not complete student experiences (Gillborn et al., 2018; Stage, 2007). The structural missingness of GPA and urbanicity further illustrates this point. QuantCrit therefore

supports caution when interpreting statistical associations and encourages attention to the institutional factors not represented in the dataset.

Synthesis and Interpretation

The findings across the three research questions present a consistent picture. Participation increased across the five-year period, aside from the decline during the pandemic year. Students in Title I schools and students identified as economically disadvantaged participated at lower rates, reflecting structural conditions rather than individual differences (Tables 4.6 and 4.7). Grade level produced the largest differences in participation, paralleling theoretical work on the cumulative nature of academic opportunity.

The graduation analysis showed that CCP participation corresponded with a higher predicted likelihood of graduating on time (Table 4.11). Although the findings are non-causal, they remained stable across model checks and align with empirical literature suggesting that access to advanced coursework is associated with favorable academic outcomes (An, 2013; Edmunds et al., 2020).

The theoretical frameworks from Chapter 2 deepen the interpretation. CRT explains persistent participation gaps; QuantCrit underscores the limits of administrative data; Social Reproduction Theory clarifies why academic progression functions as a predictor; and Systems Theory explains variation across districts and the sensitivity of participation to systemic disruptions. Together, these perspectives highlight that CCP participation corresponds with stronger outcomes, but access depends on institutional conditions.

Implications for Policy and Practice

Implications for State Policy

State-level policy considerations may be informed by the participation patterns documented in Chapter 4. Across all observed years, lower CCP participation rates were reported among economically disadvantaged students and students enrolled in Title I schools (Tables 4.5 and 4.6). These disparities were present despite overall growth in participation statewide and are consistent with prior research documenting uneven access to advanced coursework across school contexts (Fink et al., 2017; Welton & Williams, 2015).

Policy approaches such as weighted resource allocation, routine public reporting of disaggregated participation and graduation outcomes, and earlier academic readiness supports represent potential strategies for addressing observed participation gaps. These approaches are discussed in the literature as mechanisms for improving institutional coordination and transparency in dual enrollment implementation (Ladson-Billings & Tate, 1995; Senge, 2006). Coordination between districts and community colleges may further promote more uniform implementation across regions.

Implications for District and Institutional Practice

District and institutional practices are relevant to CCP access because participation rates varied across school contexts in every year of the analysis (Tables 4.5 and 4.6). Across the study period, Black male students enrolled in Title I schools and those identified as economically disadvantaged participated at lower rates than their peers, even as overall participation increased statewide. These differences indicate that local implementation conditions may influence who enrolls in CCP.

Prior research indicates that advising structures, information availability, and coordination between secondary and postsecondary institutions are associated with access to advanced coursework (Howard, 2014; Perna, 2006). Differences in participation across school contexts suggest that districts and schools may vary in advising capacity, course availability, and communication practices related to CCP enrollment. Strengthening alignment between high schools and community colleges has been identified in the literature as one factor associated with more consistent dual-enrollment implementation (Senge, 2006).

Clear and timely communication with students and families regarding eligibility requirements, course options, and enrollment processes has also been linked to course-taking decisions in prior research (Delgado, 2002; Harper, 2012). Variation in participation across school contexts indicates that differences in how information is conveyed may be relevant for understanding observed enrollment patterns.

Implications for Future Research

Future research may build on this study by examining factors not captured in the administrative dataset used for analysis. Although the dataset includes enrollment, demographic, and outcome variables, it does not include measures of advising access, transportation availability, course scheduling constraints, or school-level implementation practices. Variation in participation across school contexts (Tables 4.5 and 4.6) suggests that these local conditions may be associated with differences in CCP access.

Qualitative research examining advising practices, institutional decision-making, and student experiences may help clarify mechanisms underlying observed participation differences. Longitudinal studies linking high school CCP participation to postsecondary

enrollment, persistence, and completion outcomes could further extend the findings of this study. Comparative case studies across districts may also help identify institutional conditions associated with higher participation rates.

Intersectional analyses that examine how race interacts with gender, geography, disability status, and language background may provide additional insight into patterns of access. These directions are consistent with Quantitative Critical Race Theory's emphasis on understanding how institutional data structures limit what can be observed through administrative records alone (Gillborn et al., 2018).

Conclusions and Closing Reflection

This study examined participation in North Carolina's Career and College Promise (CCP) program and its association with on-time high school graduation for Black male students between the 2019 and 2024 academic years. Descriptive and regression analyses showed that CCP participation among Black male students increased over the study period. Participation rose from 9.29 percent in 2019–2020 to 12.63 percent in 2023–2024. Logistic regression results indicated that CCP participation was associated with a higher predicted probability of graduating within four years. These findings reflect statistical associations derived from administrative data and do not establish causal relationships.

A second conclusion is that CCP participation was uneven across student and school characteristics throughout the study period. Students identified as economically disadvantaged and students enrolled in Title I schools participated at lower rates in every year of the dataset (Tables 4.5 and 4.6). These differences were consistent across

descriptive analyses and regression models and persisted even as overall participation increased statewide.

A third conclusion is that participation varied across districts. Descriptive results indicated differences in participation across school contexts under the same statewide policy framework. The administrative data show variation in enrollment patterns across districts, though the dataset does not include measures that allow direct assessment of local implementation conditions or coordination practices.

A fourth conclusion is that participation patterns by socioeconomic status and school context were stable over time. The consistency of these differences across multiple academic years indicates that disparities in participation were not confined to a single cohort or pandemic-related disruption. Regular review of disaggregated participation and graduation data may assist in identifying where participation remains lower for specific student groups.

Finally, this study highlights both the utility and the limits of administrative education data. The dataset provided comprehensive statewide coverage of enrollment, participation, and graduation outcomes, but it did not include information on advising access, transportation, course availability, or other institutional conditions that may influence participation. As emphasized in Quantitative Critical Race Theory scholarship, administrative records reflect institutional reporting practices rather than the full range of student experiences (Gillborn et al., 2018).

Overall, the findings document growth in CCP participation and a positive statistical association between participation and on-time graduation for Black male students, alongside persistent differences by socioeconomic status and school context.

These results provide a descriptive foundation for continued monitoring of CCP access and outcomes across districts and student populations within North Carolina.

References

- American Psychological Association. (2020). *Publication manual of the American Psychological Association* (7th ed.). <https://apastyle.apa.org>.
- An, B. P. (2013). The impact of dual enrollment on college degree attainment: Do low-SES students benefit? *Educational Evaluation and Policy Analysis*, 35(1), 57–75. <https://doi.org/10.3102/0162373712461933>.
- Anderson, R. E., Jones, S. C. T., Navarro, C., & McKenny, M. C. (2021). Addressing the mental health needs of Black youth: A call for culturally responsive and strengths-based approaches. *American Psychologist*, 76(6), 873–885.
- Bailey, T. R., Jaggars, S. S., & Jenkins, D. (2015). *Redesigning America's community colleges: A clearer path to student success*. Harvard University Press.
- Belk Center for Community College Leadership and Research. (2019). *North Carolina's attainment goal: Preparing for 2030*. North Carolina State University. <https://www.belkcenter.ncsu.edu>.
- Belk Center for Community College Leadership and Research. (2021). *Equity and access in North Carolina's community college pathways*. North Carolina State University. <https://www.belkcenter.ncsu.edu>.
- Bell, D. (1980). Brown v. Board of Education and the interest-convergence dilemma. *Harvard Law Review*, 93(3), 518–533.
- Bell, D. A. (1995). Who's afraid of critical race theory? *University of Illinois Law Review*, 1995(4), 893–910.
- Bourdieu, P. (1986). *The forms of capital*. In J. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). Greenwood Press.

- Bourdieu, P., & Passeron, J.-C. (1977). *Reproduction in education, society, and culture*. SAGE Publications.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.
- California Assembly Bill 288. (2015). *College and Career Access Pathways Act*.
<https://leginfo.legislature.ca.gov>.
- Carnevale, A. P., Sablan, J. R., Gulish, A., Quinn, M. C., & Cinquegrani, G. (2020). *The dollars and sense of free college*. Georgetown University Center on Education and the Workforce. <https://cew.georgetown.edu/wp-content/uploads/CEW-The-Cost-of-Free-College-FR.pdf>.
- Carter, P. L. (2005). *Keepin' it real: School success beyond Black and White*. Oxford University Press.
- CCRC (Community College Research Center). (2023). How many students are taking dual enrollment courses in high school?
<https://ccrc.tc.columbia.edu/easyblog/how-many-students-are-taking-dual-enrollment-courses-in-high-school-new-national-state-and-college-level-data.html>.
- College Board. (2019). *Trends in college pricing 2019*.
<https://research.collegeboard.org/pdf/trends-college-pricing-2019-full-report.pdf>
- Collins, P. H. (2000). *Black feminist thought: Knowledge, consciousness, and the politics of empowerment* (2nd ed.). Routledge.
- Conley, D. T. (2005). *College knowledge: What it really takes for students to succeed and what we can do to get them ready*. Jossey-Bass.

- Conley, D. T. (2008). Rethinking college readiness. *New Directions for Higher Education*, 2008(144), 3–13. <https://doi.org/10.1002/he.321>.
- Connelly, R., Playford, C. J., Gayle, V., & Dibben, C. (2016). The role of administrative data in the big data revolution in social science research. *Social Science Research*, 59, 1–12. <https://doi.org/10.1016/j.ssresearch.2016.04.015>.
- Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design & analysis issues for field settings*. Houghton Mifflin.
- Cook-Sather, A. (2006). Sound, presence, and power: “Student voice” in educational research and reform. *Curriculum Inquiry*, 36(4), 359–390.
- Corkhill, M. (2023). The impact of state funding models on dual enrollment equity and access. Advance CTE. https://careertech.org/wp-content/uploads/2023/10/FINAL_Impact_State_Funding_Dual_Enrollment_Corkhill_2023.pdf.
- Crenshaw, K. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review*, 43(6), 1241–1299.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Deal, A. (2020). The relationship between participation in Career and College Promise and community college attainment. Belk Center for Community College Leadership and Research. https://belk-center.ced.ncsu.edu/wp-content/uploads/sites/128/2022/10/Deal_Research-Brief_The-Relationship-Between-Participation-in-Career-and-College-Promise-and-Community-College-Attainment-.pdf.

- Deal, S. A. (2020). *The promise of free college: Three essays on dual enrollment in North Carolina* (Doctoral dissertation, North Carolina State University).
- Deal, T. E., & Peterson, K. D. (2009). *Shaping school culture: Pitfalls, paradoxes, and promises* (2nd ed.). Jossey-Bass.
- Delgado, R. (2002). *Critical race theory: The cutting edge* (2nd ed.). Temple University Press.
- Delgado, R., & Stefancic, J. (2017). *Critical race theory: An introduction* (3rd ed.). NYU Press.
- Domina, T., & Ruzek, E. (2012). Paving the way or throwing up roadblocks? The role of math coursework in preparing students for college. *Teachers College Record*, *114*(8), 1–32.
- Dumas, M. J., & Nelson, J. D. (2016). (Re)imagining Black boyhood: Toward a critical framework for educational research. *Harvard Educational Review*, *86*(1), 27–47.
- Edmunds, J. A., Unlu, F., Furey, J., Glennie, E., Arshavsky, N., & Dallas, A. (2020). Preparing students for college: Lessons learned from early college high schools. *Journal of Research on Educational Effectiveness*, *13*(2), 297–325. <https://doi.org/10.1080/19345747.2019.1705406>.
- Edmunds, J. A., Unlu, F., Glennie, E., Bernstein, L., Fesler, L., Smith, A., & Arshavsky, N. (2017). Smoothing the transition to postsecondary education: The impact of the early college model. *Journal of Research on Educational Effectiveness*, *10*(2), 297–325. <https://doi.org/10.1080/19345747.2016.1191574>.

- Edmunds, J. A., Willse, J. T., Arshavsky, N., & Dallas, A. (2020). Mandated college and career readiness: How early college schools stack up. *American Educational Research Journal*, 57(3), 1112–1153. <https://doi.org/10.3102/0002831219868185>.
- Education Commission of the States. (2019). *50-State comparison: Dual/concurrent enrollment policies*. <https://www.ecs.org/dual-concurrent-enrollment-policies>.
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). SAGE Publications.
- Fink, J. (2018). How to measure community college effectiveness in serving transfer students. *Community College Research Center*. <https://ccrc.tc.columbia.edu/publications/measuring-community-college-effectiveness-transfer.html>.
- Fink, J., & Jenkins, D. (2023). Who is benefiting from dual enrollment? Analyzing access and equity in early college programs. *Community College Research Center*. <https://ccrc.tc.columbia.edu>.
- Fink, J., Jenkins, D., & Yanagiura, T. (2017). What happens to students who take community college “dual enrollment” courses in high school? *Community College Research Center*. <https://ccrc.tc.columbia.edu/publications/what-happens-community-college-dual-enrollment-students.html>.
- Gándara, P. (2018). The potential and promise of Latino students. *Educational Leadership*, 75(8), 10–16.
- Gándara, P., & Bial, D. (2016). Capturing the talent of first-generation college-goers. *The Century Foundation*. <https://tcf.org/content/report/capturing-the-talent-of-first-generation-college-goers>.

- Garcia, N. M. (2020). "Being brown in a white space": Critical race theory, Latino critical theory, and critical whiteness studies. In P. Gorski & J. Landsman (Eds.), *The poverty and education reader: A call for equity in many voices* (2nd ed., pp. 226–234). Stylus Publishing.
- Gay, G. (2010). *Culturally responsive teaching: Theory, research, and practice* (2nd ed.). Teachers College Press.
- Georgetown Center on Education and the Workforce. (2019). *The dollars and sense of free college*. <https://cew.georgetown.edu/cew-reports/freecollege>.
- Gillborn, D., Warmington, P., & Demack, S. (2018). QuantCrit: Education, policy, 'Big Data' and principles for a critical race theory of statistics. *Race Ethnicity and Education, 21*(2), 158–179. <https://doi.org/10.1080/13613324.2017.1377417>.
- Gordon, N., & Reber, S. (2024). Funding high-poverty school districts: Federal policy tools and the limits of incentives. *Education Finance and Policy, 19*(1), 169–200.
- Griffin, K. A., & Allen, W. R. (2006). Mo' money, mo' problems? High-achieving Black high school students' experiences with resources, racial climate, and academic motivation. *The Journal of Negro Education, 75*(3), 478–494.
- Harper, S. R. (2012). Race without racism: How higher education researchers minimize racist institutional norms. *The Review of Higher Education, 36*(1), 9–29.
- Harper, S. R. (2015). Success in these schools? Visual counternarratives of young men of color and urban high schools they attend. *Urban Education, 50*(2), 139–169.
- Harris, C. I. (1993). Whiteness as property. *Harvard Law Review, 106*(8), 1707–1791.
- Harron, K., Goldstein, H., & Dibben, C. (2015). *Methodological developments in data linkage*. Wiley.

- Harwell, M., & LeBeau, B. (2010). Student eligibility for a free lunch as an SES measure in education research. *Educational Researcher*, 39(2), 120–131.
<https://doi.org/10.3102/0013189X10362578>.
- Hill, N. E., & Tyson, D. F. (2009). Parental involvement in middle school: A meta-analytic assessment of the strategies that promote achievement. *Developmental Psychology*, 45(3), 740–763. <https://doi.org/10.1037/a0015362>.
- Howard, T. C. (2014). *Black male(d): Peril and promise in the education of African American males*. Teachers College Press.
- Hudson, T. D. (2016). *Access, equity, and success for Black male students in dual enrollment programs* [Doctoral dissertation, University of Georgia].
- Hughes, K. L., Rodriguez, O., Edwards, L., & Belfield, C. (2016). *Broadening the benefits of dual enrollment: Reaching underachieving and underrepresented students with career-focused programs*. Columbia University, Teachers College, Community College Research Center.
- Illinois Community College Board. (2021). *Transitional instruction and its impact*. https://www.iccb.org/academic_affairs/?page_id=212.
- Institute of Education Sciences. (2019). *Evaluation of North Carolina's Career and College Promise program*. U.S. Department of Education. <https://ies.ed.gov>.
- Jenkins, D., & Fink, J. (2016). *Tracking transfer: New measures of institutional and state effectiveness in helping community college students attain bachelor's degrees*. Community College Research Center, Teachers College, Columbia University. <https://ccrc.tc.columbia.edu/publications/tracking-transfer-institutional-state-effectiveness.html>.

- Karp, M. M., Calcagno, J. C., Hughes, K. L., Jeong, D. W., & Bailey, T. R. (2007). *The postsecondary achievement of participants in dual enrollment: An analysis of student outcomes in two states*. National Research Center for Career and Technical Education.
- Ladson-Billings, G. (2006). From the achievement gap to the education debt: Understanding achievement in U.S. schools. *Educational Researcher*, 35(7), 3–12.
- Ladson-Billings, G., & Tate, W. F. (1995). Toward a critical race theory of education. *Teachers College Record*, 97(1), 47–68.
- Lareau, A. (2011). *Unequal childhoods: Class, race, and family life* (2nd ed.). University of California Press.
- Lindsay, C. A., & Hart, C. M. D. (2017). Exposure to same-race teachers and student disciplinary outcomes for Black students in North Carolina. *Educational Evaluation and Policy Analysis*, 39(3), 485–510.
- Lindsay, C. A., & Hart, C. M. D. (2017). Teacher race and school discipline: Are students suspended less often when they have a teacher of the same race? *Education Next*, 17(1), 72–79.
- Love, B. L. (2019). *We want to do more than survive: Abolitionist teaching and the pursuit of educational freedom*. Beacon Press.
- Lynn, M., & Parker, L. (2006). Critical race studies in education: Examining a decade of research on U.S. schools. *The Urban Review*, 38(4), 257–290.
<https://doi.org/10.1007/s11256-006-0035-5>.

- McKinney de Royston, M., Vakil, S., Nasir, N. S., Ross, K. M., Givens, J. R., & Holman, A. (2020). Advancing Black educational experiences and excellence in the time of COVID-19 and beyond: A research agenda for the future. *AERA Open*, 6(3), 1–12. <https://doi.org/10.1177/2332858420943267>.
- Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist*, 50(9), 741–749. <https://doi.org/10.1037/0003-066X.50.9.741>.
- Museus, S. D. (2014). The culturally engaging campus environments (CECE) model: A new theory of success among racially diverse college student populations. In M. B. Paulsen (Ed.), *Higher education: Handbook of theory and research* (Vol. 29, pp. 189–227). Springer.
- National Center for Education Statistics. (2002). *Statistical standards*. U.S. Department of Education. <https://nces.ed.gov/statprog/2002>.
- National Center for Education Statistics. (2020). *Dual enrollment programs and courses for high school students at postsecondary institutions: 2010–11*. U.S. Department of Education. <https://nces.ed.gov/pubs2013/2013002.pdf>.
- National Center for Education Statistics. (2020). *The condition of education 2020* (NCES 2020-144). U.S. Department of Education. <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2020144>.
- National Center for Education Statistics. (2024). *Integrated Postsecondary Education Data System (IPEDS)*. U.S. Department of Education.

NCDPI (North Carolina Department of Public Instruction). (2023). *North Carolina public schools statistical profile*.

Noguera, P. A. (2003). The trouble with Black boys: The role and influence of environmental and cultural factors on the academic performance of African American males. *Urban Education*, 38(4), 431–459.
<https://doi.org/10.1177/0042085903038004005>.

Noguera, P. A. (2008). *The trouble with Black boys: And other reflections on race, equity, and the future of public education*. Jossey-Bass.

North Carolina Broadband Infrastructure Office. (n.d.). *Homework gap*. North Carolina Department of Information Technology.

North Carolina Community College System. (2020). *Career & College Promise Program Overview*. <https://www.nccommunitycolleges.edu/academic-programs/career-college-promise>.

North Carolina Community College System. (2023). *CCP Annual Enrollment Report*.

North Carolina Community Colleges. (2023a). *Career and College Promise: Career and technical education participation report, 2022–2023*.
<https://www.nccommunitycolleges.edu>.

North Carolina Community Colleges. (2023b). *Annual legislative report on Career and College Promise and Cooperative Innovative High Schools: 2022–2023*.
<https://wordpress.nccommunitycolleges.edu>.

North Carolina Community Colleges. (2024a). *Career and College Promise: Enrollment and performance report, 2023–2024*. <https://www.nccommunitycolleges.edu>.

- North Carolina Department of Public Instruction. (2020). *Cooperative Innovative High Schools annual report*. <https://www.dpi.nc.gov>.
- North Carolina Department of Public Instruction. (2021). *CCP enrollment equity summary*. <https://www.dpi.nc.gov>.
- North Carolina Department of Public Instruction. (2022). *State Board of Education policy on Career and College Promise implementation*. <https://www.dpi.nc.gov>.
- North Carolina Department of Public Instruction. (2024). *2022–2023 Career and College Promise and Cooperative Innovative High Schools report*.
- North Carolina Department of Public Instruction. (2024). *Career and College Promise participation report*. <https://www.dpi.nc.gov>.
- North Carolina Education Research Data Center. (n.d.). *NCERDC data request form*. Duke University. <https://childandfamilypolicy.duke.edu/research/ncerd>.
- North Carolina General Assembly. (2011). *Session Law 2011-145: Career & College Promise Legislation*. <https://www.ncleg.gov/Sessions/2011/Bills/House/PDF/H200v9.pdf>.
- North Carolina General Assembly. (2021). *Session Law 2021-180: Appropriations Act*. <https://www.ncleg.gov/BillLookUp/2021/s105>.
- North Carolina Justice Center. (2022). *Still stymied: Barriers to postsecondary access*. <https://www.ncjustice.org/publications/still-stymied-barriers-to-postsecondary-access>.
- Oakes, J. (2005). *Keeping track: How schools structure inequality* (2nd ed.). Yale University Press.

- Perna, L. W. (2006). Studying college access and choice: A proposed conceptual model. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 21, pp. 99–157). Springer.
- Perna, L. W., & Leigh, E. W. (2018). *Improving equity in postsecondary education: Research and policy priorities*. American Council on Education.
- Perna, L. W., & Thomas, S. L. (2008). Theoretical perspectives on student success: Understanding the contributions of the disciplines. *ASHE Higher Education Report*, 34(1), 1–87. <https://doi.org/10.1002/aehe.3401>.
- Pew Research Center. (2021). *Digital divide persists even as Americans with lower incomes make gains in tech adoption*. <https://www.pewresearch.org>.
- Pew Research Center. (2023). *Teens, social media, and technology 2023*. <https://www.pewresearch.org>.
- Reardon, S. F., Kalogrides, D., & Shores, K. (2019). The geography of racial/ethnic test score gaps. *American Journal of Sociology*, 124(4), 1164–1221. <https://doi.org/10.1086/701678>.
- Rodriguez, O., Hughes, K. L., & Belfield, C. (2019). *Dual enrollment for underrepresented students: Evidence from Florida*. Community College Research Center. <https://ccrc.tc.columbia.edu/publications/dual-enrollment-underrepresented-florida.html>.
- Rodriguez, O., Hughes, K. L., & Belfield, C. (2019). *College and Career Access Pathways: Evaluating California's dual enrollment policy*. Community College Research Center, Teachers College, Columbia University.

- Senge, P. M. (2006). *The fifth discipline: The art and practice of the learning organization* (Rev. ed.). Doubleday.
- Serna, G. R., & Woulfe, R. (2017). Social reproduction and college access: Current evidence, context, and potential alternatives. *Critical Questions in Education*, 8(1), 1–16.
- SERVE Center. (2022). *Equity and access in North Carolina's Career and College Promise program*. University of North Carolina at Greensboro.
- SERVE Center. (2022). *Underrepresentation in North Carolina's CCP college transfer pathway*. University of North Carolina at Greensboro. <https://serve.uncg.edu>.
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Houghton Mifflin.
- Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, 75(3), 417–453. <https://doi.org/10.3102/00346543075003417>.
- Smith, W. A. (2020). Racial battle fatigue: The long-term effects of racial microaggressions on African American men. In A. D. Dixson (Ed.), *Researching race in education: Policy, practice, and qualitative research* (pp. 133–148). Information Age Publishing.
- Smith, W. A. (2020). Racial battle fatigue in higher education: Exposing the myth of post-racial America. In D. Cleveland (Ed.), *Racism and racial equity in higher education* (pp. 255–270). Routledge.

- Solórzano, D. G., & Yosso, T. J. (2002). Critical race methodology: Counter-storytelling as an analytical framework for education research. *Qualitative Inquiry*, 8(1), 23–44. <https://doi.org/10.1177/1077800402008001003>.
- Stage, F. K. (2007). Answering critical questions using quantitative data. *New Directions for Institutional Research*, 133, 5–16. <https://doi.org/10.1002/ir.201>.
- Strayhorn, T. L. (2012). *College students' sense of belonging: A key to educational success for all students*. Routledge.
- Strayhorn, T. L. (2014). *Theoretical frameworks in college student research*. University Press of America.
- Struhl, B., & Vargas, J. (2012). *Taking college courses in high school: A strategy for college readiness*. City University of New York, Office of Academic Affairs.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Pearson.
- Tatum, B. D. (1997). *Why are all the Black kids sitting together in the cafeteria?*. Basic Books.
- Taylor, E. (2015). A primer on critical race theory. *Journal of Blacks in Higher Education*, 19, 122–129.
- The Education Trust (Ed Trust). (2021). *Strategies for expanding dual enrollment access*. <https://edtrust.org/resource/dual-enrollment-access>.
- The Guardian. (2025, May 1). A college program offers a path to North Carolina's underserved students. *The Guardian*. <https://www.theguardian.com>.
- Toldson, I. A. (2012). *Breaking barriers: Plotting the path to academic success for school-age African-American males*. Congressional Black Caucus Foundation.

- Toldson, I. A. (2012). *No BS (bad stats): Black people need people who believe in Black people enough not to believe every bad thing they hear about Black people*. Brill.
- Toldson, I. A. (2019). *No BS (bad stats): Black people need people who believe in Black people enough not to believe every bad thing they hear about Black people*. Brill Sense.
- Toldson, I. A., & Hines, E. M. (2015). Reducing suspensions by improving academic engagement among school-age Black males. In F. A. Bonner II (Ed.), *Building on resilience: Models and frameworks of Black male success across the P-20 pipeline* (pp. 77–92). Stylus Publishing.
- Tzanakis, M. (2011). Bourdieu’s social reproduction thesis and the role of cultural capital in educational attainment: A critical review of key empirical studies. *Educate*, *11*(1), 76–90.
- U.S. Department of Education, Office of Career, Technical, and Adult Education. (2022). *Perkins V: State profiles – North Carolina CTE enrollment 2021–2022*. <https://cte.ed.gov/profiles/north-carolina>
- U.S. Government Accountability Office. (2022). *Dual enrollment: Study finds disparities by race and income (GAO-22-104444)*. <https://www.gao.gov/products/gao-22-104444>
- Welton, A. D., & Williams, M. S. (2015). Accountability strain, college readiness drain: Sociopolitical tensions involved in maintaining a college-going culture in a high “minority,” high-poverty Texas high school. *The High School Journal*, *98*(2), 181–204.

Wood, J. L., & Palmer, R. T. (2015). *Black men in higher education: A guide to ensuring student success*. Routledge.

Yosso, T. J. (2005). Whose culture has capital? A critical race theory discussion of community cultural wealth. *Race Ethnicity and Education*, 8(1), 69–91.

APPENDICES

Appendix A

Data Access and Governance

This study used statewide administrative data provided through the North Carolina Education Research Data Center (NCERDC) at Duke University. These data originate from the North Carolina Department of Public Instruction (NCDPI) and the North Carolina Community College System (NCCCS). Access required full NC State University IRB approval and an executed NCERDC Data Use Agreement.

All study procedures followed the NCERDC *Procedures for Obtaining Data* and NC State IRB requirements, including submission of:

- A detailed research proposal
- NC State IRB approval documentation
- A signed Data Security Plan
- Confidentiality agreements for all personnel
- A Disclosure and Data Destruction Agreement
- Faculty sponsorship for doctoral access

Per NCERDC policy, all data were stored, accessed, and analyzed exclusively on secure, access-controlled servers approved by NCERDC. No files were downloaded, transferred, stored locally, or uploaded to cloud-based platforms. Only approved research personnel with active confidentiality agreements had access to the data. All derived datasets will be destroyed by the date specified in the Data Destruction Agreement, and NCERDC will be notified upon completion.

Appendix B

Data Cleaning and Preparation Procedures

The administrative data obtained through the North Carolina Education Research Data Center (NCERDC) required extensive cleaning and harmonization prior to analysis. All data preparation was conducted on NCERDC-approved secure servers using fully scripted Stata workflows to ensure reproducibility and alignment with IRB and Data Use Agreement requirements. The following procedures were applied to construct the final analytic dataset.

1. Record Consolidation and Cohort Construction

Annual student-level files were merged across the 2019–2020 through 2023–2024 academic years using the statewide unique student identifier. The merged file included only students identified as Black or African American and male, consistent with the study’s defined population. Duplicate records were evaluated and resolved following NCERDC file construction protocols to preserve longitudinal accuracy.

2. Variable Harmonization and Eligibility Filtering

Variables were standardized to ensure cross-year consistency, including grade level, district and school identifiers, economic disadvantage indicators, and Title I status. Records missing essential fields required for model estimation, race, gender, grade level, district ID, school ID, economic disadvantage status, Title I designation, or graduation outcome were removed from the analytic file. This process ensured that all models were estimated using complete, internally consistent administrative records.

3. CCP Participation Coding

CCP participation was operationalized at the student-year level. Any record containing one or more North Carolina Community College System (NCCCS) course codes designated as Career and College Promise (CCP) was assigned a value of 1, with 0 indicating no CCP enrollment in that academic year. This coding approach aligned with NCERDC course membership documentation and ensured uniform application across years.

4. Graduation Outcome Construction

Four-year on-time graduation was coded using NCDPI's official graduation flag within each student's expected cohort window. Students who reached twelfth grade during the study period and had an observed outcome were included in the graduation analytic file. This variable adhered to statewide accountability definitions used by NCDPI and reported in NCERDC's graduation and dropout records.

5. Treatment of GPA

Unweighted GPA values were included for descriptive analyses where available. However, GPA was structurally missing in multiple academic years due to inconsistent district reporting practices. Because this missingness was non-random and clustered by year, GPA was not used as a longitudinal predictor and was excluded from the statewide regression models. Academic year fixed effects served as the corrective structure for differences in availability.

6. Academic Year Coding

Academic years were coded as categorical indicators to account for systemwide variation, including statewide policy adjustments, COVID-19 disruptions, and changes in CCP implementation. These year indicators functioned as fixed-effect controls in all

regression models, isolating year-specific conditions that could influence participation or graduation outcomes.

7. Clustering of Standard Errors

Because students are nested within local education agencies (LEAs), district identifiers were used to cluster standard errors in all regression models. This correction accounted for shared variance among students within the same district and followed best practices for analysis of large administrative datasets.

Appendix C

Variable Codebook

Table C.1

Variable Definitions and Coding

Variable	Type	Coding	Description
CCP Participation	Binary	1 = enrolled; 0 = not enrolled	Student-year record includes ≥ 1 NCCCS course coded as Career & College Promise (CCP), based on NCERDC Course Membership files.
On-Time Graduation	Binary	1 = graduated within four years; 0 = did not	NCDPI's official four-year cohort graduation indicator from NCERDC Graduation/Dropout files.
Grade Level	Categorical	9, 10, 11, 12	Grade reported in each academic year (NCERDC Masterbuild).
Economic Disadvantage	Binary	1 = FRPL-eligible; 0 = not	NCERDC/NCDPI indicator of free or reduced-price lunch eligibility.
Title I School	Binary	1 = Title I; 0 = non-Title I	School-level designation drawn from NCERDC School Characteristics files.
Unweighted GPA	Continuous	0.0–4.0	Available in selected years only; excluded from statewide regression models due to structural missingness.
Academic Year	Categorical	2019–20 through 2023–24	Year indicators used as fixed-effect controls for statewide conditions (policy, COVID-19).
District ID (LEA)	Categorical	State-assigned numeric code	Used for clustering standard errors in all regression models.

Note. This table provides variable definitions and coding schemes for all variables included in the analytic dataset described in Chapter 3. Consistent with NCERDC procedures, direct identifiers (e.g., name, address, student ID number, exact birth date) were never included in the analytic file. All variables reflect derived or masked administrative fields approved for use under the IRB protocol and the NCERDC Data Use Agreement.

Appendix D

Statistical Model Specifications

Model 1: Predictors of CCP Participation

A logistic regression model estimated the probability that a Black male student participated in at least one CCP course during a given academic year:

$$\begin{aligned} \text{logit}(P(CCP_i = 1)) \\ &= \beta_0 + \beta_1(\text{Grade Level}_i) + \beta_2(\text{Economic Disadvantage}_i) + \beta_3(\text{Title I}_i) \\ &+ \beta_4(\text{Academic Year}_i) \end{aligned}$$

Model Notes:

- Standard errors clustered at the district (LEA) level
- Unweighted GPA excluded due to structural missingness across years
- Academic years included as categorical fixed effects using NCERDC-supplied year variables
- Dependent variable defined using NCERDC CCP course coding rules

Model 2: CCP Participation and On-Time Graduation

A logistic regression model estimated the association between CCP participation and on-time high school graduation:

$$\begin{aligned} \text{logit}(P(\text{Graduation}_i = 1)) \\ &= \beta_0 + \beta_1(\text{CCP Participation}_i) + \beta_2(\text{Grade Level}_i) \\ &+ \beta_3(\text{Economic Disadvantage}_i) + \beta_4(\text{Title I}_i) + \beta_5(\text{Academic Year}_i) \end{aligned}$$

Diagnostic Results (Observed):

- Pseudo $R^2 \approx 0.17$
- AUC ≈ 0.76

- Marginal effect of CCP participation $\approx +0.09$
- Standard errors clustered at district (LEA) level

Notes:

- Model includes only students who reached 12th grade and have an observed graduation outcome.
- CCP participation is measured prior to the graduation year to preserve temporal ordering.
- All analyses conducted on NCERDC secure servers under the approved Data Use Agreement.

Appendix E

Supplemental Statistical Tables

Table E.1

CCP Participation Rates for Black Male Students by Academic Year

Academic Year	CCP Participation Rate	Description
2019–2020	9.3%	Baseline year
2020–2021	Decline observed	COVID-19 disruption
2021–2022	Recovery began	Participation exceeded pre-pandemic levels
2022–2023	Continued increase	Post-pandemic stabilization
2023–2024	12.6%	Highest participation level in study period

Note. Participation rates represent the percentage of Black male students enrolled in North Carolina public high schools who completed at least one CCP-eligible course during the academic year. Rates are calculated from the validated analytic dataset described in Chapter 3 and correspond to the descriptive statistics reported in Chapter 4. Descriptive labels summarize observed trends and do not imply causal effects.

Table E.2

Summary of Predictor Significance in Participation Models

Predictor	Association	Notes
Grade Level	Strong positive predictor	Available universally; largest effect size
Economic Disadvantage	Significant negative	Indicates persistent socioeconomic gap
Title I School	Significant negative	Reflects institutional resource disparities
GPA	Not used in full models	Structurally missing across years

Note. Predictor significance is based on logistic regression models estimating CCP participation among Black male students, with cluster-robust standard errors at the local

education agency (LEA) level. Significance reflects statistical associations reported in Chapter 4 and should be interpreted as descriptive rather than causal. GPA was excluded from full participation models due to structural missingness across academic years.

Table E.3

Marginal Effect of CCP Participation on On-Time Graduation

Predictor	Marginal Effect	Interpretation
CCP Participation	+0.09	CCP participation increases predicted probability of on-time graduation by nine percentage points, controlling for covariates

Note. Marginal effects were estimated from a logistic regression model predicting on-time high school graduation among Black male students in North Carolina public high schools. Estimates reflect the change in predicted probability associated with CCP participation, controlling for socioeconomic status (FRPL eligibility), Title I school status, grade level, and academic year. Standard errors were clustered at the local education agency (LEA) level. Results represent statistical associations based on observed administrative data and do not imply causal effects.