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# High School Persisters and Alternative Schools

by

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## Abstract

In response to a "dropout crisis," over the past decade much effort was made to retain high school students. Recent years' trends indicated an overall increased level of graduation rates; however, there has been a largely overlooked student population, *persisters*, who did not earn a high school diploma by the expected graduation date but remain engaged and continue to work towards graduation into their fifth or even sixth year of high school.

Using exploratory CART analysis, this study examined what individual-level and school-level factors were most effective in distinguishing students who were persisters versus on-time graduates. Given that persisters disproportionately attended alternative schools, this study also examined the factors that could help identify students who transferred to alternative schools. In follow-up analyses, students' demographic and academic characteristics were compared across nodes to understand complex interactions between individual-level and school-level factors that affect students' educational experiences.

Implications of the findings in this study are discussed to address educational policies and practices as well as to provide insight for school staff to help identify potential persisters and provide tailored support towards students with different needs.

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Table of Contents

List of Tables

List of Figures

## Introduction

In response to a "dropout crisis," over the past decade much effort was made to retain high school students. As part of this recent effort, the 2015 federal Every Student Succeeds Act (ESSA) requires all U.S. states to set goals to increase overall graduation rates while reducing gaps across different sub-groups of students (Kuenzi, 2018; Sublette & Rumberger, 2018). Furthermore, ESSA required all U.S. states to implement the adjusted cohort graduation rate (ACGR) to evaluate school accountability (Sublette & Rumberger, 2018, Sugarman, 2019). The ACGR calculates 'on-time graduation' rates based on the proportion of students who graduate in 4 years with a regular high school diploma from the cohort of students who enter as first-time ninth graders, adjusting for student transfer (Atwell et al., 2020; McFarland et al., 2020; Kuenzi, 2018; Rumberger, 2019; Sublette & Rumberger; 2018; Sugarman, 2019).

The implementation of the ACGR can help define student outcomes to evaluate school accountability at levels ranging from individual schools to district-, state-, and national-level performance (Atwell et al., 2020; McFarland et al., 2020; Rumberger, 2019). However, there were some concerns raised over ACGR's initial focus on using on-time graduation rates as school accountability metrics, including the possibility that it may inadvertently reinforce academic disparities by incentivizing traditional high school administrators to turn away or push out students who are at risk of not graduating on-time, in order to maintain schools' reputations and advance their careers (Lehr et al., 2009; Sugarman, 2019). These students may include immigrant

students who may have experienced educational disruptions or overage students (Sugarman, 2019) as well as students who struggle to make needed progress for on-time graduation since they may not be able to attend school regularly because of life challenges, such as experiencing houselessness, loss of family, abuse, and teen pregnancy, as well as suffering from severe mental and physical health problems (Hill & Mirakhur, 2018).

Thus, scholars called for incorporating extended graduation rates to evaluate school accountability (e.g., Sublett & Rumberger, 2017; Sublett & Rumberger, 2018). Currently, 33 states in the U.S. employ extended graduation rates (ranging from 5- to 7-year duration) to evaluate school accountability while 2 other states (CA, ID) are either exploring or in the process of developing 5-year (cohort) graduation rate calculations (McFarland et al., 2020). The remaining 15 states and the District of Columbia have not incorporated extended graduation rates for meeting the ESSA accountability plan (McFarland et al., 2020).

Although it is commendable that many states incorporated extended graduation rates as school accountability metrics, there has been limited research on extended graduation (Uretsky et al., under review; Uretsky, 2019; Uretsky & Henneberger, 2020). Furthermore, most existing research often analyzes student outcomes based on a binary division of on-time graduation versus dropout. This approach ignores a significant proportion of students who remain enrolled in school after their fourth year of high school. As a result, these students who persist after their expected graduation dates are either mislabeled as dropouts or sometimes altogether

omitted from the data analysis (Uretsky, 2019). Not surprisingly, there has been limited research to understand persisting students and their experiences (Uretsky et al., under review; Uretsky, 2019; Uretsky & Henneberger, 2020).

These students who remain enrolled in school after their fourth year of high school are referred to as "persisters" or "persisting students" (Uretsky et al., under review). From here on, I will use the term persisters or persisting students interchangeably. Although limited, previous studies suggest that persisting students are disproportionally more male, and Black, Latinx, and Indigenous students (Clark-Shim et al., in progress; Hill & Mirakhur, 2018; Mirakhur et al., 2021; Uretsky et al. 2016). As compared to on-time graduates, persisting students are more likely to live in poverty (Hill & Mirakhur, 2018; Uretsky et al. 2016), and experience significant life challenges, such as houselessness, loss of family, abuse, and mental and physical health issues (Hill & Mirakhur, 2018). Not only are persisters themselves disproportionally students of color, the schools that they attend also have more students of color (Clark-Shim et al., in progress; Hill & Mirakhur, 2018). Moreover, their schools serve higher rates of students in poverty (Clark-Shim et al., in progress). In addition, persisting students are concentrated in a subset of schools that are structurally different such that they are more disorderly and have limited resources (Hill & Mirakhur, 2018). Furthermore, upon the examination of school transfer patterns of persisting students suggests that a large portion of students are transferred into alternative schools (Clark-Shim et al., in progress; Hill & Mirakhur, 2018).

There have been growing concerns that these persisting students whose

"characteristics and experiences remain poorly understood" are excluded from most research, resulting in a lack of adequate policies or interventions to promote their academic development (Uretsky et al., under review; Uretsky, 2019; Uretsky & Henneberger, 2020). Given that these persisting students remain engaged in the school system, policies and interventions may need to move beyond a dropout prevention framework to promoting eventual graduation and preparing students for higher education and/or career development. Not paying attention to persisting students' academic experiences will hamper efforts to address inequity.

The current study aims to deepen the understanding of persisting students' characteristics by examining the factors that contribute to students' persisting. Furthermore, to deepen our understanding of persisting students' educational experiences, especially with regards to alternative school education, this study examines the characteristics of students who are transferred to alternative schools. By doing so, I hope to contribute to the existing literature to inform policy and practices as well as development of intervention strategies.

## Literature Review

To help understand the background of the current study, this section begins by sharing the current understanding of persisting students, along with an overview of alternative education since many persisting students today attend alternative schools. I will then discuss critical theory in education to deepen our understanding of the factors that affect students' academic engagement and outcomes based on an ecological perspective.

### The Current Understanding of Persisters

Persisters or persisting students refers to those who remain enrolled by their expected graduation dates and work towards a high school diploma or its equivalent (e.g., GED) into fifth or sixth year of high school (Henneberger et al., 2018; Hill & Mirakhur, 2018; Uretsky, 2019; Uretsky & Henneberger, 2020; Uretsky et al., 2016; Uretsky et al., under review). Previous research indicated that persisters represented a sizable body of students in that the proportion of persisters was estimated to be equal or greater than that of dropouts (Hill & Mirakhur, 2018; Uretsky, 2019; Uretsky & Henneberger, 2020). For example, Hill and Mirakhur (2018) found that in New York City (NYC) high schools, 19% of students were persisters, as compared with 8% permanent dropouts and 73% on-time graduates. Similarly, Uretsky (2019) reported that the national prevalence of persisters was estimated to be about 16% based on the study of Stetser and Stillwell (2014).

Comparisons between the national ACGR on-time graduation rate and status completion rate suggested somewhat similar patterns. The national ACGR on-time

graduation rates were drawn from the U.S. Department of Education (National Center for Education Statistics) and status completion rates were based on the Current Population Survey (CPS), a monthly sample survey conducted by the U.S. Census Bureau for the Bureau of Labor Statistics (Atwell et al., 2020; McFarland et al., 2020). Examination of the ACGR's on-time graduation rates indicated that there have been overall increases in graduation rates over time in that by the school year 2017-2018, 85.3% of students graduated on-time with a high school diploma (Atwell et al., 2020). The status completion rate based on CPS suggested that "of the 27.6 million 18- to 24-years-old who were not enrolled in high school in October 2017, approximately 25.8 million (93.3%) held a high school diploma or an alternative credential" (McFarland et al., 2020, p. 26). It is worthwhile noting that ACGR on-time graduation rates only account for the percentage of students who earn a regular high school diploma whereas status completion rates based on CPS account not only for those with a regular high school diploma but also an alternative credential; as a result, some portion of the gap between ACGR on-time graduation rates and status completion rates may be attributed to those with alternative credentials, including GEDs. However, the higher graduation rates based on status completion rate as compared to on-time graduation rates can also potentially be attributed to extended graduation by persisters or students reengaged after dropout, since these students could have taken more than four years to earn a high school diploma or its equivalent.

When comparing between national on-time graduation rates and status completion rates, there are noticeable divergent patterns in racial/ethnic disparities.

Upon examination, national ACGR on-time graduation rates indicated that there were overall increases in graduation rates across all racial/ethnic groups with slightly higher gains among Black, Latinx, and Indigenous students over time; however, academic disparities persist in that on-time graduation rates in 2018 of Indigenous, Black, and Latinx students (73.5%, 79%, 81% respectively) are substantially lower than those of White and Asian American/Pacific Islander students (89.1%, 92.2% respectively) with some variabilities across states (Atwell et al., 2020). Furthermore, students with low-income families, English learners (ELs), and students with disabilities had lower on-time graduation rates (79.5%, 68.3%, 67% respectively). These statistics not only represent academic disparities but also point out economic challenges that many students face, given that nearly half of students (49.1%) in the 2018 graduation cohort are from low-income families (Atwell et al., 2020).

However, some of the disparities became less noticeable upon examination of the status completion rates based on 2017 CPS survey. For example, “for the first time in 40 years, the status completion rate for Black 18- to 24-year-olds (93.8%) was not measurably different from that of White 18- to 24-year-olds (94.8%)”; however, overall Latinx 18- to 24-year-olds still had somewhat lower status completion rate (88.3%) as compared to other racial/ethnic groups, including Asian Americans (98.6%) (McFarland et al., 2020, p. iii). These lessened disparities based on the CPS status completion rates potentially suggest that disproportionately more Black and Latinx students have persisted or reengaged to earn their high school diploma or alternative credential after their fourth year of high school.

These patterns in academic disparities between the national on-time graduation rates and the status completion rates are consistent with racial/ethnic disparities observed between on-time graduates and persisters (Clark-Shim et al., in progress; Hill & Mirakhur, 2018; Mirakhur et al., 2021; Uretsky et al. 2016). Previous literature suggests that persisting students are disproportionally more male, and Black, Latinx, and Indigenous students (Clark-Shim et al., in progress; Hill & Mirakhur, 2018; Mirakhur et al., 2021; Uretsky et al. 2016). These persisting students are more likely to live in poverty as compared with on-time graduates based on the analysis of New York City (NYC) and Maryland longitudinal data sets (Hill & Mirakhur, 2018; Uretsky et al. 2016). According to Hill and Mirakhur (2018), persisting students are more likely to experience academic disruptions and have difficulty making timely progress for on-time graduation due to absenteeism and/or limited credit acquisition; persisting students tend to suffer chronic absenteeism as early as 8th grade and run the risk of being overage in NYC high schools. Furthermore, these students tend to struggle with significant life challenges, such as experiencing houselessness, loss of family, abuse, teen pregnancy, severe mental and physical health problems (Hill & Mirakhur, 2018). In addition, some of the persisting students may require additional academic support since a greater proportion of persisting students are in special education (SPED) and are English learners (ELs) (Hill & Mirakhur, 2018; Sugarman, 2019; Uretsky et al. 2016).

Persisting students appear to be heterogenous in their academic and demographic characteristics such that effective strategies to promote their learning and

eventual graduation may involve providing tailored support to meet different needs of different groups of persisting students. According to Hill and Mirakhur (2018), persisting students in NYC were heterogenous in their academic standing and could be divided into three groups. Furthermore, these three groups of persisting students represented somewhat different demographic characteristics. The three groups were: 1) marginally behind with disproportionately more English language learners, 2) moderately behind, and 3) drastically behind with an overrepresentation of Black and male students who live in high-poverty neighborhoods. Given these differences, the authors emphasized the need to provide tailored support. For example, alternative programs with flexible schedules can be especially helpful for part-time students who are working. Some students may just need extra support to meet certain graduation requirements (e.g., pass an exam or submission of paperwork). Other students who might be experiencing significant life challenges (e.g., living in high poverty neighborhoods, experiencing houselessness, struggling with mental or physical health issues, or pregnancy) or students who are significantly behind may need wraparound support that not only includes academic support but also helps meeting basic needs (e.g., hygiene, food) or other specific needed resources, such as summer job opportunities or employment opportunities (Flennaugh et al., 2018).

Upon the examination of postsecondary education and workforce outcomes, Uretsky and colleagues (2016) found that persisters participate less in postsecondary education and the workforce when compared to four-year graduates. When descriptively comparing postsecondary education and workforce outcomes between

fifth-year graduates and non-graduates during their sixth year, the proportion of them participating only in the workforce appear to have virtually no difference; however, the proportion of them participating only in college or those participating in both college and the workforce appear to be greater among fifth-year graduates (Uretsky & Henneberger, 2020). In addition, while a smaller proportion of persisters enrolled in college as compared to four-year graduates, persisters who graduated in 5 years were less likely to need remedial classes in college as compared to four-year graduates (Henneberger et al., 2018). The finding suggests potential benefits of additional education and services that persisters receive during their fifth year of high school. Furthermore, "from a social justice perspective, this is important for shifting the burden of paying for remediation in community college away from the individual student and back to the State through the provision of additional services in high school" (Henneberger et al., 2018, p. 13).

### *Educational Environments for Persisting Students*

Not only are persisters themselves disproportionally students of color, research indicates the schools that they attend also have more students of color, as found in an urban school district in Pacific Northwest and in NYC high schools (Clark-Shim et al., in progress; Hill & Mirakhur, 2018). Moreover, their schools serve higher rates of students in poverty (Clark-Shim et al., in progress). Furthermore, persisters are concentrated in a subset of high schools (20 out of 400 high schools) in NYC high schools (Hill & Mirakhur, 2018). In addition, schools that persisting students attend tend to be structurally different such that they are more disorderly and

have limited resources (Hill & Mirakhur, 2018; Uretsky et al., under review).

Based on the examination of school transfer patterns, Clark-Shim et al. (in progress) found that by their fourth year the majority of persisters were transferred into alternative schools from traditional high schools in an urban school district in Pacific Northwest (Portland Public Schools). Similarly, Hill and Mirakhur (2018) found that nearly quarter of persisting students in NYC were also transferred out to alternative schools. Concurrent to these findings, examination of extended graduation in CA suggested that many persisting students – especially adult students – tended to attend alternative educational settings, such as schools specialized in serving adults, and charter schools (Sublett & Rumberger, 2017).

School transfer of persisting students into alternative educational settings can have complex societal implications as the current educational practices may reinforce educational inequality and social stratification. As discussed, students who are struggling to make needed progress for on-time graduation are overrepresented by historically marginalized groups, including Black, Latinx, and Indigenous students (Clark-Shim et al., in progress; Hill & Mirakhur, 2018; Mirakhur et al., 2021; Uretsky et al. 2016), students in poverty (Hill & Mirakhur, 2018; Uretsky et al., 2016), and ELs or immigrants (Hill & Mirakhur, 2018; Mirakhur et al., 2021; Sugarman, 2019; Uretsky et al. 2016), as well as students who are experiencing life struggles, such experiencing houselessness, loss of family, abuse, pregnancy, mental, and physical health issues (Hill & Mirakhur, 2018). The current educational practices of using on-time graduation rates as school accountability metrics can inadvertently incentivize

traditional high school administration to push out these marginalized students into alternative schools (Hill & Mirakhur, 2018; Lange, 1998; Lehr et al., 2009; Sublett & Rumberger, 2018; Sugarman, 2019).

These practices not only reinforce disenfranchisement of students but pose challenges for public alternative schools. The growing number of alternative schools in recent decades may reflect that a greater number of students are pushed out of traditional public high schools (Dunbar, 1999; Foley & Pang, 2006; Kim & Taylor, 2008; Lange & Sletten, 2002; Lehr et al., 2009). Alternative schools are disproportionally located in urban districts where students with low SES are concentrated (Dunning-Lozano, 2016; Foley & Pang, 2006; Lange & Sletten, 2002; Lehr et al., 2009; Mitchell & Waiwaiole, 2003). These alternative schools are faced with "stigmas as dumping grounds or warehouses for at-risk students who are falling behind, have behavioral problems, or are juvenile delinquents" (Kim & Taylor, 2008, p. 207).

On the contrary, some alternative settings may promote engagement and motivation of students who are disengaged in traditional high school. Many students that are delayed or disconnected appear to attend alternative educational schools, such as community-based organizations that are primarily focusing on reengaging out-of-school youth to complete high school education and help develop skills needed for participation in the workforce (Aron, 2006; Lange, 1998; Lange & Sletten, 2002). Based on the interview findings from NYC, Hill and Mirakhur (2018) suggest that persisting students may be able to build more supportive relationships with school

staff in alternative schools, especially in community-based organizations (CBOs). This may be especially important for many persisting students who struggle to build supportive relationships with adults in traditional high schools (Aron, 2006; Jones, 2011; Mcgee & Lin, 2017; Slaten et al., 2015). According to D'Angelo and Zemanick (2009), dropout rates can be significantly reduced, and completion of postsecondary education can be promoted in alternative programs that provide tailored support to meet the needs of students.

There can be benefits for persisting and (re)engaged students attending alternative schools, especially in CBOs that promote a supportive learning environment; nonetheless, some of the policies and practices could be improved. According to Hill and Mirakhur (2018), many transfers to alternative schools happen in an ad-hoc fashion as students fall behind. Thus, they emphasize the need to intervene early to get students and their families involved in the decision-making process for school transition and the development of a learning plan.

Linking with the current educational policies of using ACGR on-time and extended graduation rates, Sublett and Rumberger (2018) recommend that extended graduation be incorporated in school accountability metrics by attributing graduation to all the schools that student attended, including alternative schools that students may have attended when a degree was awarded. The current practice of many school districts is to ascribe graduation back only to the last traditional high school that students attended, which can lead to underappreciation of alternative schools that support learning and eventual graduation of persisting or (re)engaging students

(Sublett & Rumberger, 2018). Ascribing graduation to alternative schools that persisting students attended not only helps recognize the extended graduation that persisting students accomplish but also the alternative schools that support that accomplishment.

## Overview of Alternative Education

This study hopes to increase our understanding of the characteristics of students who are persisting as well as the characteristics of students who are transferred to alternative schools. To deepen our understanding of alternative education, I will begin by sharing a brief history of alternative education. This will be followed by a discussion of the current understanding of alternative education, which includes changes to alternative education, as well as the academic experiences of students who attend in alternative schools.

### *Brief History of Alternative Education*

According to Timothy Young (1990), "alternatives in public education have existed since the very birth of American education" (cited in Lange & Sletten, 2002, p. 8); however, development of alternative education as we understand it today began during the Civil Rights Movement era in the late 1960s and early 1970s (Deal & Nolan, 1978; Lange & Sletten, 2002). With a critique towards the mainstream public educational system of 1950s and 1960s for "being racist and exclusively designed for the success of the few", alternative education took place both outside and within public school systems with a hope to accomplish the "humanistic goal of equity" (Lange & Sletten, 2002, p. 9).

**Alternative Programs Outside of Public School.** Outside of public school system, the alternative movement split into two broad categories: Freedom Schools and the Free School Movement (Lange & Sletten, 2002). Rooted in the Civil Rights Movement, in the summer of 1964 the 'Mississippi Freedom Summer Project', "sought to end segregation in the South by engaging Black students and community volunteers in strategic political action" (Davis et al., 2021, p. 6). These efforts to educate Black children, youths, and adults were incorporated into Freedom Schools created by the Student Non-violent Coordinating Committee (SNCC) with support from the Council of Federated Organizations (COFO) (Murray & Milner, 2015). In 1995, with recognition of its roots in the Civil Rights Movement, Children's Defense Fund (CDF) Freedom Schools were reborn under the direction of Marian Wright Edelman based on a critical, culturally responsive, and communal pedagogy that appreciates community cultural wealth (CCW) that encompasses aspirational, familial, linguistic resistant, navigational, and social capital of communities (Ares et al., 2021; Davis et al., 2021; Murray & Milner, 2015). Today, CDF Freedom Schools nationwide continue serving mostly Black and Latinx children and youths in poverty focusing on education rooted in activism and social change (Davis et al., 2021).

The other main branch of public alternative education was the Free School Movement that began in 1969. The Free School Movement focused on "individual achievement and fulfillment, instead of emphasizing community" (Lange & Sletten, 2002, p. 9). The Free School Movement established private alternative schools – as seen in "Summerhill" founded by A. S. Neill – which mainly catered towards children

of white middle- and upper-class families (Deal & Nolan, 1978; Barr, 1973). The Free School Movement emphasized children's internal motivation and curiosity to explore and learn freely without restrictions (Deal & Nolan, 1978). This pedagogical orientation could be seen in Neill's approach in Summerhill, which was articulated as "there was no required learning and no set of discipline or controls imposed on students" (Lange & Sletten, 2002, p. 9). Although the Free School Movement insisted as serving "a revolutionary means of self-actualization for the individual child" driven by children's internal motivation and curiosity (Dunning-Lozano, 2016, p. 437), there were some contradicting practices depending on whom they were serving. According to Barr (1973), free schools that were serving children from white middle- and upper-class families operated by creating a free learning environment with "do-your -own-thing" pedagogy; however, free schools that were serving predominantly poor, Black children in inner-city generally had more structured classes focusing on intensive drills in academic basics.

Although the Free School Movement began outside of the public school system, it had a great impact in public alternative education. While some of the enthusiasts expected the Free School Movement and its private schools would continue to expand (e.g., Graubard, 1972), most alternative schools had a relatively short lifespan (Barr, 1973; Lange & Sletten, 2002). Starting in the 1970s, growing options have become available in public schools which resemble some of the features from free schools while being held accountable and supported by public funding sources (Barr, 1973). Thus, many alternative schools outside of public schools were

replaced by the public school system (Deal & Nolan, 1978). Notably, a few of the exceptional, successful free schools, such as Herb Kohl's Other Ways School in Berkeley, were incorporated into public schools (Barr, 1973).

**Alternative Programs Within Public School System.** Even though many alternative schools outside of the public school system had rather short lifespans, nonetheless, they "advanced the notion that a singular, inflexible system of education that alienated or excluded major sectors of the population would no longer be tolerated" (Lange & Sletten, 2002, p. 10). Furthermore, acknowledgement that individual students learn better in different environments led to school reform and policy development (Deal & Nolan, 1978). For example, in 1974, California Assembly Bill 10525 "requires schools districts to inform parents of their right to request that alternative schools be established" (Deal & Nolan, 1978, p. 34). The bill facilitated alternative schools to be designed to meet a wide range of student needs while providing the opportunities for students, parents, and teachers to cooperate when making decisions on the course of the school (Deal & Nolan, 1978).

Inspired by the alternative schools outside of the public school system, educators in public school sectors created Open Schools as alternative education within public schools (Lange & Sletten, 2002). The Open Schools could generally be characterized as child-centered, non-competitive, and individualized learning (Lange & Sletten, 2002). The Open Schools included:

- Schools without Walls: focusing on community-based learning
- Multicultural Schools: integrating culture and race/ethnicity into the

curriculum

- Magnet Schools: providing curriculum to attract diverse groups of students with an effort for racial integration
- Schools within a School: making a large high school into smaller sub-communities
- Learning Centers: meeting specific student needs, such as vocational education
- Continuation Schools: providing an option for students who are struggling to make academic progress or drop out from regular high school
- Fundamental Schools: "back to basics" approach to teach core academic content

As illustrated above, some programs provided more innovative approaches in their curriculum and structure while others tended to focus on remedial or basic skills (Lange & Sletten, 2002).

**Rollback in Alternative Education.** By the 1980s, the objectives and approaches of the public alternative education drastically changed as "many of the first open schools did not survive" and their innovative approaches in pedagogy and cooperative decision-making processes involving parents and students declined while a growing number of alternative schools/programs focused on remedial learning as many alternative schools/programs became "geared toward students who were disruptive or failing in their home school" (Lange & Sletten, 2002, p. 11).

### *Alternative Education Today*

Alternative education encompasses a wide range of programs. According to Raywid (1994), alternative schools can be categorized into three main types based on their goals and characteristics (Aron, 2006; Foley & Pang, 2006):

- Type I: schools of choice that focus on individualized, innovative approaches with challenging curriculum (e.g., Magnet School, Montessori School)
- Type II: "last chance" schools before expulsion that focus on discipline for students who are disruptive with an aim to segregate and contain them; punitive in nature with short-term placement, typically not by choice (e.g., "Zero Tolerance policies" and the consequential adaptation of "disciplinary alternative education programs" (DAEPs))
- Type III: remedial schools for students with social and emotional problems in short-term, therapeutic settings to provide counseling and academic remediation; students can choose not to participate

Raywid (1994) also suggests that "alternative schools are usually identifiable as one of these three types, but particular programs can be a mix" (p.27 cited in Lange, 1998, p. 184).

As described above, alternative education is comprised of a wide range of programs with different goals. Thus, a lack of commonly accepted definition of alternative education causes confusion regarding its meaning among students, teachers, and the general public (Carver et al., 2010; Deal & Nolan, 1978; Lehr et al., 2009; Porowski et al., 2014). Further complicating the situation, many states have

their own definition of alternative education, such that 48 states had legislation on alternative education and 34 states had a definition of alternative education by 2002 (Porowski et al., 2014). Moreover, different states provide different services (e.g., regular academic instruction, counseling, social skills and support, behavioral services, career education) for different target groups of students (e.g., by age or grade, students unable to benefit from regular school, students who have dropped out, students with truancy or attendance problems, students with academic problems, students with behavioral problems) in different settings (e.g., within schools, or at separate sites) through different structures (e.g., regular school hours, outside school hours, online, workplace and job training) (Porowski et al., 2014).

Although there has been a wide range of alternative schools that existed historically and today, there has been a general shift of alternative education in their goals and characteristics as more of alternative education in recent years has been geared towards disfranchised students (Dunning-Lozano, 2016; Lange & Sletten, 2002; Kim & Taylor, 2008). Changes to the definition of alternative education by the U.S. Department of Education reflect this shift. For example, in 2002, the U.S. Department of Education defined an alternative education school as

> a public elementary/secondary school that addresses the needs of students which typically cannot be met in a regular school and provides nontraditional education which is not categorized solely as regular education, special education, vocational education, gifted and talented or magnet school programs.
> (U.S. Department of Education, p. 55 cited in Lehr et al., 2009)

In 2010, U.S. Department of Education redefined alternative schools and

programs as

> Alternative schools and programs are designed to address the needs of students that typically cannot be met in regular schools. The student who attended alternative schools and programs are typically at risk of educational failure (as indicated by poor grades, truancy, disruptive behavior, pregnancy, or similar factors associated with temporary or permanent withdrawal from school).
>
> - Alternative schools are usually housed in a separate facility where students are removed from regular schools.
> - Alternative programs are usually housed within regular schools.
>
> (U.S. Department of Education, p. 1 cited in Carver et al., 2010)

Today, many youths who are disengaged and disconnected from traditional high school attend alternative schools (Dunning-Lozano, 2016; Flennaugh et al., 2018; Lange & Sletten, 2002; Kim & Taylor, 2008). Some of the alternative schools, including community-based organizations (CBOs), may be better equipped to provide needed support by creating a supportive environment where students can build and maintain relationships with teachers and staff while they are working towards graduation, with more flexible schedules for those who are working or having difficulty attending school regularly (Jones, 2011; Lange, 1998; Mcgee & Lin, 2017; Mitchell & Waiwaiole, 2003; Slaten et al., 2015; Smith & Thomson, 2014). These schools may also provide more relevant and adequately challenging curriculum to promote student engagement (Baldridge et al., 2011; Mcgee & Lin, 2017; Smith & Thomson, 2014). According to D'Angelo and Zemanick (2009), dropout rates can be significantly reduced, and completion of postsecondary education can be promoted in alternative programs that provide tailored support to meet the needs of students. These

alternative schools can promote persisting and re-engaged youths' eventual graduation while help them better prepare for postsecondary education or workforce participation (Aron, 2006; Baldridge et al., 2011; Jones, 2011; Lange & Sletten, 2002; Mcgee & Lin, 2017; Smith & Thomson, 2014).

Based on their studies in urban alternative schools that are designed to support youth who were disengaged and disconnected from traditional high school, researchers find that teachers are able to provide a safe and comfortable space by appreciating the challenges students experience and providing needed support, including wraparound services to meet student needs (Flennaugh et al., 2018; Kim & Taylor, 2008; Richardson & Memmott, 2017). Despite these benefits, there can be some challenges experienced by students and teachers/staff. Some of these alternative schools may focus on credit recovery and teaching basics; thus, students who hope to go to college and have a professional career may not be exposed to rigorous curricula or counseling to explore different options to fulfill their aspirations (Kim & Taylor, 2008). It is crucial for teachers to have high expectations of their students and normalize achievement while providing a web of support to promote student engagement (Flennaugh et al., 2018). Furthermore, students may feel excluded as they are not necessarily given the same career opportunities, including promotion and workshops that their counterparts in traditional high school can enjoy in the same district (Kim & Taylor, 2008; Richardson & Memmott, 2017). In addition, teachers may also feel left out as school or district administration may make important decisions that affect them, such as relocating the school, without consulting with teachers and students (Kim &

Taylor, 2008). Moreover, some of these alternative settings may have limited resources, including staff shortage, inadequate infrastructure (lacking library, computer labs), and funding instability (Aron, 2006; Foley & Pang, 2006; Lange, 1998; Lehr et al., 2009; Richardson & Memmott, 2017), which further makes it difficult for teachers to support student learning. Finally, teachers may not be ready to change "oppressive structures that so profoundly affecting students' lives" (Flennaugh et al., 2018, p. 132), and therefore remain unable to provide culturally responsive curricula based on critical approaches that honor students' hope, dreams, and aspirations to break the cycle of educational inequality (Kim & Taylor, 2008).

The growing number of alternative schools in recent decades may reflect pervasive social injustice as current policies and practices may reinforce educational inequality and social stratification. As noted by Kim and Taylor (2008), "the higher the number disfranchised students, the more alternative schools are built" (p. 207). There are currently more than 20,000 alternative schools and programs that are operating to serve students who struggle in traditional high school (Lange & Sletten, 2002). As one form of alternative education, second-chance high schools are designed to serve disconnected youth who are "recovered dropouts who have previously left or been pushed out of high school"; the number of second-chance high schools has increased from 1,000 in 1990s to 6,000 by 2010 (Flennaugh et al., 2018, p. 116). Alternative schools are disproportionally located in urban districts where students with low SES are concentrated (Dunning-Lozano, 2016; Foley & Pang, 2006; Lange & Sletten, 2002; Lehr et al., 2009; Mitchell & Waiwaiole, 2003). The growing number of

alternative schools in recent decades may also reflect that a great number of students are pushed out of traditional public high schools (Dunbar, 1999; Foley & Pang, 2006; Johnston-Goodstar & Roholt, 2017; Kim & Taylor, 2008; Lange & Sletten, 2002; Lehr et al., 2009). Furthermore, students of color may be disproportionally placed in alternative settings that might have limited resources to support student learning (Aron, 2006; Foley & Pang, 2006; Lange, 1998; Lehr et al., 2009; Richardson & Memmott, 2017). Perzigian et al. (2017) found that Black students are overrepresented in behavioral-focused and academic remediation-focused alternative schools while underrepresented in innovative alternative schools. These racial disparities raised concerns about removing Black students' educational opportunities in traditional high schools and relocating them to "more restrictive and segregated placements" (Perzigian et al., 2017, p. 692). Some of these restrictive and segregated alternative programs may have limited resources to support students' academic and career development (Aron, 2006; Foley & Pang, 2006; Lehr et al., 2009; Lange; 1998).

Furthermore, the concentration of students who are marginalized in alternative schools may be reinforced by other policies, such as "Zero Tolerance policies" and consequential adaptation of "disciplinary alternative education programs" (DAEPs) by disproportionally penalizing students of color (Dunbar & Villarruel, 2004; Hines-Datiri & Andrews, 2020; Raible & Irizarry, 2010). These educational policies can perpetuate academic disparity by reinforcing social stratification and segregation, thereby removing educational opportunities from students who are marginalized (Edelman, 2009; Heitzeg, 2009; Hines-Datiri & Andrews, 2020; Raible & Irizarry,

2010). While initially designed for students who commit serious offenses – such as drug related activities or gun violence – to provide them with alternative learning opportunities, more and more DAEP referrals have been made based on discretionary reasons, including rule breaking and disruptive behaviors which were previously addressed by time-outs or sending students to the principal's office (Cortez & Cortez, 2009; Booker & Mitchell, 2011). Cortez and Cortez (2009) found that only 1 in 5 cases were meeting "serious offenses specified in the Texas code of conduct" (p. 10), and the rest of the referrals to DAEPs were based on discretionary reasons, such as "problem behaviors." "Students as young as 6 years old have been removed from their kindergarten classes and sent to DAEPs for problems" (Cortez & Cortez, 2009, p. 4). Not surprisingly, Black, Latino, and Indigenous students, students from low-income families, and students in special education are overrepresented in DAEPs (Cortez & Cortez, 2009; Dunbar & Villarruel, 2004; Hines-Datiri & Andrews, 2020). Furthermore, Welch and Payne (2010) found that Black and Latinx students are not only disproportionally placed in DAEPs, but also faced with extremely punitive discipline as a means of social control.

There have been growing concerns raised about the prevalence of a deficit approach in public alternative education (Dunbar, 1999; Dunning-Lozano, 2016; Flennaugh et al., 2018). According to Dunning-Lozano (2016), "public alternative schools… were transformed from a means to extend quality education to a diverse range of students, at least in theory, to repositories for undesirable youths" (p. 437). Thus, these alternative schools are faced with "stigmas as dumping grounds or

warehouses for at-risk students who are falling behind, have behavioral problems, or are juvenile delinquents" (Kim & Taylor, 2008, p. 207). Many of the Black youths who are placed in restrictive and segregated alternative settings may feel excluded and isolated while internalizing failure. As Dunbar (1999) articulated, "while failed by the system designed to educated them, they internalize the failure and make it their own" and "experience a sense of hopelessness as a result of continued patterns of perceived failures" (p. 244).

These practices call for our attention and the need to reverse "these social trends that result in economic and racial isolation" (Dunbar, 1999, p. 245) and find ways to hold traditional high schools accountable (Marsh & Hill, 2010; Richardson & Memmott, 2017) and encourage traditional high schools to "lead to greater inclusion" of historically marginalized students (Dunbar, 1999, p. 245). Furthermore, alternative schools which intend to provide individualized support can be sometimes strained by having students with diverse needs, such as students with learning disabilities, students with physical or mental issues, pregnant students, and students in extreme poverty; thus, students with different challenges "call for different solutions" (Dunbar, 1999, p. 245). These findings call for school districts to (re)structure different alternative schools to meet the needs of diverse students (Dunbar, 1999) while providing adequate resources, including funding, to alternative schools (Richardson & Memmott, 2017). Furthermore, it is important to create educational spaces that honor the strengths of students who are historically marginalized (Baldridge et al., 2011; Dunbar, 1999) while creating partnerships with parents, educators, community leaders, and

government leaders to promote wellbeing of youths and their community to foster the youths' academic engagement and developmental competencies (Edelman, 2006; Edelman, 2007).

## Theoretical Frameworks

Three conceptual frameworks provide the foundation for this study: 1) critical theory in education to elaborate structural inequalities perpetuated in the educational system, 2) ecosystem theory to provide a holistic understanding of multiple contextual factors that affect student engagement and outcomes, and 3) the integrative model proposed by Garcia Coll et al. (1996) that conceptualizes development of youth of color at the intersection of social class, culture, ethnicity, and race. These conceptual frameworks pertain to students' academic development with special attention given to the factors that affect students from historically underserved populations.

### Critical Theory in Education

Despite commitments to equality and justice in many school reform efforts, academic disparities persist (Oakes, 2018; Oakes & Rogers, 2007; Sarason, 1998). Following up on the monumental passage of *Brown v. Board of Education* in 1954 which helped acknowledge a deeply ingrained racist society of the United States as *separate* and *unequal*, the public educational system failed to provide "meaningful remedies" (Bell, 2005, p. 1065). Much of the effort behind racial integration caused unintended detrimental consequences (Bell, 2004; 2005; Orfield et al., 2016). For example, the implementation of court orders for racial integration resulted in busing of Black students to predominantly white schools, but not so much in the other way around, where Black students often faced hostility (Bell, 2005; Serbulo, 2019). Busing out Black students from predominantly Black neighborhoods also resulted in "closing of black schools and the dismissal of thousands of black teachers and administrators",

which had a detrimental impact on Black students (Bell, 2005, p. 1062). Furthermore, desegregated schools adopted academic tracking practices which resulted in placing disproportionately Black, Latinx, and Indigenous students in non-academic tracking (Anderson & Oakes, 2014; Oakes, 2018; Oakes & Guiton, 1995; Oakes, 1992). Similarly, "Zero Tolerance policies" and the consequential adaptation of "disciplinary alternative education programs" (DAEPs) led to disproportionately penalizing Black, Latinx, and Indigenous students by removing them from traditional high schools to alternative schools; thereby removing educational opportunities and perpetuating educational inequality (Dunbar & Villarruel, 2004; Edelman, 2009; Heitzeg, 2009; Hines-Datiri & Andrews, 2020; Raible & Irizarry, 2010).

Oakes and Rogers (2007) point out the cause for the failure is because school reforms were often based on false assumptions and "the premise that social inequality, school inequality, and racial inequality are at odds with basic American values; and therefore, Americans, if given the opportunity, will reject that inequality (p.196)." Sarason (1998) further points out the educational system's inability to learn and correct, as well as suggests that academic disparities seen in urban school systems are a reflection of larger structural inequities.

Critical theorists in education acknowledge that inequities in education are deeply rooted in "school structures that privilege the dominant, whitestream communities and disadvantage communities of color" (Pewewardy et al. 2018, p. 38). Critical theorists also note that the economic system is unequal and aims to maintain the status quo, and education can be used as means to control and perpetuate social

stratification by reinforcing and internalizing stereotypical messages for students who are marginalized (Freire, 2018; Palmer & Maramba, 2011; Fitzgerald, 2009; Harro, 2013). Palmer and Maramba (2011) articulate that a "stereotypical, criminalized" portrayal of Black men in media can be serve as a "hidden curriculum" (p. 441) and this negative portrayal provide guidelines for behaviors, therefore undermining African American male students' engagement and academic achievement.

## Ecosystem Theory

Social stratification through education can be reinforced by multiple forces that are interacting at different levels. According to the bioecological perspective, multiple layers of a system – micro-, meso-, and macrosystem – can interact and influence one another to affect human development (Bronfenbrenner & Morris, 1998). Based on this ecological perspective, I will discuss factors that perpetuate academic disparities by undermining engagement of students who are historically underserved. This includes 1) micro-level factors, such as teacher-student interactions, 2) meso-level factors, notably school culture and organizations, and 3) macro-level factors, including district policies and practices, state-level policies and practices, national level policies and procedures, as well as societal norms and cultures. In addition, this section introduces *the integrative model* proposed by Garcia Coll et al. (1996) that conceptualizes development of youth of color at the intersection of social class, culture, ethnicity, and race.

### *Micro-Level Factors*

Teachers often make assumptions about students of color and their parents

based on cultural stereotypes that are incomplete and misinformed (Tatum, 2017). Notably, stereotypes towards Black and Latinx students can result in low teacher expectations and differential treatment which in turn can undermine student engagement and sense of belonging in school (Booker, 2006; Delale-O'Connor et al., 2017; Ozer et al. 2008; van den Bergh et al., 2010; Walton & Cohen, 2007), hinder learning and academic achievement (Alfaro et al., 2009; Klem & Connell, 2004), and even impact individual student graduation or dropout (Wayman, 2002; Zaff et al., 2017). However, teachers are often unaware of their biases and prejudices (Oakes, 2018; Oakes & Guiton, 1995), such that van den Bergh et al. (2010) found that students' achievement gaps were not related to how teachers themselves report on their own attitudes; however, teachers' implicit biases and prejudices were related to student achievement gaps.

Furthermore, students' perceptions of teachers' respect and concern for their learning can affect student feelings of connection to school among ethnically diverse students in urban schools (Ozer et al., 2008). Therefore, it is important to create inclusive environments that honor students' strengths and culture (Dunbar, 1999). Here are some interventions/activities suggested by previous literature to reduce stereotype threats by deepening interpersonal understanding between teachers and students/families/communities as well as encouraging supportive relationships in school:

- Create an environment with a positive image/role model and engaging in critical conversation at home and in class, including the use of Ben Carson's

Think Big, The Autobiography of Malcolm X, and the PACT (Palmer & Maramba, 2011)

- Provide teacher training on historical and contemporary issues across different communities – for example training on tribal sovereignty and Indigenous Peoples' history (Reyhner, 1991), and "poverty, deindustrialization, segregation, housing, and access to health care" (Delale-O'Connor et al., 2017, p. 183)
- Develop programs that help build skills needed in the workforce by partnering with business in collaboration with families and communities (Reyhner, 1991)

***Meso-Level Factors***

Overall school culture and safety can also affect student engagement in schools (Eccles & Roeser, 2012). Stone and Han (2005) found that school climates are related to student perceptions of discrimination, and consequently affect school performance among Mexican American adolescents. Furthermore, poverty and segregation in school can reinforce academic disparity. For example, Suárez-Orozco et al. (2010) found that schools with higher segregation rates and higher poverty among students negatively impact immigrant students' academic achievement. In addition, poverty and limited access to resources can limit educational opportunities for students who are historically underserved. For example, Stearns and Glennie (2010) found that participation in extracurricular activities, especially frequently participating in diverse activities, result in higher levels of achievement and decreases in dropout rates among high school students; however, "the availability of activities (in schools) reflects

inequalities" such that district-level policies and decisions on funding for extracurricular activities relied upon available resources which were varied and reflected social and economic compositions of a district. Thus, it is crucial to craft efforts for school reform by collaborating with students, families, and community members using "learning power" that promotes activism and cultural democracy to create equitable educational space for all students (Oakes & Rogers, 2007; Oakes, 2018).

### *Macro-Level Factors*

Teacher biases and prejudices in combination with school- or district-level practices can reinforce academic disparities. Although academic ability tracking or grouping was first designed to accommodate and meet the needs of students, these practices may reinforce social stratification (Anderson & Oakes, 2014; Oakes, 2018; Oakes & Guiton, 1995; Oakes, 1992). While many teachers may believe their decisions on assignments of students to be based on objective criteria and merits of students and deny making racial/ethnic- or gender-based assignments, Black and Latinx students are disproportionally assigned to low academic or vocational tracks (Oakes, 2018; Oakes & Guiton, 1995). Students in low academic tracks suffer from poor academic self-concept and low self-esteem (Ireson & Hallam, 2009). Furthermore, academic tracking practices can limit student peer groups and opportunities to be exposed to intriguing and challenging curricula, thereby undermining students' intrinsic motivation to learn (Eccles & Roeser, 2012). Given the negative impact of academic tracking and potential reinforcement of social

stratification, its practices fell out of favor. However, in recent years, there has been the resurgence of tracking practices and tracking has become more commonplace in schools (Loveless, 2013).

Similar to the negative impact of academic tracking disproportionately placing Black, Latinx, and Indigenous students in non-academic tracking thereby removing their educational opportunities and reinforcing social stratification, Fitzgerald (2009) found that federal policies (i.e., the Individuals with Disabilities Education Act of 1990 and Section 504) resulted in disproportionate behavioral-stimulant use (e.g., Ritalin, psychotropic medications) on African American male students as a mode for social control. As noted by Fitzgerald (2009), "social stratification is continued through the use of labeling and medicating special education and non-special-education students on the basis of "behavioral concerns," a practice arguably connected to a doctrine of inferiority" (p. 239) and this long-standing racist ideology can be reinforced in a vicious cycle.

State- and national-level policies and practices can affect students' academic outcomes. For example, Filindra et al. (2011) found that state-level policies and practices affect immigrant students' academic achievement and graduation rates, such that states which provide immigrant inclusion policies with more access to social welfare programs had higher graduation rates among immigrant students. States with predominantly Democratic leadership tend to have narrower graduation gaps across sub-groups of students. They also found that immigrant students in states that provide ESL classes have lower graduation rates.

Furthermore, societal norms and cultures can perpetuate academic disparities. Johnston-Goodstar and VeLure Roholt (2017) noted that education for Indigenous children has been rooted in an attempt to assimilate as suggested by the phrase "kill the Indian, save the child" and witnessed through Indian boarding schools (Piccard, 2013; Grosfoguel, 2013). Today, derogatory characterizations of Indigenous peoples are commonplace in media and schools, as seen in sports and school mascots. Many Indigenous students have difficulty building rapport and maintaining relationships with teachers and other students, experience racist threats, and feel isolated in school. Not surprisingly, Indigenous students disproportionally suffer from lower academic achievement and higher dropout rates (McFarland et al., 2018; Kuenzi, 2018; Atwell et al., 2019). Goodstar and Roholt (2017) found that there are rampant microaggressions towards Indigenous students in traditional high schools, such that teacher implicit biases and deficit model approaches, resulting in blaming individual students and families for poor academic performance dropout, rather than noticing schools are failing students and pushing them out from traditional high schools.

Reyhner (1991) called for the need for teacher training and curriculum development that shares Indigenous Peoples' history and presence today, acknowledgement of sovereignty and self-determination, as well as collaboration with families and community members to promote student engagement and positive interactions with teachers and other students.

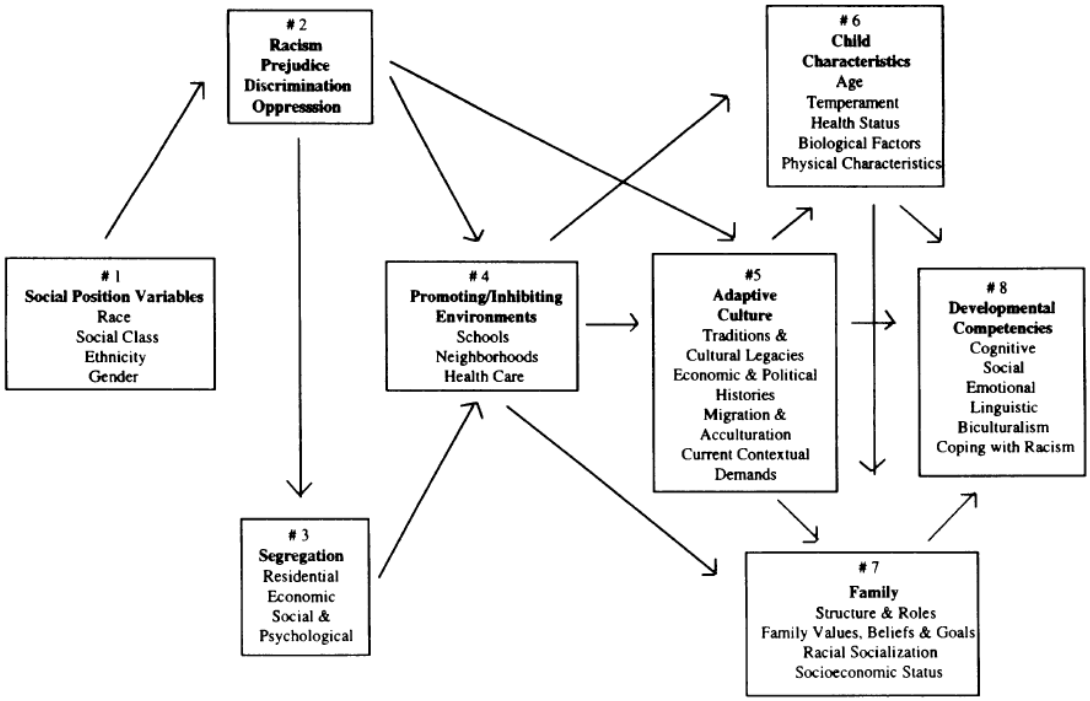
**The Integrative Model**

Garcia Coll et al. (1996) provided a conceptual model – the integrative model

– to understand the developmental competencies of children/youth of color in the U.S. Using a critical analysis of mainstream frameworks, the integrative model anchors within social stratification theory and emphasizes the roles of prejudice, discrimination, oppression, and segregation in reinforcing structural inequality. Garcia Coll et al. (1996) conceptualize the developmental process of children of color as intersecting with social class, culture, ethnicity, and race. The integrative model is illustrated in the figure below (Garcia Coll et al. 1996, p. 1896):

**Figure 1**

*Integrative Model for the Study of Developmental Competencies in Minority Children*




The integrative model incorporates the power of adaptive culture and captures the complex interactions across different contextual factors that affect children's development. Garcia Coll et al. (1996) conceptualize adaptive culture "as responses

largely reflecting culturally defined coping mechanisms to the demands placed by the promoting and inhibiting environments," including an example of extended kinships which provide support (p. 1904). Garcia Coll et al. (1996) expanded their model by summarizing the existing literature in light of their integrated model and articulating the impact of contextual factors (e.g., the healthcare system, economic and political history, migration history and immigration patterns) that interact with children's characteristics (e.g., age, gender, health conditions, family and family structure and roles, family values, racial socialization, SES) to provide a comprehensive understanding of developmental competencies of children of color.

**Summary**

The theoretical frameworks – critical theory in education, ecosystem theory, and the Integrative Model – helped me conceptualize the background understanding of academic inequalities perpetuated in the educational system, including disparities present in persisting students and their educational experiences. These frameworks highlight how multiple systems (micro, meso, and macro systems) can interact to influence students' academic engagement and development. Although the study is exploratory and the analysis involves an inductive, data-driven approach, the theories will be useful in interpreting the findings and generating hypotheses for future research using methods other than administrative data.

## The Current Study

Expanding on my previous research, this dissertation study aims to deepen the understanding of persisting students – who are overrepresented from historically marginalized populations – and their experiences in the educational system. The present study poses two main research questions:

RQ 1: What individual-level and school-level factors are most effective in distinguishing students who are persisters versus on-time graduates?

- RQ 1.1: What distinctive profiles of interacting factors identify students with the highest probability of being persisters?

RQ 2: What individual-level factors are most effective in distinguishing students who transfer to alternative schools versus remain in mainstream high schools?

- RQ 2.1: What distinctive profiles of interacting factors identify students with the highest probability of transferring to alternative schools?

This study will focus on identifying students' individual-level and school-level characteristics that can interact to affect being persisters versus on-time graduates. In addition, this study examines students' individual-level factors that can interact to contribute to students' transfer to alternative schools versus remaining in mainstream high schools. The examination of the first question will help us understand the characteristics of persisting students who are largely ignored in current educational research and policy. The examination of the second question using CART

(classification and regression tree) analysis can help us identify not only the characteristics of students who are transferred to alternative schools, but also allow us to examine whether students with different characteristics are transferred to different types of alternative schools. By doing so, I hope to contribute to the existing literature by deepening our understanding of persisting students as well as the characteristics of students who are transferred to alternative schools These findings can inform policy and practice as well as development of intervention strategies for students who are marginalized. These findings can potentially be used by teachers, counselors, and school social workers to identify students with higher probability of being persisters and help design intervention strategies that provide tailored support.

# Methods

## Portland Public Schools

As one of the largest school districts in Pacific Northwest, Portland Public Schools is an urban school district located in Portland, Oregon. Portland Public Schools currently serves more than 49,000 PK-12 students in 81 schools, including 10 high schools. The current student body is made up of 55.9% white, 16.6% Latinx, 8.6% Black, 6.2% Asian American, 0.8% Pacific Islander, 0.5% Indigenous (Native American/Alaskan Native), and 11.3% multi-racial/ethnic and Others (https://www.pps.net/domain/265).

### *Alternative Education in Portland Public Schools*

**History.** Alternative education in PPS began with community-based organizations (CBOs). Some of these early CBOs that are still operating include Open Meadow Alternative School, now called Open Schools, was founded in 1971 to offer a small community-learning environment for students who have difficulty in regular schools or students who previously dropped out. The Open Schools are designed to accommodate students with various learning abilities and learning styles while they "learn to experience success and a sense of purpose practicing a commitment to personal responsibility, accountability, and respectful relationships" (Aron, 2006, p. 29). Another CBO based on culturally responsive pedagogy is NAYA (Native American Youth and Family Center). NAYA Family Center was "founded by parent and Elder volunteers in 1974" to fulfill their mission "to enhance the diverse strengths of our youth and families in partnership with the community through cultural identity

and education" (NAYA Family Center: https://nayapdx.org/). As part of their services, NAYA Family center provides educational opportunities for elementary to high school students while providing counseling and other support services.

**Alternative Education Today.** Alternative education in Oregon is defined as "a school or separate class group designed to best serve students' educational needs and interests and assist students in achieving the academic standards of the school district and the state (ORS-336.615 OAR-581-022-1350, Porowski et al., 2014, p. B-5).

In Oregon, alternative education (including online schools) accounts for about 10% of public high school enrollment in the 2015-2016 school year (Richardson & Memmott, 2017). According to Richardson and Memmott (2017), dropout rates are disproportionately higher in alternative education (18%) as compared to roughly 2% in traditional high schools. They call for the need to hold traditional high school accountable especially "when their students transfer to alternative schools and drop out soon after" (p. 15). In addition, the authors call for the need to develop metrics to account for contributions made through alternative education when students are making good academic progress, including completion of high school through alternative education (Richardson & Memmott, 2017). Finally, noting the budget challenges districts face, Richardson and Memmott (2017) recommend seeking assistance from outside sources to build strong alternative education, including funding from state, county health departments, and coordinated care organizations.

***Multiple Pathways to Graduation.*** As discussed, Portland Public Schools

alternative education has a long history serving students who are marginalized. In recent decades, to promote student learning and successful graduation, Portland Public Schools created Multiple Pathways to Graduation (MPG) to provide alternative education options. MPG aims to serve students who are struggling to make academic progress or at risk of dropping out from traditional high schools (Marsh & Hill, 2010). With an appreciation that different students learn in different ways in different settings, MPG aims to meet the varying needs of students by proving tailored support (Marsh & Hill, 2010). Portland Public Schools alternative education through MPG includes alternative programs in district-operated schools, community-based organizations (CBOs), including Open Schools, NAYA Family Center, and Gateway to College through collaboration with Portland Community College (PCC). Starting in 2002, Portland Public Schools has provided varying programs for students who pursue a high school diploma, GED, enhanced English literacy, as well as college-prep and college-level work by "maintaining high expectations of all students" and providing needed mentoring (Aron, 2006, p. 29), special services (100% of students in these settings are in special education), teen pregnancy, a reconnection center, online schools, and charter schools.

According to Mitchell and Waiwaiole (2003), Portland Public Schools alternative education historically has served disproportionately Black, Latinx, and Indigenous students. The authors also note that many of the students are academically struggling and faced with life challenges. Among those in alternative education, Mitchell and Waiwaiole (2003) suggest that female students are struggling more

academically as well as having more behavioral problems. Many of these students have low attendance due to challenges that they face and accumulate less credits than their counterparts in traditional high schools; nevertheless, “most in-district-alternative students appear to be on track to earn enough credits for graduation by the time they finish their senior year” (Mitchell & Waiwaiole, 2003, p. 9). Furthermore, the authors note the features of successful alternative education as supportive environments with respect, acceptance, and caring teachers/staff, teachers’ high expectations of their students, respecting and accommodating different learning styles, understanding students’ circumstances, and advising in preparation for postsecondary education and career development.

**Data Collection**

Based on collaboration with Portland Public Schools, this study will utilize a longitudinal administrative data set that contains students’ demographic and academic characteristics, as well as school information. The school district reports will be used to understand school-level characteristics. Student-level characteristics examined based on de-identified administrative data including:

- student demographic information (e.g., race/ethnicity, gender, age),
- academic characteristics (e.g., special education services (SPED), talented and gifted (TAG), limited English proficiency (LEP), language spoken at home),
- academic progress and outcomes (e.g., attendance records, GPAs, test results on reading, writing, Math, and Science, discipline records on suspension and

expulsion, degree acquisition, diploma type and date), and

- school information.

School-level characteristics include:

- type of school (regular high school, alternative school/program, community-based organization (CBO), special services, and charter school),
- school-level percent of students who qualified for free- or reduced-price meals (school-level FRPM rate), school-level SPED rate, LEP rate, TAG rate, and racial/ethnic composition of student body.

The longitudinal administrative data set was obtained through a data sharing agreement made between Portland Public Schools and School of Social Work, Portland State University in 2018. The IRB was obtained and maintained from the Human Research Protection Program at Portland State University. Confidentiality will be maintained throughout and following the research process. Participants will remain anonymous, and only the aggregated results will be disseminated. This study will analyze de-identified student data. To protect and maintain confidentiality of students, any report that involves a group of less than 10 people will be noted as n=* to suppress the actual number of participants in that group. Furthermore, this study will not utilize students' ZIP code to protect their confidentiality.

Table 1 presents descriptive statistics summarized by school type. This includes a total count of schools as well as a mean and SD of a total number of students, school-level FRPM, SPED, LEP, and TAG rates.

**Table 1**

*Summary Statistics (Mean, SD) by School Type*

| School Type | High School | Alternative/CBO |
|---|---|---|
| Number of schools | 13 | 25 |
| Total students | 902.2 (557.1) | 108 (120.8) |
| Percentage of female students | 52.5% (15.6) | 44% (17.2) |
| Percentage of white students | 45.2% (20.5) | 46.8% (22.2) |
| FRPM rate | 55.3% (23.8) | 53.2% (31.0) |
| SPED rate | 15.1% (5.4) | 20% (16.3) |
| LEP rate | 7.4% (5.9) | 7.3% (20.3) |
| TAG rate | 14.9% (8.3) | 5.6% (8.3) |

**Note 1*. This is based on district reports during the year 2011 and 2012.

**Note 2*. Community-based alternative schools/programs do not necessarily use the District nutrition services program. Thus, FRPM rates reported in those schools/programs may be lower than actual rates.

**Note 3*. Student count of some of the alternative schools/community-based organizations is based on PK-12 total. Thus, total count of high school students may be overestimated in these schools.

**Note 4*. Some high schools provided intra-school academies. For these academies, student count is lower than the total number of students at that school.

## Participants

This study utilizes a longitudinal administrative data set covering the entire cohort of students who entered as ninth graders during the 2011-2012 school year (SY). For on-time graduates, their academic progress was followed up until the 2014-2015 SY (Year 4). For persisters, their academic progress was followed up until the

2016-2017 SY (Year 6).

***Exclusion Criteria***

**School Year 2011-2012**. The initial data set involved all students (n = 3,494) who were enrolled as ninth graders during the 2011-2012 SY at a school district in a Pacific Northwest metropolitan area. We excluded students transferring in from neighboring school districts during their first year (*n* = 135) as well as students who repeated ninth grade (*n* = 58).

**School Year 2014-2015**. Out of 3,301 remaining students, 644 students were no longer enrolled in the school district during their fourth year. In addition, 114 students dropped out by the end of their fourth year. Furthermore, there were 48 students who transferred out of the school district during or at the end of their fourth year. These students were excluded from the study. Also, there was a very small portion of students (less than 2%) whose academic outcome records were missing; thus, their data were excluded for analysis.

Upon completion of their fourth year, 2,006 students received a regular high school diploma (on-time graduates), and 89 students received a modified/extended diploma or GED. 258 students did not earn a high school diploma but continued their enrollment during their fifth year (5th year persisters). Thus, the final data set included 2,264 students: 2,006 on-time graduates (88.6%) and 258 persisters (11.4%).

**School Types.** As part of its alternative program, this school district offered special services. In addition, there were students who attended charter schools. There were 81 students who attended special services or charter schools during their first or

fourth year, and their data were excluded for analysis.

**Preliminary Results**

Before discussing the main findings of this dissertation, I would like to share some preliminary analysis results that are based on my comps project that inspired me to develop my dissertation topics and research questions. Table 2 below presents comparative statistics between persisters and on-time graduates.

**Table 2**

*Participant Demographics by Student Status*

| Participant Demographics | Persisters | On-Time Grads |
|---|---|---|
| Mean age at entry | 14.4 (.4) | 14.4 (.4) |
| Gender | | |
| Male | 58.9% | 48.4% |
| Race/Ethnicity | | |
| Black/African American | 19.8% | 10.2% |
| Asian American/Asian | 5% | 12% |
| European American/white | 39.1% | 56.6% |
| Indigenous/Native American | 2.7% | 1.1% |
| Latinx/Hispanic | 27.1% | 13.5% |
| Multiethnic/other | 6.2% | 6.5% |
| Participants (*n*) | 258 | 2,006 |

***Characteristics of Persisters***

Persisters were disproportionately students of color (e.g., Black, Latinx, Indigenous students, $\chi^2(5, N = 2264) = 73.47$, $p < .001$, Cramer's $V = .18$) and males

($\chi^2(1, N = 2264) = 10.1, p < .01, \Phi = .07$); persisters were 58.9% males compared to 48.4% of on-time graduates. A greater proportion of persisters were in SPED (31.4%), as compared to on-time graduates (8.2%), and this difference was statistically significant ($\chi^2(1, N = 2264) = 127.72, p < .001, \Phi = .24$). Similarly, almost all persisters (93.8%) were in academic priority at some point, as compared to 63.6% of on-time graduates, and this difference was statistically significant ($\chi^2(1, N = 2264) = 94.30, p < .001, \Phi = .20$). Moreover, a smaller proportion of persisters were in TAG (5.4%), as compared to on-time graduates (20%), and this difference was statistically significant ($\chi^2(1, N = 2264) = 32.39, p < .001, \Phi = .12$). When the proportion of LEP were compared, more persisters were English language learners (8.9%) as compared to on-time graduates (4.8%), and this difference was statistically significant ($\chi^2(1, N = 2264) = 7.83, p < .01, \Phi = .06$).

***School Environment***

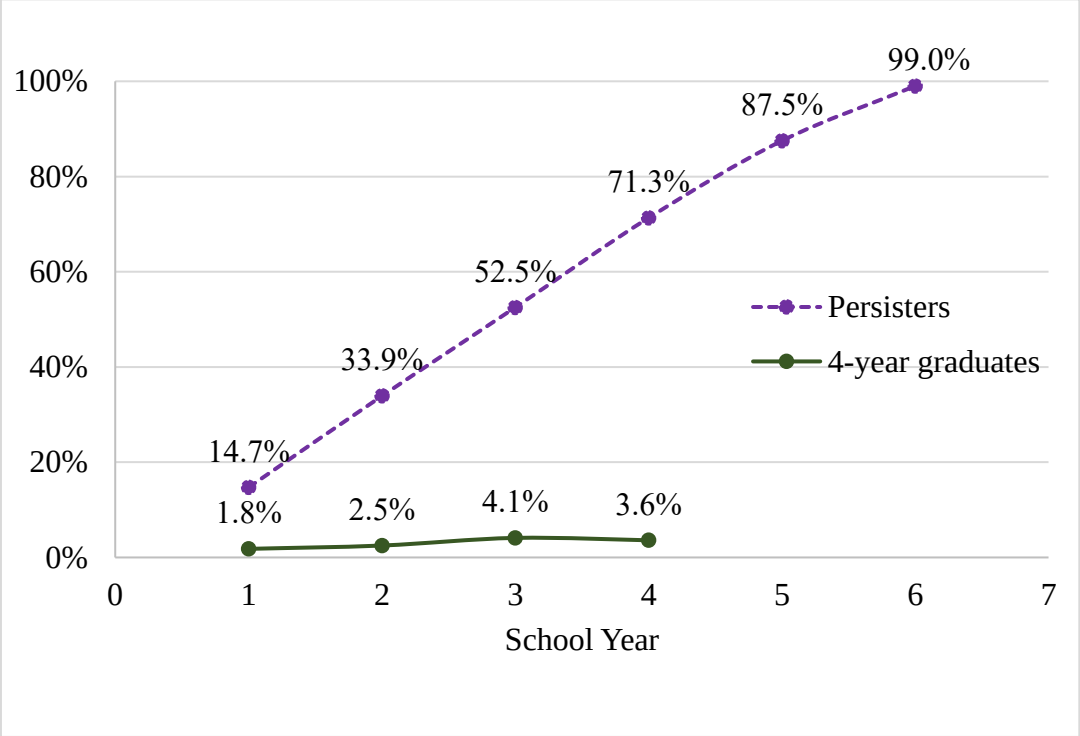
Not only were persisters themselves disproportionately students of color, the schools that they attended also had more students of color. Moreover, their schools served higher proportions of students in poverty. In addition, not only were persisters themselves disproportionately students in SPED, the schools that they attended also had more students in SPED and fewer students in TAG. Furthermore, their schools served higher rates of students with LEP.

Furthermore, persisters more commonly attended alternative educational settings (alternative programs and community-based programs) than mainstream high schools, as compared to on-time graduates. The differences increased over time. By

the time persisters reached their fifth year, 87.5% of them attended alternative schools/community-based organizations, and in their sixth year, 99% of remaining persisters attended alternative educational settings. Figure 2 represents percentages of students (persisters and on-time graduates) attending alternative educational settings over time.

**Figure 2**

*Percentage of Students (Persisters and On-Time Graduates) in Alternative Schools*




As illustrated in Figure 2 above, persisters attended disproportionately more alternative schools/community-based organizations as compared to on-time graduates, and these patterns became more pronounced as students progressed through every school year.

When examining school transfer patterns based on their first- and fourth-year

school information, most on-time graduates (88.2%) remained in the same mainstream high school as compared to only 18.6% of persisters. While the majority of persisters (57.4%) transferred from a mainstream high school to an alternative school/community-based organization between the first and fourth year, the same was true for only 2% of on-time graduates. These school transfer pattern differences between persisters and on-time graduates were statistically significant ($\chi^2(5, N = 2264) = 1133.72$, $p < .001$, Cramer's $V = .71$). Table 3 below describes detailed school transfer patterns for persisters and on-time graduates.

**Table 3**

*School Transfer Patterns by Student Status*

| | School Type(s) | Persisters | On-Time Grads |
|---|---|---|---|
| Same School | High school (HS) | 48 (18.6%) | 1796 (88.2%) |
| | Alternative/CBO | 9 (3.5%) | 22 (1.1%) |
| Transfer | HS-HS | 24 (9.3%) | 161 (8.0%) |
| | HS-Alt/CBO | 148 (57.4%) | 40 (2.0%) |
| | Alt/CBO-Alt/CBO | 27 (10.5%) | 10 (0.5%) |
| | Alt/CBO-HS | 2 (0.8%) | 4 (0.2%) |
| Participants (*N*) | | 258 | 2,006 |

## Analysis

Classification and regression tree (CART) analyses were conducted to answer two main research questions for this proposed study. As a family of advanced exploratory data optimization techniques, CART can be used to discern patterns in the data. CART is a nonparametric statistical procedure that "clusters individuals into a number of mutually exclusive and exhaustive groups based on interaction effects among the independent variables" (Ma, 2018, p. 12) associated with the outcome variable.

CART produces a visual output that resembles a tree with branches to represent clusters of individuals in each "node" with the prevalence (percentage) of the outcome under investigation. A CART tree begins with one "node" that contains the entire sample – this is called the *parent node*. In the visual output, CART analysis reveals the independent variable that has the greatest capacity to differentiate on the outcome variable after testing all the independent variables in the data. This process continues as CART analysis continues to find additional independent variables that can maximize the difference on the outcome variable within each child node. When a child node is no longer split into binary groups, it is considered a *terminal node*. At the end of the CART analysis, the visual output will be comprised of clusters of individuals separated "into a number of mutually exclusive and exhaustive groups based on interaction effects among the independent variables" (Ma, 2018, p. 12) that are identified by CART exploratory analysis. CART analysis not only reveals each group with its distinctive characteristics based on interactions among different factors,

but also the prevalence of the outcome variable.

CART analysis can use a dependent (outcome) variable that can be either categorical or continuous. For a categorical dependent variable, CART produces a classification tree whereas for a continuous dependent variable, CART produces a regression tree; thus, the term "classification and regression tree" (CART). CART analysis can utilize categorical and continuous independent (predictor) variables. For continuous independent variables, CART can identify the optimal cutoff point to create two subgroups. In the case of a categorical independent variable that involves multiple categories, CART can determine and split the node into two subgroups that can maximize differentiation on the outcome.

**Splitting Criteria.** When the node ("parent node") is split into binary subgroups ("child nodes"), this process is referred to as "splitting" or "growing" (i.e., of a tree). When running a regression tree based on a continuous outcome variable, least squares or least absolute deviations can be used to determine whether to continue growing. For a classification tree based on a categorical outcome variable (as in this study) CART can utilize misclassification error, Gini index, entropy index, and/or twoing. Misclassification error is based on "the proportion of observations in the node that are not members of the majority class in that node" (Moisten, 2008, p. 584). Gini index and entropy index are more "sensitive than the misclassification error to changes in node probability" (Moisten, 2008, p. 584), and are therefore more frequently used. Twoing is "designed for multiclass problems" and has "the advantage of revealing similarities between classes" (Moisten, 2008, p. 584). These impurity measures allow

us to determine whether to continue growing. The Gini index was used for this study, and measures the impurity (i.e. heterogeneity or diversity) of outcomes contained within each node. Gini index has an extreme case (maximum impurity) at .5, which indicates each subject in the node has an equal chance of belonging to any outcome category; the other extreme cases are 0 or 1, where all subjects in that node belong to the same outcome category (no impurity). The Gini improvement measure calculates the reduction in impurity caused by splitting a parent node into child nodes and can be used "for determining the optimal split of a parent node into two child nodes" by reducing impurity and maximizing the homogeneity within the node on the outcome prevalence (Lemon et al., 2003, p. 174).

**Stopping Rules**. At some point, we may want to prevent a tree from overgrowing. One approach to avoid an overgrown tree is to set "a priori defined criteria for stopping the growing procedure, called *stopping rules*" (Lemon et al. 2003, p. 175). Some of these a priori criteria may include defining the minimal difference between two subgroups, the minimum number of individuals in the child nodes or in terminal nodes, and the maximum number of independent variables can be included.

**Pruning.** As an alternative to setting up a priori stopping rules, we can allow a tree to overgrow and prune the tree. Pruning of a tree involves misclassification cost measures. These include minimum cost-complexity pruning and one standard error (SE) rule. The SE rule is to find the "the smallest tree whose cost is within one SE of the tree with minimum cost selected" (Lemon et al. 2003, p. 175). CART

analysis also allows us to use stopping rules and pruning simultaneously to determine the tree size.

**Advantages of CART**. CART analysis has a number of advantages, including that its results can be easily interpreted and understood. In each node, you can see the characteristics of each group (subgroup profile) and the prevalence (probability) of the outcome under investigation. CART not only identifies groups with varying prevalence but also reveals complex interactions and nonlinear relations between independent variables which is difficult to accomplish using other traditional statistical techniques. In addition, CART is a nonparametric statistical technique that does not require any distributional assumptions.

## CART Analysis of Current Study and Findings

Classification and regression tree (CART) analyses will be used to answer two main research questions for this proposed study:

RQ 1: What individual-level and school-level factors are most effective in distinguishing students who are persisters versus on-time graduates?

- RQ 1.1: What distinctive profiles of interacting factors identify students with the highest probability of being persisters?

RQ 2: What individual-level factors are most effective in distinguishing students who transfer to alternative schools versus remain in mainstream high schools?

- RQ 2.1: What distinctive profiles of interacting factors identify students with the highest probability of transferring to alternative schools?

### CART Analysis for RQ 1

In examination of RQ 1, the dependent variable was student's status: 1) persister ($n$ = 258, 11.4%) and 2) on-time graduate ($n$ = 2,006, 88.6%; student who graduated in 4 years of high school with a regular high school diploma). Independent variables included both students' individual- and school-level characteristics. Students' individual-level characteristics included:

- student demographic information (e.g., race/ethnicity, gender, age),
- academic characteristics (e.g., special education services (SPED), academic priority, Section 504 (disability and mental health), talented and gifted (TAG),

limited English proficiency (LEP), and language spoken at home), and

- academic progress and outcomes (e.g., GPAs, attendance records (categorized into two groups: 1) chronically absent (attendance rate ≤ 90%), and 2) not chronically absent (attendance rate > 90%), test results on reading, writing, Math, and Science, discipline records on suspension and expulsion).

School-level characteristics included:

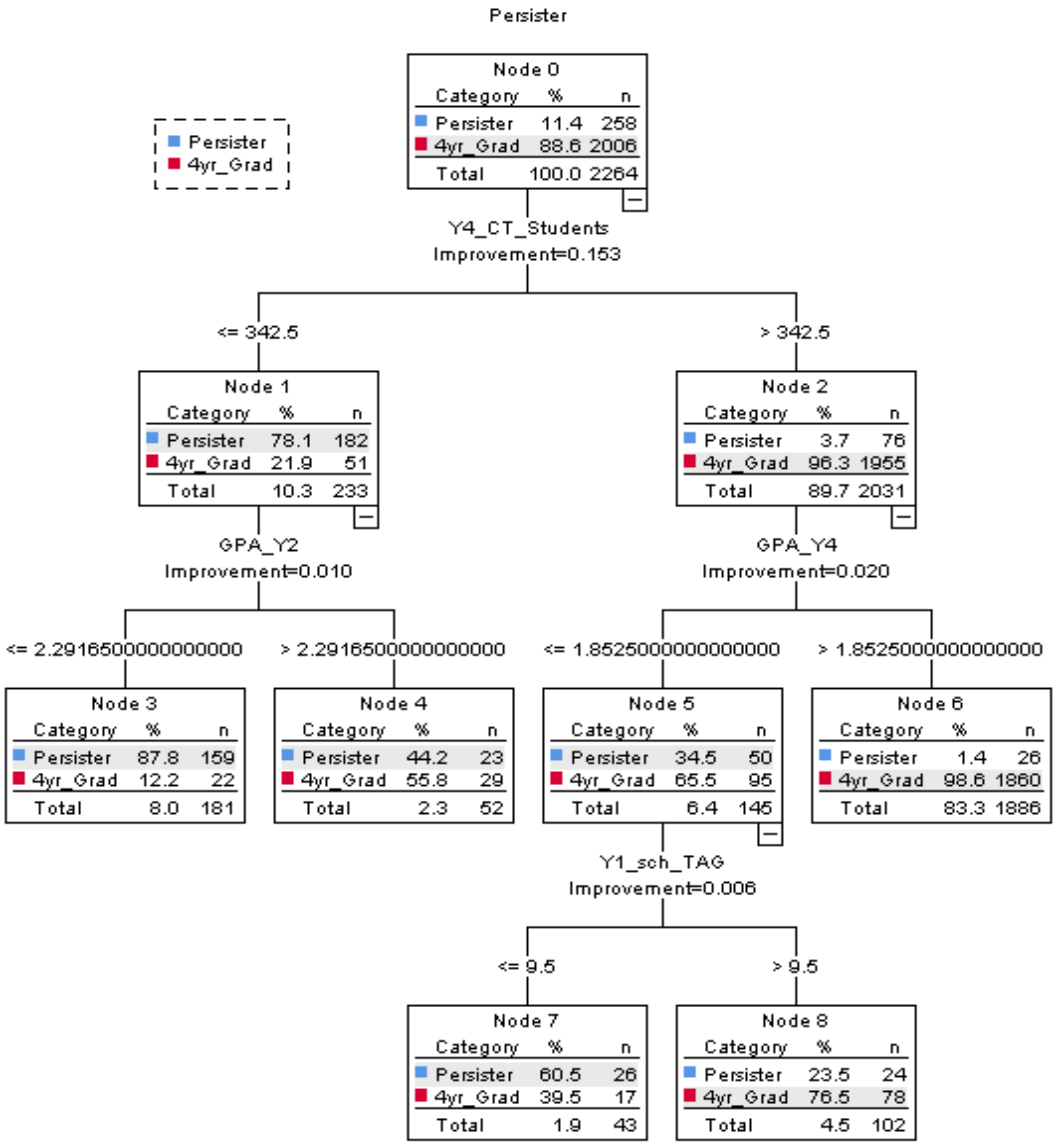
- type of school (mainstream high school, alternative school/ community-based organization),
- school-level percent of students who qualified for free- or reduced-price meals (school-level FRPM rate), school-level SPED rate, LEP rate, TAG rate, and
- racial/ethnic composition of student body.

To examine RQ 1, CART analysis was conducted using SPSS CRT methods. Since my priority was to identify persisters, I doubled the risk cost for misclassification of persisters as on-time graduates when using SPSS CRT methods. For a splitting criterion, Gini improvement measure was employed and set at .0001 for the minimum change in reduction in impurity. Stopping criteria in this study were tree growth limit set at 5 as the maximum tree depth, parent node at a minimum of 80, and child node at a minimum of 40. Pruning rules were not employed for the current study. However, this study utilized a cross-validation approach with sample folds set at 10.

Figure 3 below is visual output of CART analysis examining individual-level and school-level factors that were most effective in distinguishing students who are persisters versus on-time graduates.

**Figure 3**

*CART Visual Output for Student Status (Persisters versus On-Time Graduates)*




The CART results indicated that students' fourth-year school size was the indicator which maximized the difference in students as persisters versus on-time

graduates. As illustrated in the visual output of the CART analysis in Figure 3 above, the first node (Node 1) was comprised of students who attended small schools whose student body size was below 343. In this group, most students were persisters (78.1%, *n* = 182) while only 21.9% of students were on-time graduates (*n*=51). On the other hand, the second node (Node 2) was comprised of students who attended large schools whose student body size was at least 343. In this group, only 3.7% of students were persisters (*n* = 76) while most students were on-time graduates (96.3%, *n* = 1955).

From Node 1 (small school), the best indicator to maximize the difference in students between persisters versus on-time graduates was students' GPA in year 2. The first terminal node (Node 3) included students whose GPA was below or equal to 2.29 and most of them were persisters (87.8%, *n* = 159). The majority of all persisters belonged to this group (small schools – low Y2 GPA). The second terminal node (Node 4) included students who attended small schools and students' second-year GPA was greater than 2.29 (small school – high Y2 GPA). In this group less than half of students were persisters (44.2%, *n* = 23).

From Node 2 (large school), the factor that maximized the difference between persisters versus on-time graduates was students' fourth-year GPA. Node 5 included students whose GPA was below or equal to 1.85 and among them, 34.5% were persisters (*n* =50). The third terminal node (Node 6) included students who attended large schools with their GPA in year 4 greater than 1.85 (large school – high Y4 GPA). In this group only 1.4% of students (*n* = 26) were persisters.

From Node 5 (large school – low Y4 GPA), the best indicator to maximize the

difference in students between persisters versus on-time graduates was the school-level TAG rate in their first-year school. The fourth terminal node (Node 7) included students whose first-year school-level TAG rate was below or equal to 9.5% (large school – low Y4 GPA – low school-level TAG rates), and in this group 60.5% of students were persisters ($n$ = 26). The last terminal node (Node 8) was comprised of students whose first-year school-level TAG rate was above 9.5% (large school – low Y4 GPA – high school-level TAG rates). In this group, only 23.5% of students were persisters ($n$ = 24).

SPSS CART analysis produced a summary of how accurately the CART-identified model predicted the outcome in comparison to the observed data. Table 4 below compares the actual numbers of persisters and on-time graduates observed in the data compared to the predicted numbers of persisters and on-time graduates according to the interactions between independent variables identified by the CART analysis. In addition, Table 4 includes the percentages of correct predictions achieved through the CART analysis.

**Table 4**

*Comparison Between Predicted and Observed Percentages of Student Status*

| Observed | Predicted Persisters | On-Time Grads | Correct Percent |
|---|---|---|---|
| Persisters | 208 | 50 | 80.6% |
| On-Time Grads | 68 | 1938 | 96.6% |
| Overall Percentage | 12.2% | 87.8% | 94.8% |

Overall, the CART-identified model predicted student status (persisters/on-time graduates) with 94.8% accuracy. While the CART-identified model made a prediction with a high accuracy on student status, the model predicted on-time graduates more accurately (96.6% accuracy) than persisters (80.6%).

To understand each group's distinctive characteristics, students' demographic and academic characteristics were examined. Table 5 below summarizes the demographic and academic characteristics of students within each node.

**Table 5**

*Demographic and Academic Characteristics of Students Across Nodes*

| Node | 3 | 4 | 6 | 7 | 8 |
|---|---|---|---|---|---|
| School Size | Small | Small | Large | Large | Large |
| %Persisters | 87.8% | 44.2% | 1.4% | 60.5% | 23.5% |
| %Female | 42.5% | 69.2% | 51.9% | 25.6% | 38.2% |
| %White | 37.6% | 51.9% | 57.2% | 14% | 55.9% |
| %SPED | 31.5% | 21.2% | 7.7% | 30.2% | 18.6% |
| %AcadPriority | 92.8% | 76.9% | 62.8% | 100% | 81.4% |
| %TAG | 3.3% | 15.4% | 20.7% | 0% | 10.8% |
| %LEP | 8.3% | 3.8% | 4.9% | 16.3% | 2.9% |
| Participants (*N*) | 181 | 52 | 1,886 | 43 | 102 |

**Note 1*. *SPED* stands for students in special education services.
**Note 2*. *AcadPriority* stands for students in academic priority anytime during school year.
**Note 3*. *TAG* stands for students in talented and gifted program
**Note 4*. *LEP* stands for students with limited English proficiency.

Racial disparity can be observed when comparing proportions of persisters and proportions of students of color across nodes. In general, nodes that had more students of color tended to have higher proportions of persisters. In addition, nodes that had more students of color appeared to have more students in SPED and academic priority while fewer students in TAG. They also seemed to have more students with LEP. Statistically significant differences in racial/ethnic make-ups were found across terminal nodes ($\chi^2(20, N = 2264) = 129.44, p < .001$, Cramer's $V$=.24); the same was true for proportions of students in SPED ($\chi^2(4, N = 2264) = 128.30, p < .001$, Cramer's $V$=.24), academic priority ($\chi^2(4, N = 2264) = 102.87, p < .001$, Cramer's $V$=.21), TAG ($\chi^2(4, N = 2264) = 48.04, p < .001$, Cramer's $V$=.15), and LEP ($\chi^2(4, N = 2264) = 15.68, p < .01$, Cramer's $V$=.08) based on ANOVA results.

Racial disparity with regards to the proportion of persisters were evident, especially comparing between Node 7 and Node 8. Students in these nodes shared similar academic characteristics based on the CART-identified model (large school – low Y4 GPA) and follow-up analyses on academic progress. While they were split based on students' first-year school-level TAG rates, Node 7 (low school-level TAG rates) included mostly students of color (86%) and had nearly three times the proportion of persisters as compared with Node 8 that had a majority of white students.

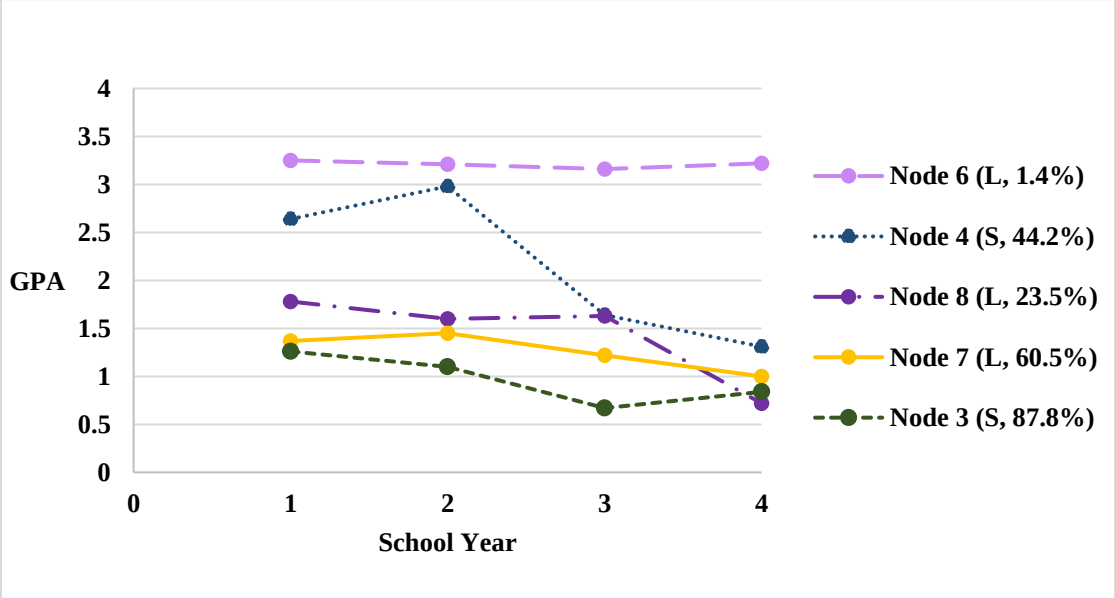
There appear to be gender differences in student status such that nodes that had more male students tended to have lower GPAs and higher proportions of persisters. For example, among students in smaller schools, Node 3 (small school –

low Y2 GPA) had more male students and nearly two times the proportion of persisters as compared with Node 4 (small school – high Y2 GPA), which had more female students. Students in larger schools showed similar patterns. While students in Node 6 (large school – high Y4 GPA) had more female students and only 1.4% persisters, students in Nodes 7 and 8 (large school – low Y4 GPA) had more male students with higher proportions of persisters (60.5% and 23.5% respectively). In addition, nodes that had more female students appeared to have more students in TAG and fewer students in SPED and academic priority. Statistically significant gender differences were found across terminal nodes ($\chi^2(4, N = 2264) = 30.08, p < .001$, Cramer's $V$=.12).

Academic progress and outcomes were compared across nodes. Figure 4 below illustrates average GPA over time within each group.

**Figure 4**

*Comparisons of GPA Over Time Across Nodes*




**Note*. Node information within apprentices includes school size (*L* stands for larger school, and *S* stands for smaller school) and percentage of persisters within each group.

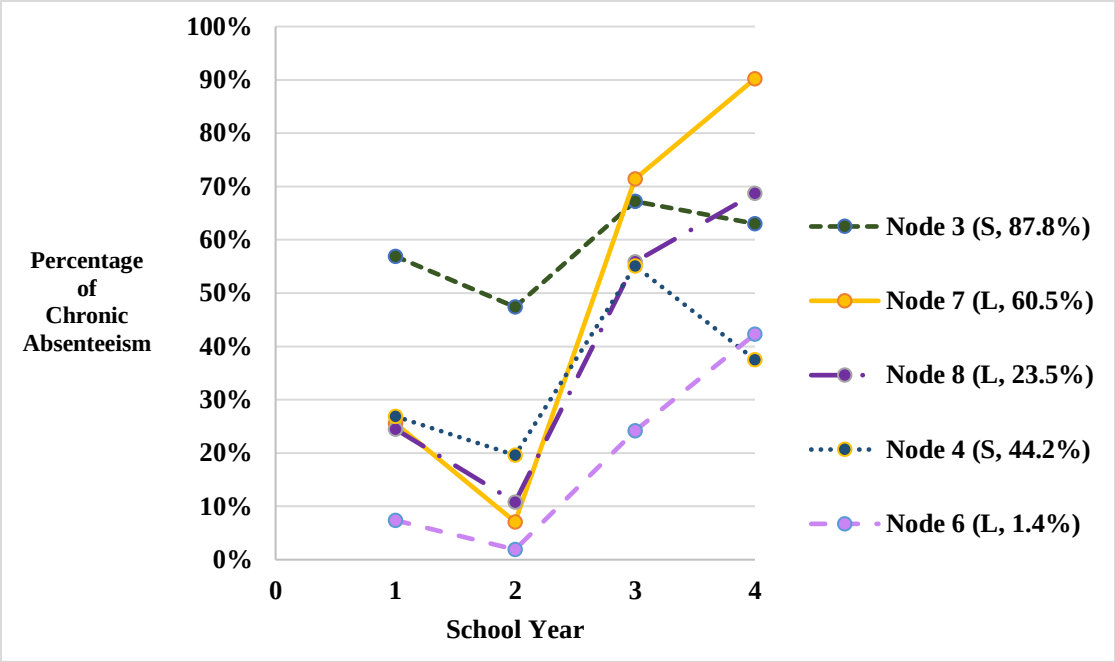
As seen in Figure 4 above, students in Node 6 (large school – high Y4 GPA) had overall high, steady GPAs across years. Students in Nodes 7 and 8 (large school – low Y4 GPA) appeared to experience overall declines in their GPAs over time. These trends appeared to be somewhat comparable for students in Node 3 (small school – low Y2 GPA); however, students in this group seemed to bounce back up somewhat during their fourth year indicating potential academic engagement and motivational resilience. On the other hand, students in Node 4 (small school – high Y2 GPA) seemed to experience sharp drops in their GPAs during their third and fourth years.

Figure 5 below illustrates percentages of students who experienced chronic

absenteeism over time within each node.

**Figure 5**

*Percentages of Students Experiencing Chronic Absenteeism Over Time Across Nodes*




**Note*. Node information within apprentices includes school size (*L* stands for larger school, and *S* stands for smaller school) and percentage of persisters within each group.

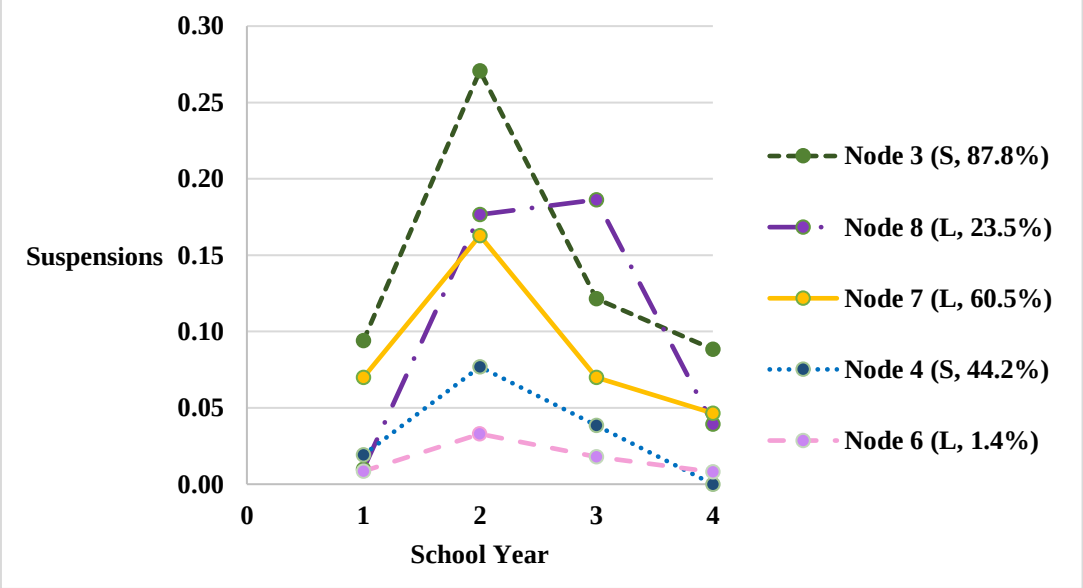
Based on the examination of chronic absenteeism, students in small schools in their fourth year (Nodes 3 and 4) tended to experience higher chronic absenteeism in their first two years. Looking across all nodes, students' chronic absenteeism seemed to decline in their second year but sharply increased during their third year. Chronic absenteeism for students in large schools during their fourth year kept increasing during their fourth year such that students in Nodes 7 and 8 (large school – low Y4 GPA) had the highest chronic absenteeism rates during the fourth year across all nodes

(90.2% and 68.7% respectively). Even in Node 6 (large school – high Y4 GPA) discernable increases in chronic absenteeism were evident in their later two years in high school. However, for Nodes 3 and 4 (small school), students' absenteeism declined during their fourth year of high school. Similar to GPA patterns, this may potentially indicate students in small schools remaining academically engaged even in their fourth year of high school.

Students' discipline records were compared across nodes based on suspensions every year. Figure 6 below illustrates the mean number of suspensions across all students within each node over time.

**Figure 6**

*Mean Numbers of Suspensions Over Time Across Nodes*




**Note*. Node information within apprentices includes school size (*L* stands for larger school, and *S* stands for smaller school) and percentage of persisters within each group.

As seen in Figure 6 above, overall students appeared to receive more suspensions during their second year but fewer during their third year and even less in their fourth year, similar to their first-year levels. Overall, nodes that included students receiving more suspensions had higher proportions of persisters. However, students in Node 8 (majority white students) received more suspensions than Node 7, yet, had nearly three times lower proportion of persisters as compared to Nodes 7 (mostly students of color).

Finally, students' school transfer patterns were compared across different groups. There were statistically significant differences in students' transfer patterns across different nodes ($\chi^2(20, N = 2264) = 2602.36$, $p < .001$, Cramer's $V$=.54). Table 6 below describes detailed school transfer patterns within each node.

**Table 6**

*School Transfer Patterns Across Nodes*

| | Node/School | 3 | 4 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|
| Same School | HS | - | - | 91.5% | 44.2% | 70.6% |
| | Alt | 3.9% | 5.8% | - | - | 20.6% |
| Transfer | HS-HS | - | - | 8.3% | 53.5% | 5.9% |
| | HS-Alt | 80.1% | 78.8% | - | - | 2.0% |
| | Alt -Alt | 16.0% | 15.4% | - | - | - |
| | Alt -HS | - | - | 0.2% | 2.3% | 1.0% |
| Participants (*N*) | | 181 | 52 | 1,886 | 43 | 102 |

*****_Note_. *HS* stands for high school and *Alt* stands for alternative school.

As shown above, most students in Nodes 3 and 4 transferred from a high school to an alternative school. For both nodes, less than a quarter of them initially attended an alternative school in their first year, increasing to nearly half during their second year, to about 75% during their third year, and then all of them attended an alternative school during their fourth year. Most students in Nodes 6 and 8 stayed in the same school. On the other hand, many students in Node 7 experienced school mobility between high schools.

***Node Profile Summaries***

In Node 3 (small school – low Y2 GPA; 87.8% persisters), students were disproportionately male and students of color (62.4%). This group included more English learners, students in SPED and academic priority, and fewer students in TAG. Students in this group experienced higher levels of suspensions. While their GPAs were overall lower, their GPA during their fourth year slightly increased. Their attendance patterns were somewhat similar in that while they began with higher rates of chronic absenteeism during their earlier years, their chronic absenteeism rates declined in later school years which may indicate their motivational resilience.

Somewhat differently, in Node 4 (small school – low Y2 GPA; 44.2% persisters), students were disproportionately female with slightly more white students. Compared to the entire sample, students in this group included fewer English learners and somewhat comparable rate of TAG. However, there were more students in SPED and academic priority. Their GPAs began high in earlier years but sharply declined during their third and fourth years. Somewhat similar to students in larger schools,

their chronic absenteeism increased sharply during their third year but declined again during their fourth year.

Students in Nodes 7 and 8 shared similar academic characteristics (large school – low Y4 GPA), but they differed based on students' first-year school-level TAG rates. Students in Node 7 (low school-level TAG rate; 60.5% persisters) were mostly students of color and male. All the students in this group were in academic priority and none were in TAG. Many of them were in SPED. Students in this group had the highest rate of English learners. Their GPAs began somewhat low in the beginning of high school and experienced gradual, but steady declines throughout high school. While these students experienced somewhat low levels of chronic absenteeism in the first two years, their chronic absenteeism spiked to 71.4% during their third year, and nearly all students (90.2%) experienced chronic absenteeism during their fourth year; this was the highest chronic absenteeism rate across all groups during the third and fourth year.

Node 8 (high school-level TAG rate; 23.5% persisters) included disproportionately white and male students. This node had the fewest English learners. Compared to the entire student sample, there were more students in SPED and academic priority, but fewer students in TAG. Their GPAs began somewhat low in the beginning of high school and experienced gradual declines with a somewhat sharp drop during their fourth year, such that their GPA was the lowest among all nodes during the fourth year. Their attendance patterns were somewhat comparable to Node 7, such that they began with relatively low chronic absenteeism in their first two years

and had sharp increases during their third year and fourth year. By the fourth year, their chronic absenteeism rate reached to 68.7% and it was the second highest rate during the fourth year across groups.

Most students in Node 6 (large school – high Y4 GPA; 1.4% persisters), who accounted for a majority of students in this study, remained in the same high school. This group included slightly more female students, the highest proportion of white students, and fewer English learners compared to the entire student sample. This group had the lowest proportions of students in SPED and academic priority, and the highest rate of students in TAG. These students experienced the lowest number of suspensions. While their GPAs remained steadily high over time, their absenteeism nonetheless spiked up during their third and fourth years, similar to the other nodes for larger schools.

**Additional CART Analysis for RQ 1**

I conducted an additional CART analysis to examine RQ 1 based on students' individual-level characteristics which include:

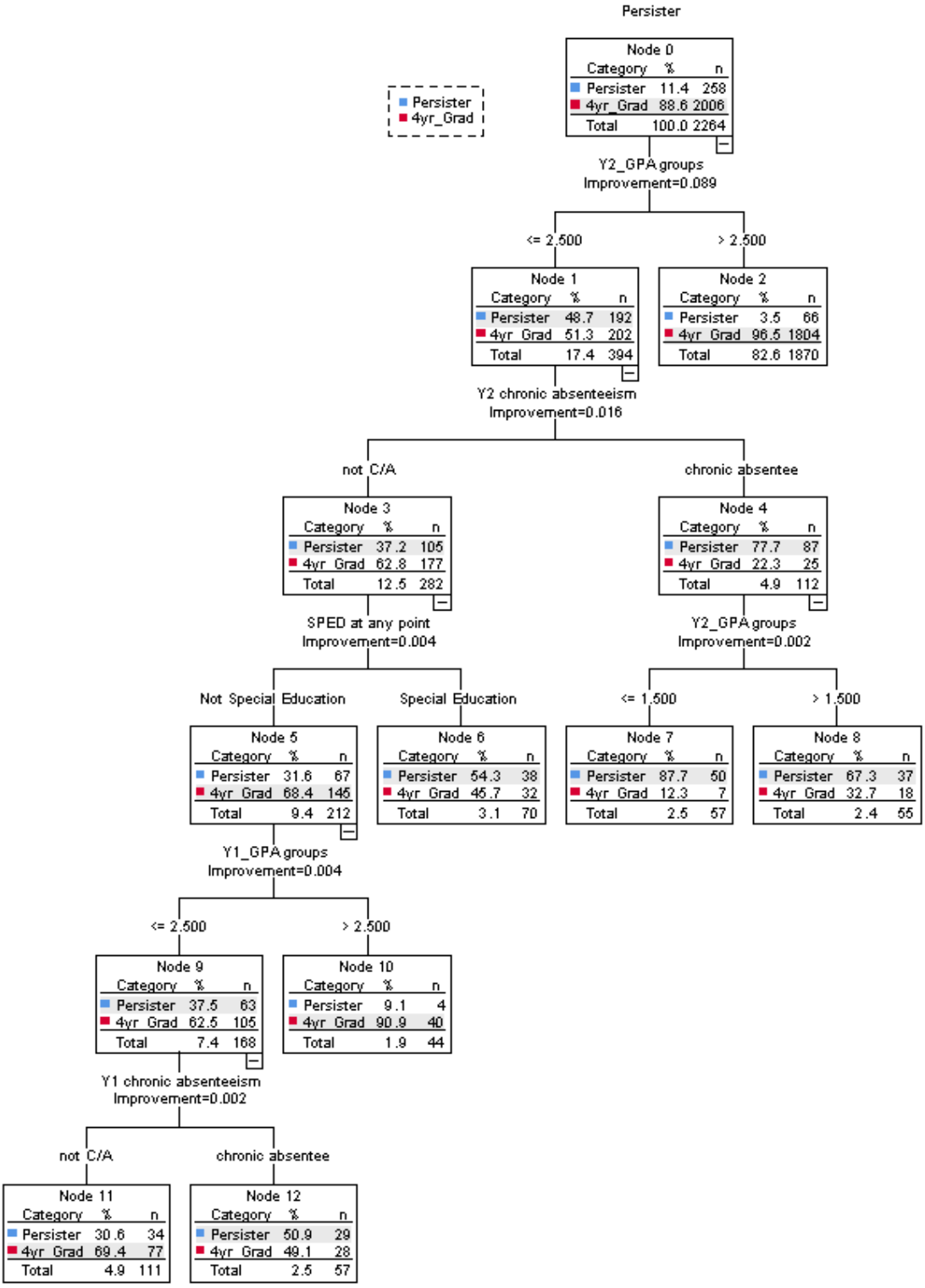
- student demographic information (e.g., race/ethnicity, gender, age),
- academic characteristics (e.g., special education services (SPED), academic priority, Section 504 (disability and mental health), talented and gifted (TAG), limited English proficiency (LEP), and language spoken at home), and
- academic progress and outcomes during their first two years (e.g., GPAs (categorized into 4 sub-groups: 1) 0 to 1, 2) above1 to 2, 3) above 2 to 3, and

4) above 3 to 4), attendance records (categorized into two groups: 1) chronically absent (attendance rate ≤ 90%), and 2) not chronically absent (attendance rate > 90%), discipline records of suspension and expulsion).

This analysis was conducted to see if CART analysis can help identify students who might become persisters in early academic years so that teachers, counselors, and school social workers can help identify persisters early on to provide tailored support. Figure 7 below is visual output of CART analysis examining individual-level factors that were most effective in distinguishing students who are persisters versus on-time graduates based on their demographics, academic characteristics, and progress during their first two years.

**Figure 7**

*CART Visual Output for Student Status based on Individual-Level Factors*


Persister
Persister
4yr_Grad
Node 0
Category % n
Persister 11.4 258
4yr_Grad 88.6 2006
Total 100.0 2264
Y2_GPA groups
Improvement=0.089
<= 2.500
> 2.500
Node 1
Category % n
Persister 48.7 192
4yr_Grad 51.3 202
Total 17.4 394
Node 2
Category % n
Persister 3.5 66
4yr_Grad 96.5 1804
Total 82.6 1870
Y2 chronic absenteeism
Improvement=0.016
not C/A
chronic absentee
Node 3
Category % n
Persister 37.2 105
4yr_Grad 62.8 177
Total 12.5 282
Node 4
Category % n
Persister 77.7 87
4yr_Grad 22.3 25
Total 4.9 112
SPED at any point
Improvement=0.004
Y2_GPA groups
Improvement=0.002
Not Special Education
Special Education
<= 1.500
> 1.500
Node 5
Category % n
Persister 31.6 67
4yr_Grad 68.4 145
Total 9.4 212
Node 6
Category % n
Persister 54.3 38
4yr_Grad 45.7 32
Total 3.1 70
Node 7
Category % n
Persister 87.7 50
4yr_Grad 12.3 7
Total 2.5 57
Node 8
Category % n
Persister 67.3 37
4yr_Grad 32.7 18
Total 2.4 55
Y1_GPA groups
Improvement=0.004
<= 2.500
> 2.500
Node 9
Category % n
Persister 37.5 63
4yr_Grad 62.5 105
Total 7.4 168
Node 10
Category % n
Persister 9.1 4
4yr_Grad 90.9 40
Total 1.9 44
Y1 chronic absenteeism
Improvement=0.002
not C/A
chronic absentee
Node 11
Category % n
Persister 30.6 34
4yr_Grad 69.4 77
Total 4.9 111
Node 12
Category % n
Persister 50.9 29
4yr_Grad 49.1 28
Total 2.5 57

The CART results indicated that students' second-year GPA was the best indicator which maximized the difference in students as persisters versus on-time graduates. As illustrated in the visual output of the CART analysis in Figure 7 above, the first node (Node 1) was comprised of students whose second-year GPA ranged from 0 to 2. In this group, nearly half of students were persisters (48.7%, *n* = 192). On the other hand, the first terminal node (Node 2) was comprised of students whose second-year GPA was greater than 2 (. In this group, only 3.5% of students were persisters (*n* = 66) while most students were on-time graduates (96.5%, *n* = 1804).

From Node 1 (Y2 GPA ≤ 2), the best indicator to maximize the difference in students between persisters versus on-time graduates was students' second-year chronic absenteeism status. Node 3 included students who were not chronically absent, and among them, 37.2% were persisters (*n* = 105). Node 4 included students who were chronically absent, and most of them were persisters in this group (77.7%, *n* = 87).

From Node 3 (Y2 GPA ≤ 2 – Y2 not chronically absent), the factor that maximized the difference in students between persisters versus on-time graduates was students' SPED status. Node 5 included students who were not in SPED, and 31.6% of them were persisters (*n* = 67). The second terminal node (Node 6) included students who were in SPED, and more than half of them were persisters (54.3%, *n* = 38).

From Node 4 (Y2 GPA ≤ 2 – Y2 chronically absent), the factor that maximized the difference was again students' second-year GPA. The third terminal node (Node 7) included students whose GPA ranged from 0 to 1, and this node included the highest proportion of persisters (87.7%, *n* = 50). The fourth terminal node (Node 8) included

students whose GPA ranged above 1 to 2, and 67.3% of them were persisters (*n* = 37).

From Node 5 (Y2 GPA ≤ 2 – Y2 not chronically absent – not SPED), the factor that maximized the difference in students between persisters versus on-time graduates was students' first-year GPA. Node 9 included students whose first-year GPA ranged from 0 to 2, and 37.5% of them were persisters (*n* = 63). The fourth terminal node (Node 10) included students whose first-year GPA was above 2. In this group, only 9.1% were persisters (*n* = 4).

From Node 9 (Y2 GPA ≤ 2 – Y2 not chronically absent – not SPED – Y1 GPA ≤ 2), the factor that maximized the difference in students between persisters versus on-time graduates was students' first-year chronic absenteeism status. The fifth terminal node (Node 11) included students who were not chronically absent, and in this group 30.6% were persisters (*n* = 34). The last terminal node (Node 12) included students who were chronically absent, and more than half of them were persisters (50.9%, *n* = 29).

Table 7 below is a summary of how accurately the identified model by CART predicted the outcome in comparison to the observed data. In addition, Table 7 includes the percentages of correct predictions achieved through the CART analysis.

**Table 7**

*Comparison Between Predicted and Observed Percentages of Student Status*

| Observed | Predicted Persisters | On-Time Grads | Correct Percent |
|---|---|---|---|
| Persisters | 154 | 104 | 59.7% |
| On-Time Grads | 85 | 1921 | 95.8% |
| Overall Percentage | 10.6% | 89.4% | 91.7% |

Overall, the CART-identified model predicted student status (persisters/on-time graduates) with 91.7% accuracy. While the CART-identified model made a prediction with a relatively high accuracy on an overall student status, the model predicted on-time graduates much more accurately (95.8% accuracy) but not so accurately for persisters (59.7%).

**CART Analysis for RQ 2**

RQ 2: What individual-level factors are most effective in distinguishing students who transfer to alternative schools versus remain in mainstream high schools?

- RQ 2.1: What distinctive profiles of interacting factors identify students with the highest probability of transferring to alternative schools?

As discussed earlier, the majority of persisters (57.4%) transferred from a high school to an alternative school while most on-time graduates remained in the same high school (88.2%) or transferred to another high school (8%).

A CART analysis was conducted to explore RQ 2. In this analysis, the outcome was defined as 3 groups: 1) 1,848 students who remained in the same school from the first year to fourth year, including those who remained in the same high school ($n$ = 1,817) and alternative school ($n$ = 31), 2) 225 students who transferred to an alternative school from a high school ($n$ = 188) or another alternative school ($n$ = 37), and 3) 191 students who transferred to a high school from another high school ($n$ = 185) or an alternative school ($n$ = 6). Thus, a total of 2,264 students were included in this analysis. Independent variables were students' individual-level characteristics, such as demographics and academic characteristics:

- student demographic information (e.g., race/ethnicity, gender, age),
- academic characteristics (e.g., SPED, academic priority, Section 504 (disability and mental health), TAG, limited English proficiency, and language spoken at home), and
- academic progress and outcomes (e.g., GPAs, attendance records (categorized into two groups: 1) chronically absent (attendance rate ≤ 90%), and 2) not chronically absent (attendance rate > 90%), discipline records on suspension and expulsion).

Since students' school transfer patterns were examined based on their first year and fourth year school information, students' academic progress up to their third year was included in the analysis.

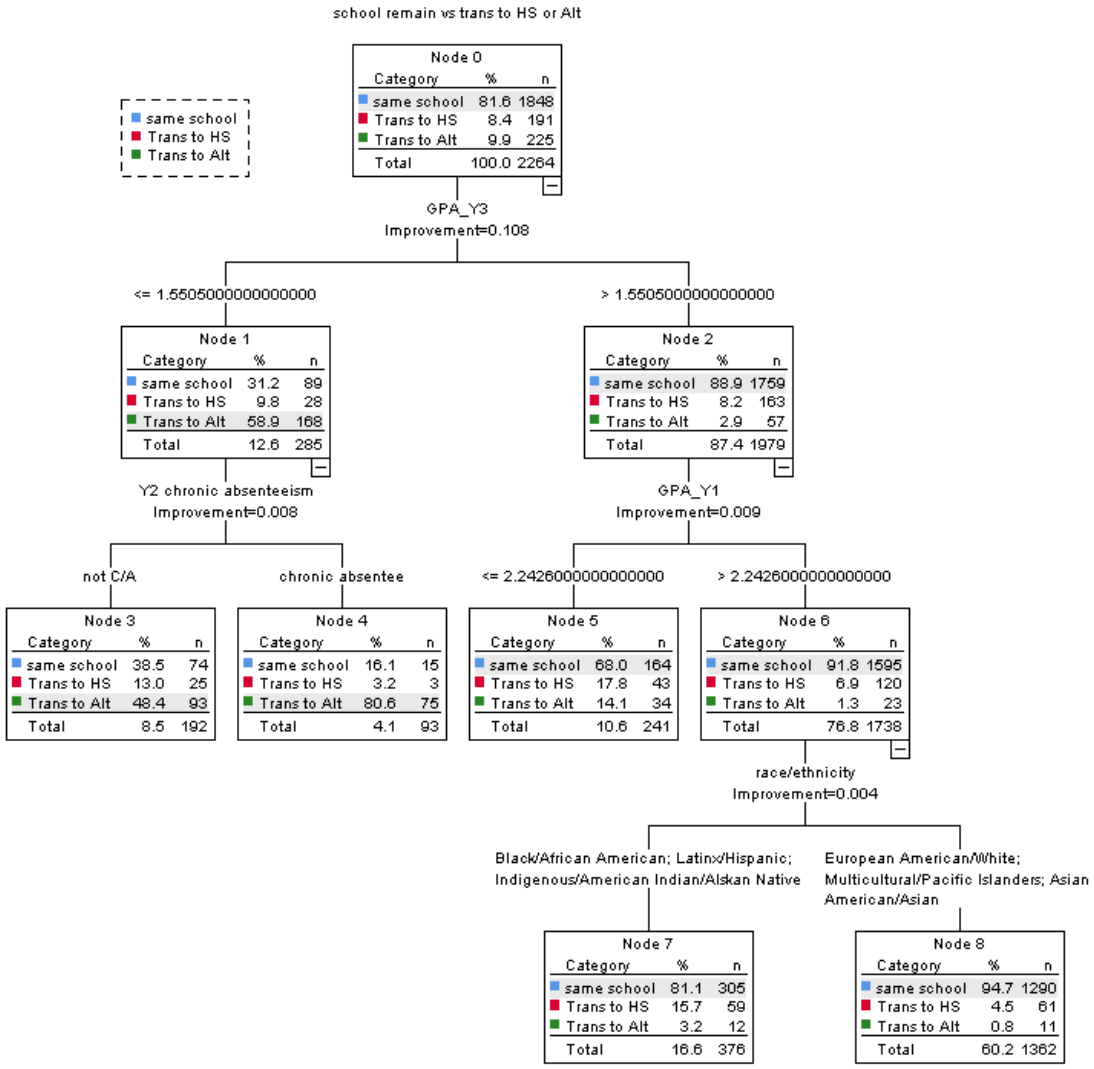
CART analysis was conducted using SPSS CRT methods. Since my priority was to identify students who transferred to an alternative school, I doubled the risk

cost for misclassification of students who transferred to an alternative school. Again, for a splitting criterion, Gini improvement measure was employed and set at .0001 for the minimum change in reduction in impurity. Stopping criteria in this study were tree growth limit set at 5 as the maximum tree depth, parent node at a minimum of 80, and child node at a minimum of 40. Pruning rules were not employed for the current study. However, this study utilized a cross-validation approach with sample folds set at 10.

Figure 8 below is visual output of CART analysis examining individual-level factors that were most effective in distinguishing students who transferred to an alternative school versus remained in the same school versus students who transferred to a high school.

**Figure 8**

*CART Visual Output for School Transfer Patterns*




The CART results indicated that students' third-year GPA was the indicator which maximized the difference on student transfer patterns. As illustrated in the visual output of the CART analysis in Figure 8 above, the first node (Node 1) included

students whose third-year GPA was below or equal to 1.55. In this group, the majority of students transferred to an alternative school (58.9%, *n* = 168) followed by students who remained in the same school (32.1%, *n* = 89) and students who transferred to a high school (9.8%, *n* = 28). The second node (Node 2) included students whose third-year GPA was above 1.55. In this group, most students remained in the same school (88.9%, *n* = 1,759), followed by students who transferred to a high school (8.2%, *n* = 163); only 2.9% of students transferred to an alternative school (*n* = 57).

From Node 1 (Y3 GPA ≤ 1.55), the factor that maximizes the difference in students' transfer patterns was students' second-year chronic absenteeism status. The first terminal node (Node 3) included students who were not chronically absent. In this group, 48.4% of students transferred to an alternative school (*n* = 93), followed by students who remained in the same school (38.5%, *n* = 74) and students who transferred to a high school (13%, *n* = 25). The second terminal node (Node 4) included students who were chronically absent during their second year. In this group, most students transferred to an alternative school (80.6%, *n* = 75) – nearly twice the proportion of students who transferred to an alternative school in Node 3.

From Node 2 (Y3 GPA > 1.55), students' first-year GPA was the factor that maximized the difference in students' transfer patterns. The third terminal node (Node 5) included students whose first-year GPA was below or equal to 2.24. In this group, the majority of students remained in the same high school (68%, *n* = 164) followed by students who transferred to another high school (17.8%, *n* = 43) and students who transferred to an alternative school (14.1%, *n* = 34). Node 6 included students whose

first-year GPA was above 2.24. In this group, most students remained in the same school (91.8%, *n* = 1,595), followed by students who transferred to another high school (6.9%, *n* = 120). Only 1.3% of students (*n* = 23) transferred to an alternative school, which is nearly 11 times lower than the proportion in Node 5.

From Node 6 (Y3 GPA > 1.55 – Y1 GPA > 2.24), students' race/ethnicity was the best indicator to maximize the difference in school transfer patterns. The fourth terminal node (Node 7) included white, Asian American, and Multicultural/Pacific Islander students. In this group, most students remained in the same school (94.7%, *n* = 1,290). Only .8% students (*n* = 11) transferred to an alternative school. The last terminal node (Node 8) included Black, Latinx, and Indigenous students. While their academic characteristics were somewhat comparable to Node 7, students in this group transferred four times more often to an alternative school (3.2%, *n* = 12) and 3.5 times more often to a high school (15.7%, *n* = 59) compared to Node 7. 81.1% of students remained in the same school (*n* = 305). The overall number of students experiencing school transfer were not high; nevertheless, Black, Latinx, and Indigenous students experienced more school transfer than white, Asian American, and Multicultural/Pacific Islander students.

Table 8 below included a summary of how accurately the CART-identified model predicted the outcome of school transfer patterns compared to the observed data. It also includes the percentages of correct predictions achieved through the CART analysis.

**Table 8**

*Comparisons Between Predicted and Observed Percentages on School Transfer Patterns*

| Observed | Predicted 1 | 2 | 3 | Correct Percent |
|---|---|---|---|---|
| Remained in Same School (1) | 1,759 | - | 89 | 95.2% |
| Transfer to High School (2) | 163 | - | 28 | 0% |
| Transfer to Alternative school (3) | 57 | - | 168 | 74.7% |
| Overall percentage | 87.4% | 0% | 12.6% | 85.1% |

Overall, the CART-identified model predicted on students' transfer patterns (transfer to an alternative school versus remain in the same school versus transfer to a high school) with 85.1% accuracy. While the CART-identified model made a prediction with somewhat high accuracy on transfer patterns, the CART-identified model predicted students who remained in the same school much more accurately (95.2% accuracy) and less accurately for students who transferred to an alternative school (74.7% accuracy). The CART-identified model entirely missed students transferred to another high school (0% accuracy).

## Additional Multivariate CART Analysis based on Combined Dependent Variable

Crosstab analysis was conducted to examine the association between student status (persisters versus on-time graduates) and school transfer patterns (transferred to an alternative school versus remained in a high school). The results indicated that the

association between student status and school transfer patterns were statistically significant ($\chi^2(1, N = 2{,}190) = 1073.42$, $p < .001$, $\Phi = .70$). Most on-time graduates (88.1%) remained in a high school as compared to only 18.6% of persisters.

In CART analysis, for this level of association (moderate correlation of $.4 \leq r \leq .7$) it is recommended to use multivariate CART analysis by creating a combined dichotomous dependent variable between two dichotomous dependent variables (Ma, 2018). For this analysis, I divided school transfer patterns into 2 groups: 1) 188 students who transferred from a high school to an alternative school, and 2) 2,002 students who either remained in the same high school ($n$ = 1,817) or transferred to another high school ($n$ = 185). I divided school transfer patterns into only 2 subgroups so that it would be manageable to create a combined dependent variable which will also help interpretation of the CART-identified model.

The combined dichotomous dependent variable included 4 sub-groups: 1) persisters who transferred to an alternative school, 2) persisters who remained in a high school, 3) on-time graduates who remained in a high school, and 4) on-time graduates who transferred to an alternative school. Thus, a total of 2,190 students were included in this analysis. Table 9 below is a summary indicating the frequencies/percentages associated between student status and school transfer patterns.

**Table 9**

*Student Status and School Transfer Pattern Crosstabulation*

| | Persisters | On-Time Graduates |
|---|---|---|
| Remained in HS | 72 (3.3%) | 1,930 (88.1%) |
| Transfer to Alt/CBO | 148 (6.8%) | 40 (1.8%) |
| Participants (*N*) | 220 (10.05%) | 1,970 (89.95%) |

**Note*: Percentages in parentheses were calculated based on the total sample included for this analysis.

The final CART analysis was conducted to examine what factors are most effective in distinguishing on the combined dependent variable. Independent variables were students' individual-level characteristics, such as demographics and academic characteristics:

- student demographic information (e.g., race/ethnicity, gender, age),
- academic characteristics (e.g., SPED, academic priority, Section 504 (disability and mental health), TAG, limited English proficiency, and language spoken at home), and
- academic progress and outcomes (e.g., GPAs, attendance records (categorized into two groups: 1) chronically absent (attendance rate ≤ 90%), and 2) not chronically absent (attendance rate > 90%), discipline records on suspension and expulsion).

Again, since students' school transfer patterns were examined based on their first-year and fourth-year school information, students' academic progress up to their third year

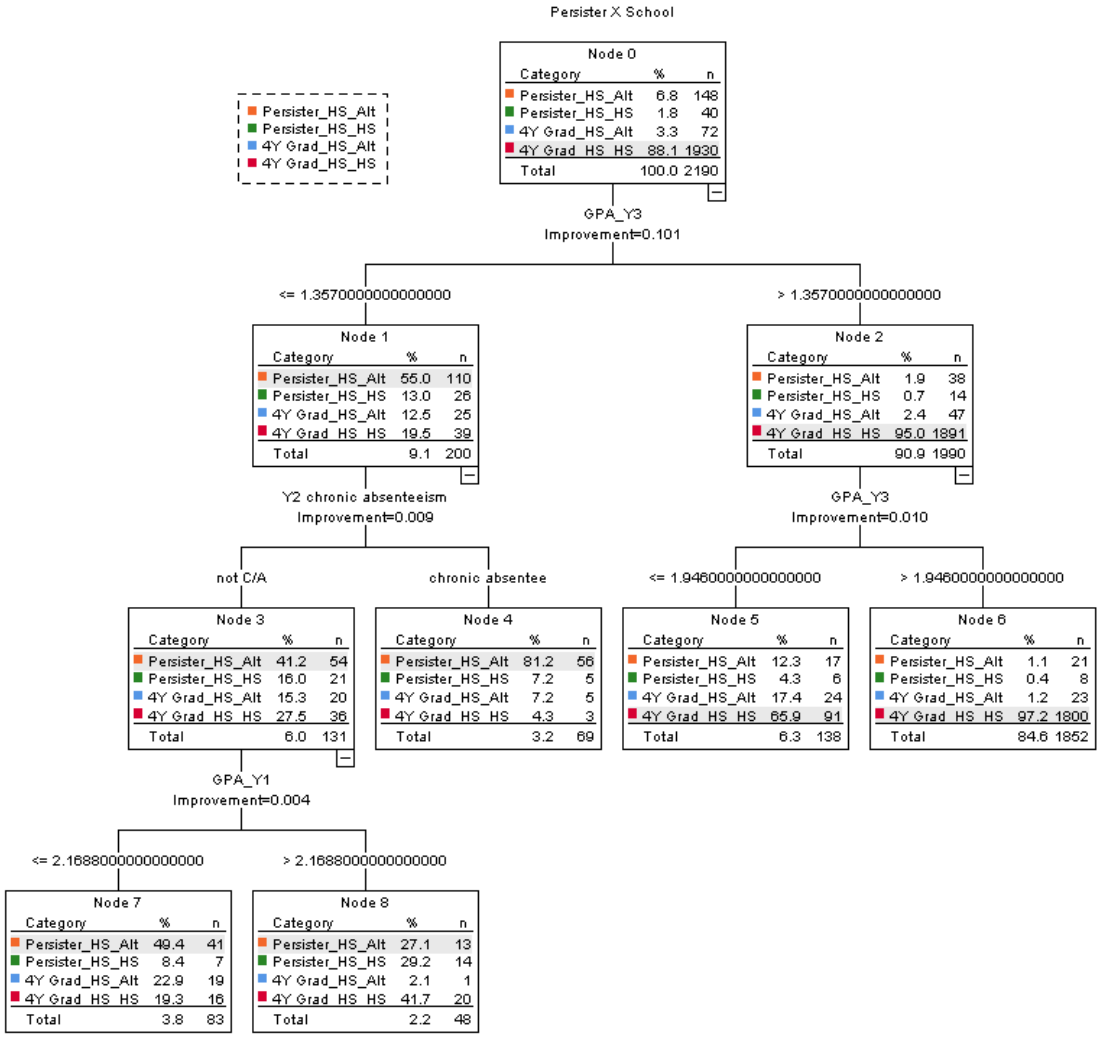
were included in the analysis.

CART analysis was conducted using SPSS CRT methods. Since my priority was to identify persisters regardless of school transfer patterns, I doubled the risk cost for misclassification of persisters when using SPSS CRT methods. Again, for a splitting criterion, Gini improvement measure was employed and set at .0001 for the minimum change in reduction in impurity. Stopping criteria in this study were tree growth limit set at 5 as the maximum tree depth, parent node at a minimum of 80, and child node at a minimum of 40. Pruning rules were not employed for the current study. However, this study utilized a cross-validation approach with sample folds set at 10.

Figure 9 below is visual output of CART analysis examining individual-level factors that were most effective in distinguishing 4 sub-groups: 1) persisters who transferred to an alternative school, 2) persisters who remained in a high school, 3) on-time graduates who remained in a high school, and 4) on-time graduates who transferred to an alternative school/CBO.

**Figure 9**

*CART Visual Output for Combined Outcomes*




The CART results indicated that students' third-year GPA was the indicator which maximized the difference in the combined dependent variable. As illustrated in the visual output of the CART analysis in Figure 9 above, the first node (Node 1) included students whose GPA was below or equal to 1.36. In this group, a majority of

students were persisters who transferred to an alternative school (55%, *n* = 110), and 12.5% of students were persisters who remained in a high school (*n* = 25). On the other hand, Node 2 which included students whose third-year GPA above 1.36, only 1.9% of students (*n* = 38) were persisters who transferred to an alternative school and 2.4% of students (*n*=47) were persisters who remained in a high school.

From Node 1 (Y3 GPA ≤ 1.36), the best indicator to maximize the difference was students' second-year chronic absenteeism status. Node 3 included students who were not chronically absent. In this group, 41.4% of students were persisters who transferred to an alternative school (*n* = 54), and 15.3% of students were persisters who remained in a high school (*n* = 20). The first terminal node (Node 4) included students who were chronically absent during their second year. In this group, most students were persisters who transferred to an alternative school (81.2%, *n* = 56) – almost twice the proportion in Node 3.

From Node 2 (Y3 GPA > 1.36), the best indicator to maximize the difference on the dependent variable was again students' third-year GPA (1.95). The second terminal node (Noe 5) included students whose third-year GPA ranged from 1.36 to below or equal to 1.95. In this group, 12.3% of students (*n* = 17) were persisters who transferred to alternative school and 17.4% of students (*n* = 24) were persisters who remained in a high school. The third terminal node (Node 6) included students whose third-year GPA above 1.95. In this group, only 1.1% of students (*n* = 21) were persisters who transferred to an alternative school and 1.2% of students (*n* = 23) were persisters who remained in a high school. Most students in this group were on-time

graduates who remained in a high school (97.2%, *n* = 1,800). Compared to Node 6 (Y3 GPA > 1.95), Node 5 (1.36 < Y3 GPA ≤ 1.95) had more than 11 times the proportion of persisters who transferred to an alternative school.

From Node 3 (Y3 GPA ≤ 1.36 – Y2 not chronically absent), the best indicator to maximize the difference was students-first-year GPA. The fourth terminal node (Node 7) included students whose first-year GPA was below or equal to 2.17. In this group, almost half of students were persisters who transferred to an alternative school (49.4%, *n* = 41) and 22.9% of students (*n* = 19) were persisters who remained in a high school. The last terminal node (Node 8) included students whose first-year GPA was above 2.17. In this node, 27.1% of students were persisters who transferred to an alternative school (*n* = 13), and this is almost half of the proportion in Node 7.

Table 10 below included a summary of how accurately the CART-identified model predicted on the outcomes compared to the observed data. It also includes the percentages of correct predictions achieved through the CART analysis.

**Table 10**

*Comparisons Between Predicted and Observed Percentages on Combined DV*

| Observed | Predicted 1 | 2 | 3 | 4 | Percent Correct |
|---|---|---|---|---|---|
| Persister_Alt (1) | 110 | - | - | 38 | 74.3% |
| Persister_HS (2) | 25 | - | - | 47 | 0% |
| On-time Grad_Alt (3) | 26 | - | - | 14 | 0% |
| On-time Grad_HS (4) | 39 | - | - | 1,891 | 98% |
| Overall percentage | 9.1% | 0% | 0% | 90.9% | 91.4% |

Overall, the CART-identified model predicted on the combined dependent outcomes with 91.4% accuracy. While the overall CART-identified model made a prediction with a high accuracy on the combined DV, the CART-identified model predicted on-time graduates who remained in a high school much more accurately (98% accuracy) and somewhat less accurately for persisters who transferred to an alternative school (74.3% accuracy). The CART-identified model entirely missed persisters who remained in a high school and on-time graduates who transferred an alternative school (0% accuracy).

## Discussion

Using CART analysis, this study identified students' individual-level and school-level factors in distinguishing persisters versus on-time graduates as well as students' individual-level factors in distinguishing student school transfer patterns. CART analysis, which uses an inductive, data-driven exploratory approach, helped not only identify the distinguishing factors but also revealed complex interactions between independent variables. The findings from the CART-identified models and follow-up analyses helped us understand distinctive characteristics of each node (subgroup profiles) and prevalence of outcomes. These findings can contribute to the limited existing literature on persisters – who have been largely ignored in educational research and policy – by deepening our understanding of the characteristics of persisters (who are overrepresented from historically marginalized populations) and their experiences in the educational system. Furthermore, these findings can inform policy and practice as well as provide insight for development of intervention strategies to provide tailored support for students who are marginalized.

### Deepening the Understanding of Persisters

The first CART-identified model helped us understand distinguishing factors between persisters and on-time graduates and produced subgroups of students (nodes) based on the complex interactions among these distinguishing indicators and prevalence of persisters in each node. Additional follow-up analyses allowed us to dive deeper into subgroups of students to understand their profiles and their academic experiences as well as school transfer patterns.

Consistent with previous findings, racial disparity can be observed in this study when comparing proportions of persisters and proportions of students of color (Clark-Shim et al., in progress; Hill & Mirakhur, 2018; Mirakhur et al., 2021; Uretsky et al., 2016; Uretsky et al., under review). Nodes that had more students of color tended to have higher proportions of persisters, as well as more students in special education services (SPED) and academic priority while fewer students in talented and gifted (TAG) (Hill & Mirakhur, 2018; Sugarman, 2019; Uretsky et al. 2016). This racial disparity is most pronounced when comparing between Nodes 7 and 8, in which students shared similar academic characteristics and progress but differed in their demographic characteristics such that Node 7 included mostly students of color while Node 8 contained a majority of white students; nonetheless Node 7 had nearly three times higher proportion of persisters (60.5%) than Node 8 (23.5%).

Also consistent with previous findings, gender differences can be observed such that nodes that had more male students tended to have lower GPAs and higher proportions of persisters (Hill & Mirakhur, 2018; Uretsky et al. 2016). In addition, this study found that nodes that had more male students tended to have more students in SPED and academic priority while fewer students in TAG.

***Persisters in Alternative Schools***

Based on the first CART-identified model, students' school-level characteristics (i.e., school size) was the best indicator initially to differentiate students between persisters and on-time graduates. The node that included students who attended a small school during their fourth year had 21 times higher the proportion of

persisters (78.1%; Node 1) than the node that included students who attended a large school (3.7%; Node 2). Most alternative schools/CBOs had a smaller school size compared to mainstream high schools. These findings suggest that persisters disproportionately attended an alternative school. Follow-up analyses concurred with these findings in that persisters not only disproportionately attended alternative schools in their fourth year but there was a steady pattern of transfer from a high school to an alternative school throughout the high school years.

When follow-up analyses compared students' demographic and academic characteristics across nodes, similar racial disparity and gender differences found in the proportion of persisters can be observed in students who attended an alternative school. Nodes that included students who attended an alternative school during their fourth year included higher proportions of students of color and male students (Nodes 3 and 4). In addition, these subgroups included more students in SPED and academic priority and fewer students in TAG. They also had more students with limited English proficiency (LEP). As suggested by many scholars, these findings may reflect that many alternative schools/programs in recent years have been geared towards serving disfranchised students who are disengaged and disconnected from mainstream high schools (e.g., Dunning-Lozano, 2016; Flennaugh et al., 2018; Foley & Pang, 2006; Kim & Taylor, 2008; Lange & Sletten, 2002; Lehr et al., 2009; Richardson & Memmott, 2017).

**Diversity in Students Attending Alternative Schools.** Alternative education is often used as an overarching term that encompasses a wide range of programs with

different goals (Carver et al., 2010; Deal & Nolan, 1978; Lehr et al., 2009; Porowski et al., 2014; Raywid, 1994). As discussed earlier regarding the district whose data were analyzed for this study, alternative program/schools and CBOs that began in the 1960s brought innovative approaches to meet varying needs of students by proving tailored support with an appreciation that different students learn in different ways in different settings, and provided culturally responsive curricula that continue to serve students today (Aron, 2006; Marsh & Hill, 2010; Mitchell & Waiwaiole, 2003). While alternative education in this District generally aimed to serve students who are struggling to make academic progress or are at risk of dropping out from mainstream high schools (Marsh & Hill, 2010), some of the high performing students and their family nonetheless may choose an alternative school that is aligned with their goals and values.

The first CART-identified model produced two subgroups of students who attended an alternative school during their fourth year (Nodes 3 and 4), and these two groups somewhat differed in their demographic and academic characteristics as well as their academic progress. The demographic and academic characteristics of students in Node 3 were consistent with what previous literature suggested were disfranchised and underserved students in mainstream high schools (Dunning-Lozano, 2016; Flennaugh et al., 2018; Foley & Pang, 2006; Kim & Taylor, 2008; Lange & Sletten, 2002; Lehr et al., 2009; Richardson & Memmott, 2017). This group included disproportionately students of color, and males, as well as more students in SPED and academic priority, and fewer students in TAG. This group also included more students

with LEP. Among those who attended a small school during their fourth year, most students belonged to this group (*n*=181).

A smaller group of students belonged to Node 4 (*n*=52), and students in this group were somewhat different from Node 3, in that they were disproportionately female, and with slightly more white students. There were fewer students with LEP. There were a comparable number of students in TAG as compared to the entire sample; however, there were more students in SPED and academic priority.

These two groups of students also differed in their academic progress. Again, students in Node 3 reflected underserved and disengaged students from mainstream high schools as noted by previous literature (Dunning-Lozano, 2016; Flennaugh et al., 2018; Foley & Pang, 2006; Kim & Taylor, 2008; Lange & Sletten, 2002; Lehr et al., 2009; Marsh & Hill, 2010; Richardson & Memmott, 2017), such that their GPAs were overall low throughout their high school years and many of them suffered from chronic absenteeism during their early years of high school. In addition, higher proportions of students received suspensions again in their early high school years. And as discussed earlier, students in this group gradually transferred from a high school to an alternative school throughout their high school years.

On the other hand, students in Node 4 began with fairly high GPAs in their first two years and most students did not received suspensions. However, many of these students nonetheless suffered from chronic absenteeism. These students may reflect diversity existing in the student population among those who attended alternative schools. These students and family may have chosen an alternative school

to meet their needs, or they may have selected an alternative school that is better aligned with their goals or values. As noted earlier, some of the alternative schools, including community-based organizations (CBOs), may be better equipped to provide tailored support to meet varying needs of students. For example, they may provide flexible schedules for those who are working or having difficulty attending school regularly for varying reasons while creating a supportive environment where students can build and maintain relationships with teachers and staff (Aron, 2006; Baldridge et al., 2011; Jones, 2011; Lange, 1998; Mcgee & Lin, 2017; Mitchell & Waiwaiole, 2003; Marsh & Hill, 2010; Slaten et al., 2015; Smith & Thomson, 2014). They may also provide culturally respectful space for students to engage and learn (Aron, 2006; Marsh & Hill, 2010; Mitchell & Waiwaiole, 2003; Richardson & Memmott, 2017).

**Motivational Resilience Among Students in Alternative Schools.**

Alternative schools with supportive features may help students stay engaged and persist even when they are faced with challenges (Aron, 2006; Baldridge et al., 2011; Jones, 2011; Lange, 1998; Mitchell & Waiwaiole, 2003; Smith & Thomson, 2014). While many students in alternative schools appeared to struggle, especially in early high school years, nevertheless, many of these students seemed to stay engaged and continued making academic progress even in their fourth year, indicating motivational resilience. Indeed, compared to students who stayed in mainstream high schools and academically performed better during their first two years (higher GPAs and lower chronic absenteeism), students who transferred to alternative schools initially suffered from higher chronic absenteeism and lower GPAs. However, students in mainstream

high schools experienced declining GPAs and sharp increases in their chronic absenteeism in later years. These discernable patterns of sharp increases in chronic absenteeism in later years were even shown among students who had high GPAs throughout their high school years. On the other hand, students in alternative schools showed motivational resilience, as illustrated by their GPA rebounding and chronic absenteeism declining during their fourth year. This may suggest that many alternative schools/CBOs in this study provided an engaging learning environment for students, perhaps by offering a supportive relationship with teachers and staff and tailored support to meet the needs of students, which in turn helped students stay engaged and keep making academic progress towards high school graduation (Aron, 2006; Marsh & Hill, 2010; Mitchell & Waiwaiole, 2003; Richardson & Memmott, 2017).

***Persisters in Mainstream High Schools***

While most persisters transferred to an alternative school over the course of their high school years, a smaller proportion of persisters remained in the mainstream high schools (Nodes 7 and 8). Although many students in alternative schools seemed to stay engaged and showed motivational resilience, students in mainstream high schools, especially students of color, seemed to experience continual motivational declines. While these students began with somewhat lower chronic absenteeism during their first two years, their chronic absenteeism spiked up during the third year and continued increasing during their fourth year, such that they experienced the highest chronic absenteeism during their fourth year. Notably, within the subgroup that included mostly students of color, more than 90% of students experienced chronic

absenteeism. Similarly, their GPAs continued to decline throughout their high school years, and they were receiving the lowest average GPAs in their fourth year. This may reflect in part that these students were somewhat underserved in their mainstream schools, so that a higher proportion of them became persisters. In the node that included disproportionately students of color, many students were persisters (nearly three times more) than students in the node that included disproportionately white students, even when their individual-level academic characteristics and progress were comparable.

**School Transfer Patterns**

Students who struggled in earlier years disproportionately transferred to alternative schools. Consistent with previous findings, this happened disproportionately among students of color, students in SPED and academic priority, and students who experienced suspensions (Dunning-Lozano, 2016; Lange & Sletten, 2002; Kim & Taylor, 2008). Similarly, the second CART-identified model indicated racial differences in school transfer patterns. While students in Nodes 7 and 8 shared similar individual-level academic characteristics, their school transfer patterns were somewhat different. While most students in these nodes remained in the same high school, Black, Latinx, and Indigenous students experienced more school transfer than white, Asian American, and Multicultural/Pacific Islander students. For example, Black, Latinx, and Indigenous students transferred four times more often to an alternative school and 3.5 times more often to another high school than white, Asian American, and Multicultural/Pacific Islander students.

**Interpretations of CART Analysis Results**

The CART-identified models in this study revealed the independent variables and their complex interaction – distinguishing factors – to maximize differentiation between persisters versus on-time graduates, as well as school transfer patterns. The models also produced terminal nodes, which were subgroups of individuals with distinctive characteristics based on interactions among different factors, as well as the prevalence of the outcome variable, such as percentages of persisters within each node.

**GPA.** In this study, students' GPAs were identified as distinguishing factors between persisters versus on-time graduates, and school transfer patterns. Here I should note the importance of capturing the complexity of what student GPA encompasses. Often it is easier to view GPA as a student outcome or academic performance which results from students' academic motivation and ability. However, student grades can be affected by teachers' implicit biases and prejudices (Alfaro et al., 2009; Booker, 2006; Delale-O'Connor et al., 2017; Eccles & Roeser, 2012; Ozer et al. 2008; van den Bergh et al., 2010; Walton & Cohen, 2007). Of course, teachers' implicit biases and prejudices do not exist in a vacuum, but are rather ingrained in our cultural and educational system to maintain the status quo and perpetuate social stratification by reinforcing and internalizing stereotypical messages for students who are marginalized, thereby undermining students' engagement and achievement (Freire, 2018; Fitzgerald, 2009; Harro, 2013; Palmer & Maramba, 2011). In this study, follow-up analyses were conducted to capture some of these complexities.

**School-Level TAG Rate**. Another indicator I wanted to expand on in this discussion was the first-year school-level TAG rate identified in the first CART analysis. We observed racial disparity in the proportion of persisters between Nodes 7 and 8, which otherwise contained students with similar academic characteristics; yet the subgroup that had mostly students of color had nearly three times higher the proportion of persisters than the other subgroup which contained a majority of white students. The CART-identified model differentiated between these two groups based on students' first-year school-level TAG rates, so that the subgroup with mostly students of color had a lower school-level TAG rate than the other subgroup with a majority of white students. This indicates many students of color initially attended schools where they had fewer peers in TAG. Again, students' assignment to TAG may have been in part affected by teachers' implicit biases and prejudices (Anderson & Oakes, 2014; Loveless, 2013; Oakes, 1992; Oakes, 2018; Oakes & Guiton, 1995; Oakes & Rogers, 2007) or lower school-level TAG rates may reflect limited school resources. Therefore, low school-level TAG rate may reflect SES, as well as students facing continual challenges stemming from structural racism and stereotypes (Freire, 2018; Fitzgerald, 2009; Harro, 2013; Palmer & Maramba, 2011), such that although the subgroup that had mostly students of color made similar academic progress as their counterpart, the group had nearly three times higher proportion of persisters. These findings may potentially indicate that not only did students' academic progress define student outcomes but their early year school environments or other factors that were related to racial disparities may have had continual impact on student academic

development.

**Summary**

This combination of an exploratory, inductive approach of CART analysis and follow-up analyses allowed us to deepen our understanding of persisters and their experiences in the educational system. Racial and gender differences were observed, such that subgroups that included more students of color had a higher proportion of persisters, more students in SPED and academic priority, and fewer students in TAG. Subgroups that had more male students showed similar patterns.

Many persisters disproportionately transferred to an alternative school from a high school. Many of these students appeared to struggle during their early years; nonetheless, many students in alternative schools seemed to stay engaged and motivated. It is also important to note that there appeared to be diversity among students who attended alternative schools such that there was a small subgroup of students who had higher GPAs in their early years attending an alternative school. This may reflect in part that this District had alternative schools/CBOs that may be better equipped to provide tailored support for students with varying needs and provide an engaging learning space by maintaining a supportive relationship with teachers/staff.

Racial disparity was also observed in student transfer patterns in that more students of color experienced school transfer either to an alternative school or between high schools than white students. Among the small proportion of persisters who remained in mainstream high school, the subgroup that had a higher proportion of

students of color had nearly three times higher proportion of persisters than the other subgroup with a majority of white students.

**Implications**

Using an exploratory CART analysis, the current study utilized a school district administrative data set to identify what individual-level and school-level factors were most effective in distinguishing between persisters versus on-time graduates, as well as school transfer patterns. The findings of the current study can be used as a steppingstone to build theory and deepen our understanding of the intersection between individual-level and school-level factors that affect students' academic development and their educational experiences.

Furthermore, at a pragmatic level, because most school districts have administrative data like the dataset analyzed in this study, the findings could have widespread relevance and potential for use in practice. Replications of the current study using similar administrative data in different settings (e.g., rural school districts) can further enrich our understanding of persisters and provide insight into how to support these students.

In addition, the visual output of CART analysis can be easily interpreted and understood by practitioners and utilized in educational settings to support students' development. Teachers, counselors, and school social workers can use this study's findings to identify students who have a higher probability of becoming persisters and to design intervention strategies which provide tailored support. The more we can understand the characteristics of groups of persisters, the better we can identify how

best to meet the varying needs of different groups of students. For example, this study observed diversity existing across different subgroups of students. These nuanced findings will help practitioners develop different intervention strategies to support various subgroups of students to promote their academic engagement as well as help prepare them for postsecondary education and career development.

### *Implications for Practice*

The findings of this study have implications for the social work field and its practices. Students who are struggling academically or experiencing chronic absenteeism are more likely to become persisters and are more frequently transferred to alternative schools. While this study found potential benefits of attending alternative schools – as indicated by motivational resilience among students who attend alternative schools – nevertheless, there are concerns involving school transfer. As noted by Richardson and Memmott (2017), some students dropped out soon after they transferred to an alternative school. To prevent these students from dropping out, school social workers and counselors can provide transition support by engaging students and families in decision-making, including exploring available options together and helping students and families connect with staff in their new schools so that students can build supportive relationships in their new schools. This can help make the transition easier by making students and families feel included and more comfortable in a new school setting. Given the racial disparities observed in school transfer patterns, transition support can somewhat ameliorate negative impacts on students of color who may have been underserved by or even pushed out from

mainstream high schools.

There has been a growing appreciation for school mental health and school social work in that school social workers and counselors play a key role in promoting wellbeing of students (Cuellar & Mason, 2019; Kelly et al., 2015). This study found that students in special education services disproportionately become persisters and attend alternative schools. Previous literature suggests that many persisters experience significant life challenges, such as houselessness, loss of family, teen pregnancy, abuse, and severe mental and physical health issues (Hill & Mirakhur, 2018). In addition, students who experience social and emotional problems more often attend alternative schools (Dunning-Lozano, 2016; Kim & Taylor, 2008; Lange & Sletten, 2002; Marsh & Hill, 2010; Raywid, 1994; Richardson & Memmott, 2017). To meet the varying needs of these diverse students, school social workers and counselors can provide a wide range of direct services and participate in multi-disciplinary teams to support students (Kelly et al., 2015). School social workers and counselors may provide mental and behavioral health services as well as special care for drug and alcohol issues. They can also support students who experience houselessness by addressing their unmet needs. In addition, school social workers often participate in multi-disciplinary teams to plan and deliver special education services (Kelly et al., 2015). Furthermore, school social workers may help students with severe mental health issues by connecting them with resources. School social workers may also refer or connect students with job opportunities, especially during summertime for students who are seeking career opportunities or who need to participate in supporting their

families' finances. Similarly, school social workers often help students find free food or groceries.

School social workers and counselors can support multilingual students or students who recently arrived in the United States so that they can feel included and can also help them access educational opportunities. Many of these students may struggle from disruptions in education, language barriers, and mental health issues which can lead into falling behind academically and more often become persisters (Atwell et al., 2020; McFarland et al., 2020; Kuenzi, 2018; Hill & Mirakhur, 2018) and disproportionately transferred to alternative schools, thereby being excluded from educational opportunities available at mainstream high schools (Hill & Mirakhur, 2018; Lange, 1998; Lehr et al., 2009; Rumberger, 2019; Sublette & Rumberger; 2018; Sugarman, 2019). School social workers and counselors can promote wellbeing of these students who disproportionately come from historically marginalized groups while helping them navigate (new) educational systems so that students are able to focus on academics.

**Impact of COVID and Related Disruptions.** This study found that students who struggled to make needed academic progress more often became persisters as well as transferred to alternative schools. The recent pandemic and disruptions caused by COVID, including school closures, may have exacerbated students' struggles. Early indicators have reported a doubling or tripling of the incidence of falling grades as well as increased credit deficiency rates, chronic absenteeism, social and emotional problems, and severe mental health issues (Addis & McNulty, 2021), while academic

gaps between low- and high-income students are expected to grow wider (Bailey et al., 2021). Furthermore, it is expected that an increased number of students who fall behind may need alternative placement to recover credits to graduate; however, due to limited capacity, alternative schools may not be able to accommodate the increased number of students such that we may experience multi-year declines in on-time graduation and increases in extended graduation (Addis & McNulty, 2021).

The longitudinal data set used for this study was gathered prior to the pandemic situation. Circumstances may have been changed considerably due to COVID and related disruptions, such that more students may struggle academically and suffer from mental and behavioral health issues. Accordingly, it is possible that mainstream school administration may not be able to meet the needs of increased numbers of students who are struggling to make needed academic progress and may transfer these struggling students to alternative schools. While this study found potential benefits of these underserved students attending alternative schools as illustrated in their motivational resilience, if mainstream high schools transfer out significantly increased numbers of students to alternative schools, alternative schools that are already restricted in their resources – including staff shortages and inadequate infrastructure (Aron, 2006; Foley & Pang, 2006; Lange, 1998; Lehr et al., 2009) – may experience an additional burden to accommodate an influx of students who are faced with significant life challenges. This situation calls for school districts to provide adequate resources, including funding, to alternative schools to accommodate more students who may need additional support for credit recovery or alternative placement

(Richardson & Memmott, 2017).

Based on this expected growth in number of students who are struggling to make academic progress, the roles of school social workers, grade counselors, and academic coaches become even more important (Chang-Bacon, 2021). School social workers and other practitioners can help students navigate academic options, including credit recovery during summer school or during the regular school day. Helping students explore academic options and connecting them with resources may promote students' engagement and support eventual graduation. Practitioners can also help students plan and get ready for postsecondary education and career paths by using specialized programs, such as the career and college pathways in the school district where the data were gathered for this study (https://www.pps.net/ccr). This program was designed to help students explore different opportunities, such as career and technical education, which enables students to experience hands-on learning opportunities in classrooms or in the community with relevant and applicable curricula for real-world work settings, as well as dual credit (enrollment in college level courses while in high school allows for credits earned that can be counted in both high school and college) which can reduce the later burden of paying for college tuition.

The recommendations discussed above can help ameliorate detrimental impacts caused by COVID and related disruptions, and reduce academic disparities. Social workers have the ethical responsibility to challenge social injustice (NASW Code of Conduct, 2008). These recommendations are also aligned with Portland Public School district's racial educational equity policy in that their equity goals go

beyond formal equality to a recognition of ingrained structural oppression; to foster "a barrier-free environment…PPS will provide additional and differentiated resources to support the success of all students, including students of color" (PPS 2.10.010-P; https://www.pps.net/Page/1870). This study utilizing exploratory CART analysis helped identify subgroups of students with varying needs who are different in their demographic and academic characteristics. It is crucial to provide tailored support to meet the varying needs of these diverse groups of students. At the same time, it is critical for school social workers and counselors to engage teachers and school administrators to reduce implicit biases and prejudices to create a more respectful and equitable environment for all students. Again, this approach is aligned with the district's racial educational equity policy to hold "high expectations to ensure that all students reach their academic potential" (PPS 2.10.010-P; https://www.pps.net/Page/1870).

***School Accountability***

This study observed racial disparities between persisters and on-time graduates, as well as school transfer patterns. As noted, persisters were overrepresented from marginalized groups and disproportionately transferred to an alternative school from mainstream high schools. While this study recognizes potential benefits of alternative schools in serving disfranchised students – in particular in the school district whose data were analyzed for this study (Aron, 2006; Marsh & Hill, 2010; Mitchell & Waiwaiole, 2003; Richardson & Memmott, 2017) – nonetheless, it raises concerns for potential segregation. In addition, racial disparity still seems to

persist in that between the two mainstream high school subgroups with similar academic characteristics, the node which contained mostly students of color had nearly three times higher proportion of persisters than the other subgroup containing a majority of white students. Academic disparity observed in this study points out deeply seated structural inequity in our educational setting and poses a question of whom our schools are designed to serve and who may be pushed out from the mainstream educational system. Thus, this study calls for the need to hold our mainstream high schools accountable to provide a respectful learning environment for all students (Marsh & Hill, 2010; Mitchell & Waiwaiole, 2003; Richardson & Memmott, 2017).

The findings of this study are relevant for educational policies and practices. Given that a significant proportion of the student body (persisters) remained engaged and continued making academic progress beyond their expected graduation dates, it is important to incorporate extended graduation (i.e., graduating high school in five or more years) when measuring school accountability. To measure extended graduation reliably requires keeping more accurate records of persisters' progress.

In the current educational system, when measuring school accountability, students' graduation credits are often ascribed only to the last mainstream high school attended before transitioning to an alternative school. Given that many alternative schools disproportionately served disfranchised students who were overrepresented among persisters, it is crucial to restructure educational metrics so that extended graduation credits can be ascribed to all schools, including alternative schools attended

during or after the fourth year when a diploma was awarded (Sublette & Rumberger, 2018). This will help acknowledge alternative schools' contribution to reducing academic gaps. This policy change may also help these alternative educational settings to secure funding and resources needed to support many students who were historically underserved especially given that many alternative schools suffered from lack of resources and stable funding (Marsh & Hill, 2010; Mitchell & Waiwaiole, 2003; Richardson & Memmott, 2017).

**Limitations**

There are some limitations to the current study, including limited generalizability and third variable issues. The current study is based on analysis of secondary administrative data set from an urban school district. The characteristics of alternative schools and school options available for students may vary depending on school district. As mentioned, some of the alternative schools/CBOs in the school district began in 1960s as early alternative schools began nationwide with innovative approaches to meeting the needs of diverse students, including creating a child-centered, non-competitive, individualized learning space that could focus on community-based learning and integration of culture and race/ethnicity in their curriculum (Aron, 2006; Marsh & Hill, 2010; Mitchell & Waiwaiole, 2003; Richardson & Memmott, 2017). These positive features may be reflected in students' motivational resilience shown in alternative schools. It will be important to replicate this study in different settings, including rural or other urban school districts in different states.

This study utilized an administrative data set which may not have included comprehensive components that could affect students' academic development. For example, the administrative data do not include family or community characteristics which might help identify resources or lack thereof. Furthermore, the administrative data set does not include information on school characteristics (e.g., school climate and culture) and classroom environments (e.g., teacher expectations and interactions) which can also contribute to students' academic motivation and engagement. Especially with the second CART-identified model entirely missing students transfer between high schools, as well as the additional multivariate CART-identified model entirely missing persisters who remained in a high school and on-time graduates who attended an alternative school suggests that either these patterns were happening at random or important variables to distinguish these patterns were not included in the study (e.g., family mobility). It will be helpful to include information on students' perception on self-concepts, academic motivation, and interactions with teachers/staff, school climate, as well as family and community resources and culture.

In addition, there could be issues involving data accuracy, especially from some of the alternative schools. It seems like some alternative programs reported their students' GPAs as "0" and this may be due to a couple of reasons: 1) GPAs may not have been relevant for a particular program that was geared towards supporting students who prepared for GED, and/or 2) some may not track all students' academic progress as accurately due to limited staff in their setting. Thus, academic progress reported based on students' GPAs in alternative schools may have underestimated

students' GPAs. While students in alternative schools generally showed motivational resilience, their average GPAs might have been potentially higher than suggested by the administrative data.

**Future Studies and Next Steps**

This dissertation project helped me better understand complex interactions between individual-level and school-level factors that distinguish between persisters and on-time graduates, as well as school transfer patterns. At the same time, I was intrigued by some of the patterns that I observed and wanted to learn more about them. Building upon the findings of the current study, I would like to follow up by integrating qualitative and quantitative approaches to examine how multiple systems can interact to affect developmental competencies of diverse students. For example, I was intrigued by noticing that many students seemed to experience motivational declines and struggled more during their later high school years. Collecting quantitative data on classroom environments (e.g., teacher expectations and interactions, peer interactions), school characteristics (e.g., school climate and culture, school resources and afterschool programs), and family or community characteristics along with qualitative data based on in-depth interviews with students, family, and school staff (teachers/counselors/social workers/administrative personnel) might help with investigating developmental and motivational changes over time among different subgroups of students in different school settings.

In addition, I wanted to deepen my understanding of alternative education through case studies and qualitative studies. For example, students' motivational

resilience exhibited in alternative schools in this study requires in-depth understanding of what features of those schools may have promoted student engagement as well as how those schools may respond to meet varying needs of students, given that alternative schools disproportionately serve disfranchised students with diverse needs. Conducting case studies based on some of these alternative school sites can deepen our understanding of alternative schools.

Richardson and Memmott (2017) suggested that some students dropped out soon after they transferred to an alternative school. This calls for further investigation as to why these students dropped out. Qualitative in-depth interviews may help us better understand perceptions of students and parents. For example, how the transition process made students feel about their academic ability and whether they perceived that they were pushed out. Furthermore, it is critical to hold mainstream high schools accountable especially "when their students transfer to alternative schools and drop out soon after" (Richardson & Memmott, 2017, p. 15). It is also crucial to understand that when students successfully transitioned to an alternative school, what the transition process looked like and how it successfully involved students and parents interacting with counselors/school social workers/teachers. Through these studies, I hope to learn more about how to create a respectful learning environment for all students.

Finally, I am also interested in policy analysis based on a big data analysis approach. For example, longitudinal or cross-sectional national data set can be used to examine the impact of national policies, such as the Every Student Succeeds Act, or

nationwide practices, such as Zero Tolerance policies, on students' learning experiences and outcomes. I am also interested in comparing the impact of state-specific policies and practices. For example, the definitions and practices of alternative education vary across states. I would like to learn more about how different policies and practices employed in each state can result in differential outcomes and educational experiences for students. Similarly, there are varying degrees of employment of extended graduation across states. I would like to know more about how policy decision-making has happened and what impact it has had. In addition, I would like to know whether the implementation of extended graduation in school accountability metrics affected school teachers' or administrators' practices, including whether they became less likely to "push out" students who are struggling to graduate in four years.

All these studies can help us better understand the impact of educational policies and practices. They can also inform us how to restructure educational systems to meet the needs of diverse students and provide a respectful learning environment for all students.

## Conclusion

Using the exploratory, inductive approach of CART analysis in combination with follow-up analyses helped deepen our understanding of persisters – who are overrepresented from historically underserved groups – and their experiences in the educational system. Many persisters disproportionately transferred to an alternative school from a mainstream high school. These transferees often seemed to struggle during their early years; nonetheless, many students in alternative schools remained engaged and continued working towards their graduation. Indeed, students in alternative schools showed motivational resilience as seen in reduced chronic absenteeism during their fourth year. The positive outcomes and motivational resilience shown among students who attended alternative schools may in part reflect that this District had alternative schools/CBOs with innovative approaches to meet varying needs of students, provide engaging learning spaces, and maintain a supportive relationship with teachers/staff (Aron, 2006; Marsh & Hill, 2010; Mitchell & Waiwaiole, 2003; Richardson & Memmott, 2017).

While this study recognizes potential benefits of alternative schools in serving disfranchised students, it raises concerns for potential segregation given that students of color disproportionately transferred to alternative schools (Dunning-Lozano, 2016; Flennaugh et al., 2018; Foley & Pang, 2006; Kim & Taylor, 2008; Lange & Sletten, 2002; Lehr et al., 2009; Marsh & Hill, 2010; Richardson & Memmott, 2017). In addition, observed racial disparities based on the comparisons between two subgroups of students in mainstream high school – one group comprised of mostly students of

color and the other with a majority of white students – call for attention. While these two groups were similar in their academic characteristics and progress, the group including mostly students of color had nearly three times higher proportion of persisters. This racial disparity may reflect deep-seated structural inequality ingrained in our educational system (Anderson & Oakes, 2014; Dunbar, 1999; Freire, 2018; Johnston-Goodstar & VeLure Roholt, 2017; Oakes, 2018; Oakes & Guiton, 1995; Pewewardy et al., 2018; Sarason, 1998; Tatum, 2017). Furthermore, these two groups experienced sharp increases in chronic absenteeism in their later two years, which may reflect disengagement of students due to being underserved in mainstream high schools. The current educational policy and focus on on-time graduation rates to evaluate school accountability can inadvertently incentivize school administration to underserve and even push out these students who may require more than four years to graduate (Lehr et al., 2009; Sugarman, 2019).

Given that a significant portion of students may require more than four years to graduate (Hill & Mirakhur, 2018; Uretsky, 2019; Uretsky & Henneberger, 2020; Uretsky et al., under review) – and this number is estimated to grow drastically due to COVID and related disruptions as observed in increased chronic absenteeism, failing grades, and temporary dropouts (Addis & McNulty, 2021; Chang-Bacon, 2021; Chatterji & Yi, 2021) – we need to incorporate extended graduation (i.e., graduating high school in five or more years) when measuring school accountability. In addition, it is crucial to restructure educational metrics so that extended graduation credits can be ascribed to all schools, including alternative schools attended during or after the

fourth year when a diploma was awarded (Sublette & Rumberger, 2018). This will help acknowledge alternative schools' contribution to reducing academic gaps and improving student outcomes. This policy change may also help these alternative educational settings secure resources to support historically underserved students (Marsh & Hill, 2010; Mitchell & Waiwaiole, 2003; Richardson & Memmott, 2017).

The findings of this study not only help inform policy and practice but provide insight and call for the need to provide tailored support for students who are marginalized. School teachers, counselors, school social workers can use the findings to identify students who have higher probability of becoming persisters and provide those students with tailored support. Given the observed diversity existing across different subgroups of students in their demographic and academic characteristics, as well as school environments, these nuanced findings will help us develop different intervention strategies to support various subgroups of students to promote their academic engagement and social/emotional development while helping prepare them for postsecondary education and career development. Recognizing racial disparities observed in this study, school social workers and counselors can not only help support students but also help others appreciate the need to hold our mainstream high schools accountable (Marsh & Hill, 2010; Mitchell & Waiwaiole, 2003; Richardson & Memmott, 2017) and engage teachers and school administrators to reduce implicit biases and prejudices to create a more respectful and equitable environment for all students (Delale-O'Connor et al., 2017; Palmer & Maramba, 2011; Reyhner, 1991).

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