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Tracking in Middle School Mathematics: The Effects of Honors Mathematics Course Placement on Student Access and Achievement

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by

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DEDICATION

This dissertation is dedicated to all my 7th-grade mathematics students—past, present, and future. Regardless of your class level, test scores, or grades, always remember that you are capable of amazing things.

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Tracking in Middle School Mathematics:

The Effects of Honors Mathematics Course Placement on Student Access and Achievement

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Executive Summary

In 2021, California began revising the California Mathematics Framework due to a widening achievement gap and students' lack of grade-level content mastery. This revision, which took over two years to be approved, stirred up controversy among education stakeholders because of its focus on equity and the call to detrack the mathematics classroom for students until the tenth grade. Since the desegregation of schools, tracking under the guise of ability level groups has been used to separate students based on non-academic measures such as race. This practice has continued to widen the achievement gap for Black and Latinx students and restricts their access to higher-level paths in their education and future careers.

As the state calls for equity in the mathematics class, it is essential to assess whether detracking the mathematics class will make a difference in the access and achievement of students. Therefore, in this study, I looked at student achievement data from tracked and non-tracked students to measure the effect of 7th-grade mathematics class placement. Additionally, I looked to understand the difference in teacher perceptions and pedagogies based on the track level of the students they teach. Finally, in this study, I gathered teacher recommendations on developing a 7th-grade mathematics course placement policy that was equitable for all student learners.

Key findings from my analysis include:

1. Students placed into the 7th-grade honors mathematics course had higher GPA scores, took more honors courses, and had greater educational goals.
2. Students in the 7th-grade honors mathematics course reported higher levels of effort, an increased sense of school belonging, a higher mathematics self-concept, and a more growth-minded mindset than the 7th-grade non-honors students.
3. The rates of Black and Latinx honors students surveyed were not demographically representative of the entire sample of students.
4. The honors student participants had parents with higher levels of education.
5. Teachers perceived that the students in their honors courses behaved better than those in their non-honors classes.
6. Teachers saw their non-honors students as less motivated and resilient and held lower expectations for these students than their honors students.
7. Teachers are making different pedagogical decisions for their non-honors students. They give them more time for review, less time for independent practice, and lower-level thinking opportunities for their non-honors students than their honors students.

To support increasing equity in the mathematics classroom, I make two recommendations for middle schools and school districts—one short-term recommendation and one long-term recommendation:

- Short term: Schools should implement a blind, equitable placement policy for 7th-grade mathematics course placement. This policy should not consider subjective measures such as behavior and grades but instead should focus on standardized test data across a minimum of three years. Students who master grade-level content for three consecutive years should be placed in the 7th-grade honors mathematics course.
- Long-term: School districts should look to completely detrack the mathematics class. Research has shown that in schools with heterogeneous math classes, students have increased levels of achievement in comparison to their tracked peers. To detrack the math class, districts will need to provide significant time and money for researching effective teaching strategies for heterogenous classrooms and for training their teachers to teach all levels of learners at the same time correctly.

ABSTRACT

Tracking in Middle School Mathematics: The Effects of Honors Mathematics Course Placement on Student Access and Achievement

by

Kasey E. Gamez

This study used a mixed methods approach to examine student access and achievement differences based on the students' 7th-grade mathematics class placement. Additionally, this study investigated the difference between teachers' perceptions and pedagogical decisions based on their students' placement levels. Finally, this study asked for teacher recommendations on developing an equitable mathematics placement policy. Findings revealed that students placed in 7th-grade honors courses are achieving at higher levels than their non-honors peers. The study also found that teachers hold their honors students to higher standards than their non-honors students and limit their non-honors students' access to higher-level mathematics. The study concluded with a call to equity in the mathematics class with a short-term recommendation to implement a blind placement policy that only considers longitudinal standardized test scores and a long-term recommendation to detrack the mathematics class and train teachers to teach heterogeneous courses effectively.

CHAPTER 1

INTRODUCTION

Despite recent focus on improving mathematics education, it is clear that "California has a math problem" (Johnson, 2021). Nine years after the development of the California Mathematics Framework and the switch to Common Core State Standards, students are still struggling to meet grade-level benchmarks, and the racial achievement gap continues to grow (California Department of Education, 2023a; Fensterwald & Willis, 2023; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). According to the National Assessment of Educational Progress (2022, as cited in Fensterwald, 2022), California students have fallen behind the nation in math, scoring in the bottom third of states in the 8th grade. Because of the lack of growth, the state has requested a revision to the initial framework—a change that has not occurred since 2013. This revision, originally released in the spring of 2021, aimed to "respond to the structural barriers put in the place of mathematics success" and focuses on equity throughout its entirety (California Department of Education, 2023a, p. 10)

This new proposed framework caused controversy among parents and teachers due to recommendations on removing tracking and accelerated courses from schools until students have reached their sophomore year of high school as a more equitable approach to mathematics education (Blume, 2021; California Department of Education, 2023a; Johnson, 2021). Parents and scholars against the changes worried that gifted students will not be challenged in grade-appropriate math classes and must take extra courses to reach calculus in high school. However, supporters of the rewrite argued that heterogenous classes will benefit students with unrealized

potential, as well as Latinx and African American students who are regularly underrepresented in advanced math classes (Blume, 2021). This change also addressed a need for more student access. Calculus is not even offered in many high-poverty schools, and in schools that do offer it, many students of color who attend those schools never get access to it because of the systemic barriers put in place (Fensterwald, 2022).

Tracking and Ability Grouping

Tracking, also known as ability grouping, is the practice of grouping students according to perceived abilities into different courses based on grades, test scores, and teacher recommendations (Berwick, 2019). These placements, often determined in middle school, can affect students' course offerings throughout their schooling and offer minimal flexibility for movement from one track to another field (McCardle, 2020). Although it is a hot-button topic right now, tracking is not new to controversy in education. The use of tracking decreased due to concern about inequities during the 1990s, but its use ramped back up again at the beginning of the century with the influx of immigrant students (Legette & Kurtz-Costes, 2021a). Tracking is especially prevalent in mathematics, where "in eighth grade alone, 75% of eighth-grade students are placed in ability-based classes" (Berwick, 2019). Supporters of tracking believe that tracking allows teachers to address students' individual needs better and allows students to learn faster (Blume, 2021). However, most research shows that tracking is only beneficial for students in the higher tracks but can also hurt the growth mindset of these "honors" students in some cases (Burris et al., 2006; Carbonaro, 2005; Chmielewski et al., 2013; Francis et al., 2020; Legette & Kurtz-Costes, 2021a, 2021b). Students in the lower tracks, who are disproportionately from low-

socioeconomic backgrounds and minority ethnic groups, suffer both academically and mentally from their placement (Francis et al., 2020).

History of Tracking as a Tool of Segregation

At its inception, tracking systems were developed to reinforce White systems of power and keep "others" as subordinates in society. The earliest form of tracking in education in the United States occurred in the South following the Civil War in the late 19th century, when African Americans were considered legally free but still did not have the same rights as their White peers. Black students attended segregated schools and, within these schools, were offered two different pathways: one that promoted a classic, liberal arts education and one that promoted an industrial education (McCardle, 2020). The schools that promoted liberal arts were much fewer in number and were less funded than those that promoted industrial education. This was because the funding came primarily from White philanthropists, who wanted Black citizens to work for lower wages in manufacturing jobs promoted by the industrial track instead of the white-collar jobs promoted by a liberal arts education. This system, promoted by White lawmakers, gave Black citizens the impression of the right to public education but was using the system to continue upholding the racist status quo (McCardle, 2020).

In the early 20th century, tracking became a way to sort immigrant students due to a large influx of Europeans to the northeastern United States (Wheelock, 1992). These tracks set the precedent of organizing students by academic ability—IQ and standardized tests were used to categorize students into their appropriate courses. After seeing the changes in the northeastern urban schools, by the 1950s, most American high schools had implemented a tracking system

based on results from IQ tests (McCardle, 2020). The separation of courses continued into the Cold War and during the Civil Rights era.

In 1954, the Supreme Court declared that the right to desegregate education was fundamental in the *Brown v. Board of Education* case. This ruling made de jure segregation, which "results from intentional governmental discrimination," unconstitutional (Fudge, 2021). In response to the ruling, schools began to use tracking systems to skirt the law and segregate students under the guise of "ability." In the 1960s, during the conflict with Russia, Americans began to implement programs for gifted and talented students and further segregated White students from their minority peers (Loveless, 1998). It was not until the late 1960s and early 1970s that the courts realized that ability grouping had negative ramifications and infringed on these students' rights. In both *Hobson v. Hansen* (1967) and *Pena v. Superior Court* (1975), courts ruled that the tracking practices used were discriminatory towards minority children, leading to the lower tracks being disproportionally comprised of Latinx and Black students. With the legal evidence to support their claims, scholars began to push back on tracking "for reproducing and exacerbating social inequalities" (Loveless, 1998, p.3). The articles published by these authors, especially *Keeping Track* by Jeanne Oakes (1985), led to an increase in anti-tracking activity. However, despite evidence of the discriminatory nature of the practice, growing demand for public school excellence led to the use of tracking ramping back up again at the beginning of the 20th century (Legette & Kurtz-Costes, 2021a).

Tracking Policies in California Public Schools

In 2015, California legislators adopted the *California Math Placement Act* of 2015. This policy, *California Senate Bill* (SB) 359, "require(s) governing boards or bodies of local

educational agencies, as defined, that serve pupils entering grade 9 and that have not adopted a fair, objective, and transparent mathematics placement policy . . . develop and adopt, in a regularly scheduled public meeting, a fair, objective, and transparent mathematics placement policy for pupils entering grade 9 with specified elements" (*California Math Placement Act*, 2015). This bill, developed to address "egregious examples of misplacement," specifically with students of color only addresses students in high school (*California Math Placement Act*, 2015). It does not reach the issue's root —middle school placements where students are tracked initially and separated by ability (*California Math Placement Act*, 2015). There is no legal requirement for middle schools to develop a placement policy, resulting in course placements being determined through biased methods like teacher recommendations. Even with a law designed for high school students, a lack of policy in middle school is too little, too late, when Latinx and Black students have already been denied access to the higher-level middle school courses of their White and Asian peers.

Statement of the Problem

Before middle school, most students are taught math in heterogeneous math classes, and all students have access to the same content and level of instruction. However, once students enter middle school, they are separated into tracked mathematics courses based on test scores, course grades, and teacher recommendations without standardization or policy across districts, schools, and even teachers in the same math departments. Although schools were legally desegregated, tracking has perpetuated segregation in schools by disproportionately filling the lower tracks with students of color and reserving the honors and advanced courses primarily for White students (Darling-Hammond, 2009). This unequal access to high-level courses for Black

and Latinx students contributes to the achievement gap found among our students, especially in mathematics. A research study by Oakes (1995) found that even when test scores were controlled, students were tracked “up” and “down” at dramatically different rates based on race. White and Asian students were almost entirely moved into the higher track when scoring near the 60th percentile on standardized assessments, while Latinx students were less than half as likely to be placed in the honors classes.

Numerous other studies found that there is an overrepresentation of White and Asian students and disproportionately low amounts of Latinx and Black students in higher math tracks (Ballón, 2008; Irizarry, 2021; Kelly, 2009). Although the racial disparities in the class composition are concerning, the effect of these placements is the cause for most concern. It has been found that teachers who instruct students on the lower track often provide lower-quality instruction, a slower pace of instruction, have lower expectations, and offer fewer opportunities for higher-level thinking, perpetuating the achievement gap (Gamoran, 2021).

Black and Latinx students are at a significant disadvantage in high school and beyond when they are not given access to higher-tracked math classes. In addition to the lack of access to increased problem-solving opportunities and more experienced teachers, they are less likely to have the opportunity to take Calculus before college, which can hinder their applications to college, their future job prospects, and their economic opportunities (Darling-Hammond, 2009).

As the research has shown, Black and Latinx students are most negatively affected by these placements. They are being kept out of honors courses at disproportionate rates when compared to their White and Asian classmates. Placement decisions made in middle school can change the outcome of students’ futures, so it is imperative to investigate the policies and

procedures teachers use to make these placements. This study aimed to address the problem of how math class placement in middle school affects the academic trajectory of students, specifically those Latinx and Black students. This study examined the effect these placements have on both students' access to high-level, quality math courses and their levels of achievement.

Purpose of the Study

The study aimed to understand how placement decisions in middle school lead to differences in students' access and achievement in their high school and their planning and preparation for college. This information was collected by surveying students placed into honors and traditional mathematics courses to gather standardized test scores, high school courses completed, and future goals and aspirations. Further, by interviewing middle school math teachers, this study explored the differences in teachers' perceptions and pedagogical choices of their honors and traditional math classes. Finally, this study offers recommendations, collected and summarized from the teacher interviews, on a placement policy that can be developed to ensure equitable placements into honors courses for middle school mathematics.

Research Questions

To better understand the impact of middle school mathematics placement on students' access and achievement, this study focused on the following research questions:

- Research Question 1: How does tracking students into honors mathematics courses in the 7th grade affect Latinx and Black students' access to courses and levels of achievement in high school and beyond?

    - Research Question 1a: How does the honors mathematics course placement of middle school students affect students' high school course trajectory and levels of achievement?
- Research Question 2: What are the perceptions and pedagogical decisions made by middle school math teachers that affect students' achievement in honors courses versus non-honored courses?
- Research Question 3: What measures of student achievement and success do middle school math teachers think should be considered when developing a placement policy for honors mathematics courses?

Significance of the Study

At many middle schools in local school districts, students are being placed into accelerated mathematics courses based primarily on teacher recommendations. There is no standardization for these placement decisions, and teachers determine who they feel would be successful in an accelerated course based on subjective determinations and their "assessments of students' approaches to learning in mathematics" (Domina, 2014, p.1952). Research confirmed that this lack of policy has resulted in an over-representation of White and Asian students in accelerated math courses (Akos et al., 2007; Domina, 2014; Waterman, 2010). Despite recommendations that placement decisions should be made systematically using objective criteria, there still have not been changes in that direction in all middle schools (Fong & Finkelstein, 2014).

It is inequitable for the Black and Latinx students who are being restricted from joining these courses even if they are academically qualified. These placement decisions, made through

subjective opinions, affect students beyond middle school. Data from a 2012 analysis of math course sequences for California students showed that "placement into algebra I by grade 8 was important to reaching calculus by grade 12, and high-achieving grade 7 minority students were less likely to reach calculus by grade 12 than their high-achieving grade 7 non-minority peers" (Fong & Finkelstein, 2014, p. 3). Given these statistically significant differences in enrollment in advanced math courses and the effect on college and career trajectories, it is evident that it is imperative that all students, but especially Black and Latinx students, are accurately placed into their middle school math courses.

Teachers teach their students differently, affecting their access to a high-quality education. Teachers of lower-tracked students reduce academic challenges for their classes and hold their students to lower expectations, which can "manifest in reduced content coverage" (Kelly & Carbonaro, 2012, p.274). Additionally, research showed that many teachers consider their students in the honors tracks to be more teachable and trustworthy. This, in turn, results in a higher sense of self-concept and school belonging for higher-tracked students—directly related to their academic achievement (Van Houtte, 2004). A lack of mathematics placement policy in middle school continues to perpetuate the racial "achievement gap" and uphold the White-dominated ideal of mathematics education.

This study offers a significant contribution to research in math education and the effects of tracking students. More research is needed on the impact of tracking students during their middle school years, and this study gives insight into the long-term effects of these decisions. By obtaining data from high schoolers tracked in middle school, there are contributions to the field of both tracking and detracking arguments that are not regularly seen in preexisting research, as

much of the studies focused on more short-term data. Finally, this study provides the foundations for developing a middle school tracking policy that educators across the country can reference as they look for more equitable tracking practices in their schools and districts.

Conceptual Framework

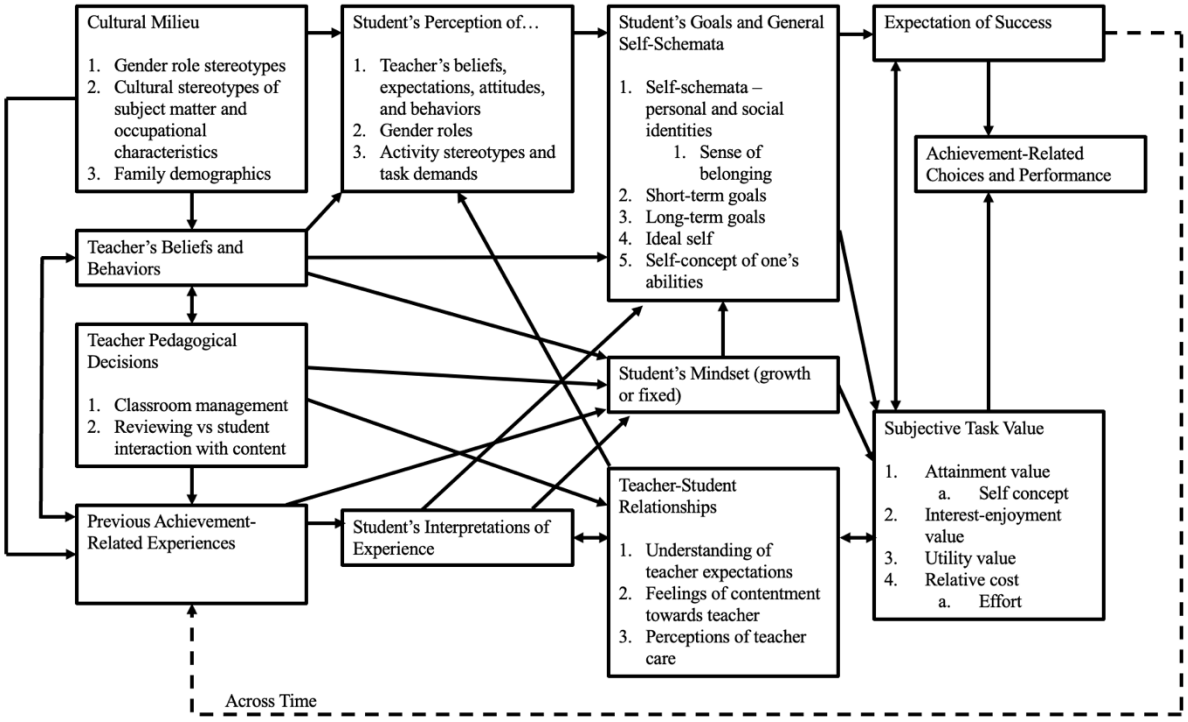
The aim of this study was two-fold: first, to understand how placement in honors mathematics courses in middle school affects students' access and achievement in their academic careers and what factors teachers feel need consideration when developing an equitable placement policy. Because of the two independent aspects of the study, there was a need for a conceptual framework that considers students' motivation as independent and dependent on teacher interactions. An adapted version of the Expectancy-value theory (EVT) offerred the go-between to both parts of the study, research into students and teachers, as there is research to show that student success is determined by their educational values and expectancies but also influenced by the student-teacher interactions (Eccles et al., 1983; Green, 2002).

The expectancy-value theory of motivation was developed by John William Atkinson and expanded to the field of education in the 1980s by Jacquelynne Eccles (Atkinson, 1964; Eccles et al., 1983). Broadly, this theory stated that individuals' expectancies for success are vital in determining their motivation to perform tasks and achieve (Wigfield, 1994). Eccles et al. (1983) defined expectancies as "individuals' beliefs about how well they will do on upcoming tasks, either in the immediate or longer-term future" (Eccles & Wigfield, 2002, p.119). According to EVT, expectancies—influenced by perceptions of confidence, difficulty, goals, and schema—and values directly influence a student's performance, persistence, and task choice. These variables are influenced by individuals' perceptions of other people's expectations of them and

their previous achievement outcomes. This modified theory of motivation was illustrated by the Expectancy-value model created by Eccles et al. (1983), which was adapted to include the influence of teacher interactions on student motivation, found below in Figure 1.

Figure 1

The Expectancy-Value Model of Achievement



Note. Adapted from the Expectancy-Value Model of Achievement to include teacher-student interactions and the effect of those on task value and expectations of success. Jacquelynne Eccles and collaborators created this flowchart to illustrate the influences of expectancies and values on students' motivation and achievement. Adapted from "Motivational Beliefs, Values, and Goals" by J. S. Eccles and A. Wigfield, 2002, *Annual Review of Psychology,* 53(1), p. 119, copyright 2002 by Annual Reviews.

Eccles et al. (1983) defined four components of task value in their model: attainment value, interest-enjoyment value, utility value, and relative cost. Attainment value is the importance of doing well on a task. This value is directly related to a student's self-concept—if a student deems themselves "smart," they will value taking honors courses to prove their intelligence. Likewise, students who perceive themselves as "bad at math" will avoid higher-

level math courses because they find little value in them. Based on the directionality of the arrow in the model that connects subjective task value and expectation of success, it is safe to assume that the inverse of those examples is also true (Eccles et al., 1983). If a student is placed into a high-level math course, where they are influenced to place value in the content, they will believe that they are bright and succeed. However, if students are not placed in an honors math course, they may think math has little value and will not succeed.

Interest-enjoyment value is the individual's interest in the subject, similar to intrinsic motivation (Eccles et al., 1983). Utility value, on the other hand, is the value placed on a task or subject determined by the importance of that task for some future goal. For example, a student may take and succeed in a high-level math course because it is necessary for a future career goal, despite not being particularly interested in the subject. In mathematics education specifically, students' perceptions of the usefulness of the course are strongly related to their willingness to take challenging courses. However, perceptions of usefulness differ across different demographics—since professions that require mathematics are dominated by White males, fewer students of color and women place utility value on honors math courses (Eccles et al., 1983).

The final value component identified is relative cost, which is "conceptualized in terms of the negative aspects of engaging in the task . . . as well as the amount of effort needed to succeed" (Eccles & Wigfield, 2002, p. 120). As seen in Figure 1, EVT draws a direct connection between expectations of success and subjective task value. Wigfield (1994) proposed that children begin to place more value on activities in which they do well and lower the value of those they deem difficult or perceive themselves to be bad at. Students who place little value in math because of past failures or other reasons—such as not being placed into an honors math

course—may be less successful than their peers who are given opportunities to find value. These students may see that the relative cost of taking higher-level mathematics classes is not worth the perceived value of these higher-level courses.

Although the original EVT model is almost all-encompassing, it was necessary to consider teacher-student interaction on students' achievement and the value they place on academic assignments (Eccles et al., 1983). Research showed that when students have positive interactions with their teachers and when they find that their teachers care for both them and the subject area they teach, they are more engaged and achieve at higher levels (Roorda et al., 2011; Wentzel, 1997). Additionally, teachers who provided their students with clear, understandable expectations and maintained them throughout the course taught students that found more value in the academic tasks and were more motivated to engage with the learning (Wentzel et al., 2017). Because of the robust research evidence that teachers profoundly affect students' motivation, it was essential to include them in the EVT model as influential on students' subjective task value and their interpretation of experience and expectations of success.

Eccles and her colleagues (1983) showed that self-concept and performance expectancies can predict achievement in mathematics and that achievement is positively related to a student's perception of mathematical ability and willingness to take advanced math courses. Additionally, studies have found that these mathematics expectancies can predict career choices, even after controlling for prior performance levels (Eccles & Wigfield, 2002). The adapted model of EVT is significant for traditionally marginalized students who are being kept out of honors mathematics courses and are not encountering teachers making the same beneficial pedagogical decisions as the teachers of honors-level courses. With all these factors influencing their

schooling, these students can develop a negative mathematics self-concept and, therefore, perceive their mathematical ability to be lower, which impacts their achievement and influences the college and career paths they feel they will be successful in (Legette & Kurtz-Costes, 2021b).

Research Design and Methodology

This mixed-methods study utilized quantitative survey data from students to illustrate access and achievement differences and qualitative open-ended survey questions and focus group data to understand teacher perceptions. The study was designed to describe the effect of mathematics placement in middle school on achievement and access and to gain insight from current middle school teachers on factors for consideration in developing an equitable placement policy. The survey information collected from the students provided half of the picture; however, the open-ended questions completed by their former math teachers completed the puzzle and offered insight into the differences in pedagogical choices based on the perceived abilities of the different tracked classes. The focus group allowed for an even deeper insight into teacher perceptions, and the teachers involved offered recommendations for a placement policy that can be implemented at a district level to ensure equitable placement in future math courses.

Participants

Participants in the student survey included former students from a small elementary school district near Los Angeles who have recently graduated from nearby high schools. Additionally, all six math teachers who taught both an honors course and a non-honors course from the middle schools in the district were asked to participate in the open-ended survey. Once the open-ended survey was completed, a smaller group of teachers were purposively selected to participate in the follow-up focus group to gather recommendations for an equitable placement

policy. The four teachers selected for the focus group represented both schools and all three grade levels. They also included the mathematics teacher on special assignment (TOSA) from one of the middle schools.

Data Collection

First, the anonymous survey created on Qualtrics (www.qualtrics.com) was emailed to former students from the district. The survey first reminded them of the nature of the study and asked for consent to participate. Students completed the survey containing Likert-scale questions to gauge their subjective task value, mathematics self-concept, growth mindset, and questions about achievement levels such as grade point average (GPA), the number of Advanced Placement (AP) courses taken, their Scholastic Achievement Test (SAT) scores, and future college and career plans. Once the student data was collected, the open-ended surveys were sent out to the honors mathematics teachers in the district to gather insight into their perceptions of their honors classes versus their non-honors classes and differences in pedagogical decisions based on class ability level. Once all surveys were completed and the data was analyzed, a group of teachers from both school sites and all grades was asked to participate in a focus group. The focus group asked questions to understand better what factors and considerations teachers want to be included in a math placement policy.

Data Analysis

Student survey data was imported into Microsoft Excel (Microsoft Office 365; www.microsoft365.com) and analyzed with descriptive statistics to identify significant trends between honors course placement and achievement levels. The open-ended teacher surveys and

focus group interview transcripts were analyzed for themes and patterns. Additional information regarding the study's methodology can be found in Chapter 3.

Assumptions

The study made assumptions about the participants. Students were asked to self-report data points, such as the number of honors/AP courses, grades, GPA, and test scores, and it was assumed that they answered honestly. Additionally, teachers were asked to answer questions they may deem sensitive, and this study assumed that teachers were being truthful and transparent in their responses.

Limitations

The limitations of this study were related to sample size, the use of self-reported data, and my positionality within the study. Teachers may have felt hesitant to respond honestly to some of the more sensitive questions as I am a member of the same math department as those who participated in the study and am a friend to many of the teachers. Additionally, asking participants, especially high-schoolers, to self-report achievement levels could have been a limitation. Student participants may have felt a need to be dishonest or to answer in a way that they think I would like them to reply. While these limitations cannot be eliminated, reminders of the anonymity of the survey data and confidentiality of the interview data helped mitigate some participants' uneasiness.

Another limitation of this study was that it grouped students binarily into Black and Latinx students and White and Asian students. As the study aimed to look at the influences of track placement on the racial achievement/opportunity gap and the most significant racial gap is between these two different racial groups, it was necessary for this division. Additionally, with

tracking as the focus of the study, there was an apparent discrepancy between honors course placement rates for Black and Latinx students versus their White and Asian counterparts, again reinforcing the necessity of this binary way of thinking despite the nuances in student outcomes when looking at each racial subgroup.

Delimitations

This study was explicitly limited to middle school math because it was the first time most students were formally tracked and separated into different leveled math courses. With evidence of a growing problem with math education, especially equity in the math class, it was essential to focus on how these decisions in the 7th grade alter students' academic trajectories through high school and beyond. Additionally, this study focused on the differences in teachers' beliefs towards their honors and traditionally tracked students, intending to look for differences in perceptions and pedagogical decisions. This was important, as teacher perceptions impact how students perform and the academic outcomes of the students they teach (Green, 2002).

Organization of Dissertation

Chapter 1 provided an overview of the study, its purpose, and its significance. Chapter 2, the literature review, discusses the effect of math track placement on students' achievement and expectancies and the effect of teacher-student interactions on students' motivation. Chapter 3 provides the study's methodology in greater detail, including a description of the research design, sampling, instruments, procedures, and data collection. Chapter 4 provides the study's findings after quantitative and qualitative data analysis. Chapter 5 discusses the findings in relation to the literature review, as well as recommendations for practice and future research.

CHAPTER 2

REVIEW OF LITERATURE

When looking at California state test scores, there is a clear gap in the mathematics achievement level between White and Asian students and their Latinx and Black counterparts. Latinx and Black students are significantly underperforming their White and Asian peers on the mathematics section of the CAASPP (California Assessment of Student Performance and Progress), given to students annually in grades 3 through 8 and again in grade 11 (California Department of Education, 2024). In 2022, 15.9% of Black students and 21.2% of Latinx students met mathematics grade-level standards, compared to 69.5% of Asian students and 48.2% of White students who met mathematics grade level standards (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010; Yee & Hong, 2022). These scores followed the same pattern as years past—since beginning the administration of CAASPP in 2015, Black and Latinx students have consistently scored lower than their Asian and White peers (California Department of Education, 2024). Framing this problem as an achievement gap, however, is a disservice to our Black and Latinx students. Instead, the achievement differences between these racial groups can and should be described as an opportunity gap. Evidence shows that opportunities to learn math are not equally distributed to all students, and "African American, Latino, and low-income students are less likely to have access to experienced and qualified teachers, more likely to face low expectations, and less likely to receive equitable per student funding" (Flores, 2007, p.29).

One practice that continues to perpetuate the opportunity gap is tracking students into leveled mathematics classes. Countless studies confirm that Black and Latinx students are placed

into lower-track math courses at higher rates than their Asian and White peers, even when they have standardized test scores that match or outperform their counterparts (Ballón, 2008; Flores, 2007; Kotok, 2017; Oakes, 1995). The lack of opportunity for higher-level math courses is not limited to Latinx and Black students in predominately White schools. In his research, Kotok (2017) found that this placement gap still exists for students who "attend more racially and economically diverse schools" (p. 186). Placement is an issue for students, but being kept out of higher-tracked math courses has issues beyond access to the higher content.

This study addressed how placement into honors-level mathematics courses in middle school affects students' academic trajectory and achievement, specifically Latinx and Black students. To address this problem, I reviewed research literature around the systemic issues behind the "achievement gap," the effect of tracking on achievement factors, and the effect of teacher-student interactions on achievement.

The Systemic Issue of Tracking Students by "Achievement" Levels

The placement of students into tracked courses based on actual academic ability is nearly impossible when considering the racial disparities in test scores and achievement based on systemic issues such as school quality or home environments. Before students enter schools, significant racial disparities in test scores indicate that schooling is not solely at fault for the "achievement gap" (Shores et al., 2020). However, these test score differences do increase throughout schooling—something that can be attributed to the quality of the school and the systems in place. This section of the literature review will focus on the systemic issues that lead to the opportunity gap and, therefore, achievement gap, as well as the disparities seen in Latinx/Black students versus White and Asian students.

The Achievement Gap Before Beginning School

Before even beginning kindergarten, Black and Latinx students are at an educational disadvantage compared to their White and Asian peers. In a 2008 study, using data from the Early Childhood Longitudinal Study-Birth Cohort, Wang determined that there was a statistically significant achievement gap between Black and White students and Latinx and White students by the age of 4. Additionally, Asian students scored better than White students, increasing the achievement gap between their Black and Latinx counterparts. This gap, found in both mathematics and literacy knowledge, "highlight[s]the extent of educational inequality experienced by Hispanic [and Black] children in the United States" (Wang, 2008, p. 30). This study is not alone in its findings—systemic issues are causing Black and Latinx students to be behind their peers before even having their first lesson.

One big racial difference that influences the gap seen between Black and Latinx students and their White and Asian peers is socioeconomic status. In a 2008 study, researchers found that White children have a family income level that is, on average, twice as high as Black families (Yeung & Conley, 2008). Additionally, they found that the parents of Black children had lower education levels, scored lower on a verbal test, and did activities with their children less frequently than White parents. All these factors contribute to lower skill levels for Black children before beginning school in comparison to White children. Although these disparities in academics may not be directly a result of familial wealth, the results of having less money—parental stress, lack of educational toys, and hours spent at work versus home—influence the skills students are learning before beginning school.

Differences in parenting styles across races can also influence students' achievement levels before school begins. In a 2006 study, Murnane and collaborators analyzed longitudinal data from the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development (NICHD SECCYD) to understand better the achievement gap that Black and Latinx students face before beginning school. This data provided information on students' family backgrounds and academic skills before kindergarten. One family characteristic they focused on in comparing Black/Latinx students and White students was maternal sensitivity. It was determined that maternal sensitivity, measured by tracking the "emotional and instrumental support for the child during collaborative interactions between mother and child" through videotaped interactions between mother and child, correlated with test scores on mathematical skills. Mothers who scored highly on the measure of maternal sensitivity had children with higher test scores than mothers who scored lower. Since Black mothers were found to be significantly lower on the maternal sensitivity measure than White mothers, differences in parenting behaviors are putting Black students at a disadvantage before schooling begins (Murnane et al., 2006, p.111).

The differences in how students are raised and their access to resources before starting school considerably impact student achievement at the start of their academic careers. Many of these differences are a result of the system failing Black and Latinx students by providing them with less access to economic and educational resources. These students are set up to fail before beginning with an increasing racial difference in familial wealth between Black/Latinx families and White families that influences all aspects of their pre-schooling years (Yeung & Conley,

2008). Once these students begin school, the inequalities between skill levels are often exacerbated instead of rectified.

How Teacher Biases Perpetuate the Achievement Gap

Black and Latinx students are starting kindergarten behind their White and Asian counterparts. However, it is often assumed that school should be the great equalizer and bring all students up to the same level. However, that is different than what is happening. Murnane et al. (2006) found that "the black-White achievement gaps in both reading and mathematics are much larger at the end of third grade than at the beginning of kindergarten," suggesting that schooling is exacerbating the academic gap instead of reducing it (p. 99). This section of the literature review aims to look at a few differences experienced in schooling between Black and Latinx students compared to White and Asian students.

There is no doubt that Black and Latinx students attend schools with more minority students and fewer resources than their White and Asian peers. Palardy et al. (2015) found that Black students who attended schools with large amounts of minority students were lower performing than those who attended schools with more White students. They argued that these differences resulted from different learning environments—educators were structuring classes differently to focus on controlling behavior instead of promoting learning. Additionally, there is a close relationship between school quality and neighborhood location, so with most American students attending schools within unofficially segregated geographic areas, Latinx and Black students are forced into lower-quality schools (Merolla & Jackson, 2019).

Teacher bias and quality also play a role in maintaining the achievement gap throughout schooling. Because teachers and other personnel are part of a "racialized social structure which

produces rampant anti-Black" sentiments, Black students are often more negatively evaluated even when their work habits and behaviors are the same as their White peers (Merolla & Jackson, 2019, p.7). In a study of pre-service teachers, Glock and Karbach (2015) found that participants associated racial majority (White-looking) students with positive words at a statistically significant higher rate than racial minority (darker hair, skin, and eyes) students. They concluded that these implicit biases impact attitudes towards these students in the classroom—students who appear to be in the racial majority are treated more positively than students who appear "foreign" or have darker characteristics.

In 2021, David Quinn completed a research study to measure racial bias in grading through a two-part grading task in a survey provided to 1,549 teachers in the United States. Teachers were provided a writing sample that either used traditionally White names or traditionally Black names and were asked to grade the sample on a scale with seven options: far below grade level, below grade level, or slightly below grade level; at grade level; or slightly above grade level, above grade level, and far above grade level. Quinn (2021) found that teachers shown the "Dashawn," or Black, version of the writing sample were "4.7 percentage points less likely to rate it being on grade-level or above" when compared to teachers shown the "Connor," or White, version of the sample. He then provided teachers with the same writing samples but also included specific grading criteria and found that teachers gave the writing samples nearly identical grades. This study offered direct evidence of the bias and subjectivity in teacher grading and can be extrapolated to teacher track recommendations. Teachers, when not provided explicit criteria for grading or course recommendation, are influenced by their implicit racial biases and will favor their White students.

These evaluations by educators impact many aspects of schooling, such as lower grades, disciplinary actions, and tracking placement decisions. Students of color are more likely to be suspended from school than their White counterparts, which impacts achievement as the student is wholly removed from the learning environment for their suspension (Sullivan et al., 2013). Additionally, this increased disciplinary action can lead to students disengaging from their education, impacting achievement (Bell, 2019).

There is a multitude of differences in schooling for Black and Latinx students compared to their White and Asian peers, and these differences often put Black and Latinx students at a disadvantage. However, it is to be noted that none of these differences are the students' fault. Instead, this "achievement gap" is a result of systemic racism "that privileges White Americans and disadvantages Americans of color" (Merolla & Jackson, 2019, p.1). Because student "achievement" level is directly influenced by structural racism, tracking students based on levels of achievement continues to perpetuate the racist structures created to keep Latinx and Black people from thriving. The next section of the literature review will examine the effects of tracking on student achievement and the way that this method of within-school segregation continues to perpetuate the opportunity and achievement gap for Latinx and Black students.

The Effects of Mathematics Tracking on Achievement

Although numerous studies on tracking exist, very few studies have directly studied the effect of tracking on achievement. Instead, researchers concentrate their studies on various factors affecting student achievement. This section of the literature review will focus on three factors of achievement: effort, sense of school belonging, and self-concept.

Differences in Student Effort by Track Level

Effort is "the amount of time and energy that students expend in meeting the formal academic requirements established by their teacher and/or school" (Carbonaro, 2005, p. 48). Effort can be further delineated into three types: rule-oriented, procedural, and intellectual. Rule-oriented effort can be measured by compliance with school rules, such as showing up to school on time and attending class. Procedural effort requires students to follow the teacher's specific demands, such as completing assignments and participating in class discussions. Finally, intellectual effort measures the energy and cognitive facilities used by students in completing academic challenges. Together, these measures make the concept of effort a multi-dimensional concept that requires the consideration of a broad range of tasks (Carbonaro, 2005).

Farkas et al. (1990) found that effort or "work habits" measured by class participation and willingness to attempt challenging problems were positively related to students' grades or achievement. Since effort is positively linked to achievement, a change in effort based on track can be assumed to result in a change in achievement. In 2005, Carbonaro examined the relationships between tracking and students' effort and achievement in 8th- and 10th-grade classes. Through test scores and students' self-reflections on self-concept and intellectual stimulation, it was determined that effort levels vary across tracks—the higher the track, the higher the amount of effort exerted. This aligned with a 1992 study, which found that students in higher tracks had higher peer-group effects, leading these students to put forth more effort than low-track students (Gamoran, 1992). Carbonaro's (2005) data also showed that students make more achievement gains in a higher math track regardless of the student's prior math achievement due to the increased effort made by students within that track. Students in the

lowest vocational track exerted the least effort and achievement. After analyzing the data, Carbonaro (2005) concluded that "when comparable students in lower track classes try as hard as students in higher track classes, they still learn less than they would in the higher track" (p. 44). Through these studies, tracking has adverse effects on the efforts of students tracked into lower-level classes (Carbonaro, 2005; Gamoran, 1992). The next measure of achievement that will be investigated is students' sense of belonging.

Tracking Level and the Effect on a Sense of School Belonging

School belonging is defined as "the degree to which [students] feel accepted, respected, and supported by others at school" (Legette & Kurtz-Costes, 2021a, p. 962). In a 2020 meta-analysis, Korpershoek and collaborators determined a positive correlation between school belonging and academic achievement—students who feel accepted in the school social environment are likely to perform better academically. Abdollahi and Noltemeyer (2018) also confirmed this finding and determined that students with a greater sense of belonging at school were more willing to exert effort on complex academic challenges, which lead to a greater likelihood of academic achievement. Conversely, they found that students with a low sense of belonging were likely to give up on an academic task, which resulted in lower academic achievement levels.

Citing this relationship between belonging and achievement, Legette and Kurtz-Costes (2021a) surveyed 322 6th graders from a school district in the southeast United States to measure the effectiveness of their school tracking position (honors math or math) on their sense of school belonging. In this study, the researchers focused on academic identity, or how strongly students use academic achievement to define themselves. Academic identity was studied "as a mediator

of the relation between track placement and students' school belonging . . . because of the value attributed to academic excellence at school" (Legette & Kurtz-Costes, 2021a, p. 966). The study results showed that students in the honors track have a higher academic identity, which increased their sense of school belonging and academic achievement.

Legette and Kurtz-Costes (2021a) surmised that because students assign "meaning" to track assignments, assumptions about academic abilities are made for each track. These assumptions can harm students on the lower track, as they may believe they have lower ability and value school less than their higher track peers. This elitism and divisiveness caused by tracking directly affects students' sense of belonging at school, influencing their academic achievement levels and willingness to exert effort (Abdollahi & Noltemeyer, 2018). When students are tracked into math classes at the beginning of middle school, there can be a detrimental effect on motivational beliefs and perceptions of competence if a student is tracked into a lower level. In contrast, students tracked to a higher level may now view themselves as talented and have increased effort and achievement (Legette & Kurtz-Costes, 2021a). The final measure of achievement that will be investigated is self-concept.

Mathematics Self-Concept and the Influence of Track Level

Tracking and its effect on self-concept is one of the more studied areas in the tracking topic with varying results. However, more recent studies show a correlation between the mathematics track level and the amount of mathematics self-concept students demonstrate (Boaler, 2013; Chmielewski, 2013; Francis et al., 2020; Lawrence, 2019; Legette & Kurtz-Costes, 2021b). Students' mathematics self-concept is their perception of or their mathematical abilities (Chmielewski et al., 2013). It is "based on a personal frame of reference, provided either

by the average academic ability of their classmates and schoolmates or by how highly society values the class or school" (Dockx et al., 2019, p. 67). The effect of tracking on self-concept is essential to study as it is a predictor of student's academic achievements and school behaviors (Legette & Kurtz-Costes, 2021b).

In their study, Francis and collaborators' (2020) data came from a large-scale mixed-methods project, 'Best Practice in Grouping Students', funded by the Education Endowment Foundation, and monitors student cohorts from the beginning of Grade 7 to the end of Grade 8 in 139 secondary schools. They analyzed two surveys given to the students at the beginning and end of the study that contained questions measuring self-concept (Francis et al., 2020). It was found that students in the higher mathematics tracks showed higher levels of self-concept than those in the lower tracks after two years in middle school. In fact, over the two years, the gap between the higher and lower tracks grew. The authors of this study "d[id] not think it unreasonable to hypothesize that these trends . . . likely impact on pupils' dis/associations with schooling, and in turn on pupils' perceptions of their futures" (Francis et al., 2020, p. 639).

Similar results were found in the 2013 study performed by Chmielewski and collaborators. Although this study discussed the effects of three different types of tracking, course-by-course tracking is most prevalent in the United States and will, therefore, be the focus of this synthesis. For their data, Chmielewski et al. (2013) used math scores and the Self-Description Questionnaire from the 2003 Program for International Student Assessment (PISA), an international assessment of 15-year-olds (Organization for Economic Cooperation and Development, 2023). The Self-Description Questionnaire asked students about their self-concept, track level, and mathematics grades. It was determined that "high-track students have higher

mathematics self-concepts and low-track students have lower mathematics self-concepts" because they know their track's relative status (Chmielewski et al., 2013, p. 948).

In a third study, Legette and Kurtz-Costes (2021b) found from a survey of 332 students that those in the honors track had higher math self-concept than students in the lower track, even with earlier math achievement controlled. From their data, they also inferred that "students may perceive that placement in an honors track is an esteemed position indicative of higher math ability, and in comparison, placement in lower tracks indicates lower ability" (Legette & Kurtz-Costes, 2021b, p. 610). The awareness of the hierarchy of track levels has a positive effect on students on the higher track but negatively affects students on the lower tracks and can result in decreased achievement for the students on the lower track.

All three studies had similar results and confirmed that students in the lower track have a lower self-concept, which results in lower achievement levels for those students (Chmielewski et al., 2013; Francis et al., 2020; Legette & Kurtz-Costes, 2021b). According to the expectancy-value theory, self-concept is directly related to students' expectations of success and their value in the task or subject area (Eccles et al., 1983). By understanding the effects of track placement on students' mathematics self-concept, it is possible to measure students' expected achievement. Students with a high mathematics self-concept are more likely to take higher-level math courses and achieve higher test scores, which directly impacts students' college and career opportunities (Parker et al., 2014).

The Effects of Tracking on Growth Mindset

One aspect of self-concept that has recently been at the forefront of educational studies is the growth mindset, the belief that "intelligence and 'smartness' can be learned and that the brain

can grow from exercise" (Boaler, 2013, p. 143). Through her extensive work, Boaler (2013) has found that ability grouping has detrimental effects on a growth mindset. With a growth mindset, students show greater achievement as they work and learn more effectively and have more resilience in the face of challenges. On the other hand, students with a "fixed mindset" believe they either have a math brain or do not and tend to give up quickly when they make mistakes. When students are tracked, whether they know it or not, their beliefs about their potential are affected (Boaler, 2013). Many will develop a fixed mindset based on their placement and conclude that either (1) they are not intelligent and nothing they will do can change that, or (2) they are smart, and if they fail or make a mistake, they will no longer be smart. Tracking communicates that only some students are high achievers, resulting in lower achievement among the entire student body (Boaler, 2013).

Lawrence (2019) studied the effects of tracking on middle school students from Cedar Falls School District in Iowa. These students were surveyed at different phases in their mathematics tracking experience, and the study yielded similar results. Students in 6th grade had yet to be tracked, 7th-grade students were beginning to be tracked, and 8th-grade students had been tracked for over a year. After data analysis, it was determined that the tracked students in Grade 8 had significantly lower growth mindset scores than the untracked students in Grade 6. Lawrence (2019) found that tracking reinforces a fixed mindset in students and can even lead to self-fulfilling prophecies where students in low-track math believe they are being told they are not "smart enough" and, therefore, put in less effort and perform lower than their ability. Tracking and its effect on a growth mindset is one of the achievement areas, and even highly tracked students can experience adverse effects. Students who develop fixed mindsets after being

tracked into high-level courses will avoid challenging work and advanced math courses to maintain the idea that they are "smart" (Boaler, 2020).

Research on tracked schools shows adverse effects on student achievement for all students, especially those tracked into lower-level classes (Burris et al., 2006; Boaler, 2011; Boaler, 2013). The implications for these results go beyond academic achievement in the math classroom. The negative sense of students' school belonging from being tracked into lower-level courses has unfavorable effects on socioemotional growth, friendship forming, and future aspirations. Similarly, developing a fixed mindset (regardless of the track level) can follow students through their careers and into adulthood. Tracking can have a long-lasting impact, and with the underrepresentation of Black and Brown students in advanced classes, there is an apparent effect on the mathematics achievement gap (Berwick, 2019).

The Differences in Pedagogy by Track

Taking different leveled math courses does not only affect students. There is evidence that teachers also differ in their approach to their tracked classes depending on the perceived level of content understanding that the students have. This section of the literature review will discuss the differences in pedagogical decisions of teachers of different tracked mathematics classes.

One of the seminal studies in this area, *Keeping Track* by Jeannie Oakes (1985), found that low-track classes focused more on life skills and math for everyday life and employment, and there was less time spent focusing on grade-level content standards (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). Conversely, students in higher tracks were exposed to higher-level thinking problems that were

more like the types of problem-solving required for college. Various additional studies have confirmed Oakes' (1985) findings on instructional differences.

In a study of two teachers, both of whom taught students in regular-level math classes and honors classes, Reed (2008) found that perceived difference between the sets of students influenced their instructional decisions. These teachers, Michelle and Sam, agreed that students in their non-honors level classes were less academically mature and less motivated to succeed, and those in the honors level courses were more motivated and harder working. Additionally, the teachers believed that students in the lower-tracked course needed more time reviewing the "basics," which left little time for the more challenging material the honors students could receive (Reed, 2008). The differences felt by these teachers extended beyond academics. Michelle and Sam saw their regular students as causing more behavior problems and spent more time on classroom management. When analyzing the teachers' different pedagogical decisions, Reed (2008) found that the participants made three significant adjustments to their teaching in their regular class: 1) modifying tasks, 2) providing additional scaffolding, and 3) shifting the responsibility of doing the mathematics from the teacher to the student.

Like the Reed (2008) study, various other studies have found that teachers of students in lower-tracked classes provide lower-quality, slower instruction and have teachers with lower expectations (Gamoran, 2009; Gamoran et al., 1995; Kelly, 2004). A recent study found that teachers tend to form their expectations about students at the beginning of the year and maintain them throughout the year (Denessen, 2020). These early assumptions allow for few changes to pedagogy and teaching style in response to actual student achievement and understanding throughout the year and result in very different pedagogies for students in different level classes.

When dealing with academically lower students, teachers' expectations are lower, teachers control more of the student learning, and student achievement is lower. Conversely, teachers offer more challenging activities and learning opportunities for students who achieve higher levels because of their higher expectations of students.

When considering the demographic differences in tracked courses, it becomes clear that Black and Latinx are being exposed to less rigorous learning experiences than their White and Asian peers, simply by being placed in lower-level courses. Without access to honors courses, these students spend less time doing high-level mathematics, receiving scaffolded content, and completing modified tasks. These differences in instruction, whether teachers are aware of the modifications or not, are contributing to the academic gap and are continuing to perpetuate the idea that Latinx and Black students are less mathematically capable than their White and Asian classmates.

The Effect of Teacher-Student Interactions

Knowing that there is a difference in pedagogical decisions based on the class level is incredibly important when considering the effect of teacher-student interactions on students' motivation and achievement. The final part of this literature review will discuss the research on teacher-student interactions in the classroom.

Research shows that students who enjoy positive support from teachers tend to be motivated and engaged in their academics at school. In a meta-analysis of 99 studies, Roorda and collaborators (2011) found that positive teacher-student relationships were associated with positive engagement and achievement for those students. Positive teacher-student relationships were defined as caring for and expressing interest in the student, providing structure, and

supporting autonomy. They also found that the closeness of a teacher-student relationship was more important as students got older, especially after the transition to secondary school (Roorda et al., 2011). Students in secondary schools were more motivated by positive teacher-student relationships, leading to increased achievement.

In a quantitative study on the effect of teacher support on middle school students' motivation, it was found that students were motivated and engaged with academic tasks if they knew their teacher's expectations, had an emotionally supportive climate, and felt that the teacher found value and interest in what they were being taught (Wentzel et al., 2017). These findings were further supported by a 2007 study that "students' level of effort and persistence will be higher for liked teachers as compared to disliked teachers" (Montalvo et al., 2007, p.154). Wentzel (1997) found more of the same—student motivational outcomes were predicted by perceptions of caring teachers. Students described teachers who "cared" as democratic in interactions, developed behavior expectations, cared about their work, and provided constructive feedback.

In a research review, Brophy (1986) determined that students achieved more when their teachers emphasized academic objectives, maximized learning time, and worked through the curriculum briskly in small steps. This analysis is essential, as many of the differences in pedagogical decisions based on the level of tracked courses are made in these areas. It is fair to conclude that when teachers are not emphasizing academics or maximizing learning time in their lower-track classes, the students are set up to be less successful when compared to those in high-track classes where there is an emphasis on mathematical achievement and higher-level thinking. When teachers are truly effective, they are "effective with students of all achievement levels"

and do not make different pedagogical decisions based on the level of heterogeneity in their classrooms (Wright et al., 1997, p.63). These studies showed teachers' profound effects on student motivation and achievement. For students to be successful, regardless of class level, they need teachers who care for their students and their subject area, hold all students to high expectations, and maximize learning opportunities.

Because Black and Latinx students are placed more often into lower-tracked courses than their White and Asian peers, where teachers hold lower expectations of students and offer fewer opportunities for challenging activities, the pedagogical decisions made by teachers are having a profound effect on these students. In their 2020 study, Denessen et al. found a statistically significant correlation between teacher expectations and student academic achievement—teachers who expected more from their students taught students who achieved more academically. The perceptions teachers have of their students have a direct impact on their levels of achievement. Suppose Black and Latinx students are being systematically and incorrectly placed into lower-level courses without genuinely belonging. In that case, they will continue to be held down, and the opportunity and achievement gap will continue to be maintained.

Conclusion

This literature review aimed to show how systemic racism contributes to the achievement gap that is seen between Black/Latinx students and White/Asian students. Despite all students beginning school in kindergarten, Black and Latinx students are coming in already academically behind their peers because of non-scholastic issues such as socioeconomic status and parenting styles. Once in school, this gap continues to be exacerbated due to discrepancies in school resources, disciplinary action, and educator bias. One way that educator bias is exposed is

through tracking—which only continues to affect the achievement of Black and Latinx students. By being disproportionally placed into lower-tracked classes, students achieve at lower levels—measured by their effort on school tasks, sense of belonging, and mathematics self-concept. Additionally, the Black and Latinx students who are placed in lower tracks are interacting with teachers who have lower expectations of them and are making pedagogical decisions that illustrate those lowered expectations. All these differences in schooling experienced by Latinx and Black students because of a single course placement decision made by biased educators continue to perpetuate the racist opportunity and achievement gap.

This study aimed to build upon the literature to show how tracking students in middle school affects long-term achievement through various factors, such as access to higher-level courses, self-concept, and teacher-student interactions. Additionally, it looked to fill in the gaps in the literature about teacher perceptions of tracked students and make connections between these perceptions and the impact they have on long-term student achievement for Black and Latinx students. This study offers new literature on how a placement decision in 7th grade, made by teachers who have biases (even if they are unaware of their biases), has an extended effect on Black and Latinx students.

CHAPTER 3

METHODOLOGY

This mixed-method study aimed to explore the impact of honors course placement in middle school on students' access and achievement in high school and their planning and preparation for college and careers. Additionally, this study was used to develop recommendations for an equitable and bias-free honors placement policy to be implemented across the middle schools where the study is being conducted. This chapter will provide an overview of the study's methodology, including the research questions, context, participants, and procedures for data collection analysis.

Research Questions

This study's goal was to understand better the impact of middle school mathematics placement on students' access and achievement and teachers' different pedagogical decisions that impact student learning. To achieve this goal and to develop recommendations for a future honors course placement policy, this study focused on answering the following three research questions:

- Research Question 1: How does tracking students into honors mathematics courses in the 7th grade affect Latinx and Black students' access to courses and levels of achievement in high school and beyond?
    - Research Question 1a: How does the honors mathematics course placement of middle school students affect students' high school course trajectory and levels of achievement?

- Research Question 2: What are the perceptions and pedagogical decisions made by middle school math teachers that affect students' achievement in honors courses versus non-honors courses?
- Research Question 3: What measures of student achievement and success do middle school math teachers think should be considered when developing a placement policy for honors mathematics courses?

Study Hypotheses

Current research on track placement and achievement shows that students who are placed in high-level tracks academically outperform their lower-tracked peers due to their increased sense of belonging, mathematics self-concept, opportunities for higher-level thinking, and access to instructors that hold them to higher expectations (Chmielewski et al., 2013; Darling-Hammond, 2009; Francis et al., 2020; Gamoran, 2021; Legette & Kurtz-Costes, 2021a, 2021b). Because of this, it was hypothesized that similar results would be seen in this study; students placed into honors courses in the 7th grade have continued to achieve higher levels than their peers not placed into honors courses. Additionally, it was postulated that this study would confirm the research found that teachers make different pedagogical decisions based on the perceived achievement levels of their students—when they teach students in the lower track, they spend more time reviewing the basics and managing classroom behaviors and less time allowing the student to do higher-level mathematics (Oakes, 1985; Reed, 2008). The hypotheses for the research questions in the study were:

- Hypothesis for Research Question 1: Latinx and Black students tracked into honors mathematics courses in 7th grade are more likely to experience greater access to

advanced courses and higher-level achievement in high school and beyond than their peers who are not tracked into honors mathematics courses in the 7th grade.

    - Hypothesis for Research Question 1a: Middle school students placed into honors mathematics courses are more likely to have a trajectory of advanced courses and higher achievement levels than their non-honors peers.

- Hypothesis for Research Question 2: Teachers of honors courses will perceive their students as more capable of higher learning, have fewer discipline problems, and require less review of basic skills compared to non-honors courses. This will result in more rigorous lessons and time, allowing students to work and problem-solve with mathematics in the honors courses compared to non-honors courses.

Method

Context

This study focused on former students and current teachers from Mandell Elementary School District (MESD) (pseudonyms used to protect confidentiality), a small district in Southern California near the Los Angeles International Airport. The participating school district has two middle schools, Florence Kelley Middle School (FKMS) and Wiley Post Middle School (WPMS), with similar student populations comprised of 72% Latino, 8% Black, 6% Asian, and 3% White students. Additionally, 85% of students identify as low-income, and the schools range from 18% to 26% English Learners. Between the two schools, there are 16 mathematics teachers in both general and special education. The demographic distribution of all math teachers is 31% Latinx, 38% White, 19% Asian, and 13% Black. This district was chosen for the study due to the

demographics of the students and the lack of an explicit policy for mathematics course placement.

Both middle schools in the district begin tracking students in mathematics in the 7th grade—there is an honors course for students deemed high-achieving and a standard, Common-Core math course for low or average-achieving students. Both schools also offer Algebra 1 for students in the 8th grade. This class is primarily composed of students placed into honors math for the 7th grade, with very few exceptions for students who perform above expectations on CAASPP and class assessments in their Common-Core course or perform below expectations on CAASPP and class assessments in the honors course the year prior (California Department of Education, 2024). Generally, students who take Algebra 1 in the 8th grade are placed into 10th-grade math for their first year of high school, which sets them on the path of taking an AP Calculus course before beginning college.

The placement decisions for 7th-grade math courses were made through a Google sheet (www.google.com) shared with 6th-grade math teachers in the district. On this sheet, teachers were asked to list the names of students they believe would succeed in the honors math course. Teachers are not given any guidelines on making this decision, and it is left entirely up to their discretion. Teachers in the 6th grade employed different standards for making decisions. Some considered class grades (which are entirely subjective), some considered assessment scores, and some considered behavior and work habits. Once the recommendations were made, counselors then placed the recommended students into the honors math course. Counselors and the mathematics teacher on special assignment (TOSA) stated that CAASPP scores were also considered in these placement recommendations (California Department of Education, 2024).

Still, in previous years, there have been students who do not meet standard on CAASPP placed in these honors courses, so it was unclear to teachers that these scores were considered part of the placement procedure (California Department of Education, 2024).

Procedures

This study took a mixed-methods approach and collected data from two different groups of participants. This approach was selected for this study to allow for a more complete exploration of the topic through both quantitative and qualitative data (Creswell, 2009). Quantitative data was obtained through student surveys to get information on achievement levels post-middle school. Qualitative data for the study was collected from the teacher participants in two ways. First, the six honors math teachers completed an open-ended survey to understand the perceptions and pedagogical decisions between leveled classes. Then, the four selected teachers were asked to participate in a focus group interview to determine the recommendations for the future mathematics honors-course placement policy. By collecting both quantitative and qualitative data, this study was able to understand the effects of honors course placement on achievement and access.

Participants

Student participants for the quantitative survey were 31 former students of the district's middle schools who have recently graduated from nearby high schools. This student group was comprised of students who were both enrolled in the honors math course in 7th grade and those who were not placed into the honors course. Teacher participants for the open-ended survey and focus group included all middle school math teachers who teach both honors and non-honors courses (N = 6). Because of the nature of the survey questions, the remaining math teachers in

the district who do not teach honors courses were not asked to participate in this study. After completing the open-ended survey, three teachers and the math TOSA at FKMS were asked to participate in the follow-up focus group. The three included teachers represented both schools and all three grade levels.

Gaining Entry and Recruitment

For the past six years, I have been a mathematics teacher at one of the middle schools in the participating district. During my tenure at the school, I taught 7th-grade honors and non-honors math courses. I have a connection with many former students and utilized that connection to recruit student participants. The anonymous student survey created on Qualtrics (www.qualtrics.com) was emailed to potential student participants through my school district email. Once students confirmed they were willing to complete the survey, I used snowball sampling by asking them to share the link with former classmates they were still in contact with. This sampling method asked the originally chosen participants to recommend other qualified participants to complete the survey and increased the number of participants (Goodman, 1961). To gather teacher participants, I used my access as a teacher in the math department. I crafted an email to my coworkers with information about the details of this study and a link to the anonymous open-ended survey for them to complete on their own if they prefer. Once the survey was completed, I used my connections with individual teachers to recruit the four participants for the focus group interview.

Data-Collection Instruments

I collected data through two anonymous surveys and one confidential focus group for this study. As a sequential mixed method study, the quantitative data was collected first, followed by the qualitative data collection.

Student Survey

A quantitative student survey was designed to measure the achievement levels of former district students who were tracked into different level middle school courses starting in the 7th grade (see Appendix A). The survey, hosted on Qualtrics, measured achievement levels through objective measures such as GPA, SAT scores, the number of AP and honors courses taken, and college plans. It also contained Likert-type questions that measured more subjective achievement factors such as effort, sense of belonging, mathematics self-concept, and growth mindset. A link to the survey was emailed to all potential student participants at the beginning of January and took up to 15 minutes to complete. The student survey was open for two months to get adequate completion rates and closed in the middle of March to begin analysis.

Student Survey Construction. Survey questions were developed based on a thorough literature review and aligned with the study's conceptual framework, Expectancy-value Theory (Eccles et al., 1983). Based on the existing research, the survey included 22 items measuring different aspects of achievement. The survey began with an informed consent page to ensure all participants understood and agreed to the project. Next, students were asked objective questions about their academic achievements in high school. Subsequently, they were asked to indicate on a 5-point Likert-type scale (ranging from 1, strongly disagree, to 5, strongly agree) their subjective levels of achievement through questions based on the literature around six themes:

effort, sense of belonging, mathematics self-concept, growth-mindset, teacher/student interactions, and student perceived task value. The student survey closed by asking the participants basic demographic questions such as parental education level and race/ethnicity.

Teacher Open-Ended Survey

A qualitative open-ended survey was designed to measure teachers' differences in pedagogical decisions and perceptions of students based on math class placement (see Appendix B). This anonymous survey, hosted on Qualtrics, asked teachers to honestly reflect on the decisions they make when teaching their honors students versus those they make when teaching their non-honors students. Because of the sensitivity of the subject and the need for teachers to be able to explain and elaborate on their thoughts, it was determined that an open-ended survey would allow respondents to be as comfortable with sharing as possible. Although interviews were considered for this part, the threat of teachers not feeling comfortable responding truthfully because of the lack of anonymity swayed the data collection method to be an anonymous survey. This survey was emailed to all mathematics teachers with an honors course at the two middle school sites and took teachers approximately 20 minutes to complete. This survey was distributed to teachers in the middle of February and was closed two weeks later once all teachers contacted had responded.

Teacher Open-Ended Survey Construction. Survey questions were created based on a thorough literature review of the differences in teacher pedagogy by track level. Based on the existing research, the survey contained eight open-ended questions measuring teacher perceptions of students and pedagogical decisions. Like the student survey, the teacher survey began with an informed consent page and provided information to the participants about the

nature of the study. This page was significant in reminding the participants that their responses were completely anonymous, ensuring they were honest. Then, teachers completed the open-ended questions asking to reflect on their pedagogical choices in their classes of honors and non-honors students. Finally, teachers were asked to think about their perceptions of students based on the student's track placement. This survey did not contain a demographic section due to the small nature of the participant pool. Because it was imperative that teachers were as honest as possible, and the demographics had little bearing on the results, forgoing this section was intended to increase comfortability when responding to the questions.

Focus Group Interview

The final part of this study was a 55-minute focus group interview held on Wednesday, March 20th. This interview was conducted with three mathematics teachers in the district and the Mathematics TOSA at FKMS. The teachers involved represented both school sites, and each teacher represented a different grade level. The focus group was conducted via Zoom (www.zoom.com) with automatic transcription. The goal of this focus group was to gather recommendations to develop an equitable, unbiased placement policy that can be implemented across both middle schools for honors course placement. The first part of the focus group discussed the different characteristics seen in honors students versus non-honors students. In the middle of the focus group, there was a conversation about detracking. The focus group ended with teacher recommendations on data and characteristics that can and should be considered to place students into honors courses in the future. This focus group interview was not intended to be a series of questions but had a few guiding questions that led the conversation (see Appendix C). The goal, which was met, was for the teachers to bounce ideas off one another and allow the

conversation to move naturally and authentically to their needs and the needs of the students they serve.

Data Analysis

The quantitative student survey was analyzed in Excel with descriptive statistics such as frequencies, means, and standard deviations. Additionally, *t*-tests were completed to identify any statistically significant trends. The open-ended survey questions and the focus group interviews completed by teachers were coded to identify themes and patterns across the different participants. Looking at the results of the two different surveys together allowed for a proper understanding of students' access at the start of their tracked education by understanding the differences in how they were taught and interacted with by their teachers based on their placement (Creswell, 2009). Analysis of the focus group provided practitioner insight into placement policy recommendations that will immediately benefit students and teachers. By analyzing all the results together, a tremendous amount of insight was provided regarding the effects of tracking on long-term achievement outcomes and ways to ensure that honors course placement does not continue to perpetuate the achievement gap in this district. The data allowed for more equitable practices for teachers and, therefore, more equitable student outcomes.

Limitations

One of the limitations of this study came from the sample size and participants' demographics. This study has reduced generalizability due to its focus on one particular subject in a smaller school district. Only a small sample of mathematics teachers could participate in the study, which impacts the ability to extend the results beyond the district. Although this was a

limitation, it is also a benefit, as the data and results of the analysis can be immediately implemented within the two schools.

Another limitation that impacted the study came from my position in the math department at one of the middle schools in the district. My relationships with the other math teachers may have caused teachers to respond to the open-ended questions in a way that they feel will make them be perceived better. To help mitigate this limitation, I reminded teachers of the anonymity of the survey and did not collect demographic data on the survey. I wanted teachers to feel as comfortable as possible in responding honestly, and by not collecting any demographic data, especially since it does not influence the analysis or results, they should have felt more comfortable with being open in their responses. My positionality may have also impacted the focus group interview, as it could have influenced the participants to provide a response they deemed socially acceptable over one representative of their true feelings. I participated as little as possible in the focus group to combat this. I prepared guiding questions to use when necessary, but I wanted to and was able to allow the teachers to lead the discussion and collaborate. I attempted to maintain a neutral stance during the focus groups and did my best to avoid influencing any of the participants' responses.

Another limitation of this study was the binary way of thinking and comparison employed throughout the study. For research and analysis, students were grouped into two groups: Black and Latinx students and White and Asian students. As the study aimed to look at the influences of track placement on the racial achievement/opportunity gap and the most prominent racial gap is seen between these two different racial groups, it was necessary for this division. It is noted that this approach may oversimplify the complexities of student outcomes,

and nuances within each racial group may not be captured by this approach. However, with tracking as the focus of the study, there is an apparent discrepancy between honors course placement rates for Black and Latinx students versus their White and Asian counterparts, which reinforces the necessity of this binary way of thinking.

Additional limitations were the potential for biases in self-reported data, the use of preestablished relationships to recruit participants, and the shortened timeframe available for the study.

Delimitations

This study could have included teachers across the mathematics and language arts departments, as middle school is the first-year students are tracked by achievement in both classes. However, it was explicitly limited to math due to the widening achievement gap in mathematics scores among students of different racial backgrounds. Additionally, as of the time of the study, California has shifted its focus to equity in math classes, which made choosing to look at math placement decisions incredibly relevant to the current state of math education. Finally, by focusing on math placement specifically, the recommendations from the focus group analysis can be implemented to make more equitable placement decisions. They will impact student access and achievement immediately.

CHAPTER 4

FINDINGS

This study aimed to understand how mathematics course placement decisions in middle school lead to differences in students' access and achievement in high school and their planning and preparation for college. This chapter presents the data collected from the three data instruments: the quantitative student achievement survey, the open-ended teacher survey, and the focus group interview. These instruments were employed to answer the three following research questions:

- Research Question 1: How does tracking students into honors mathematics courses in the 7th grade affect Latinx and Black students' access to courses and levels of achievement in high school and beyond?
    - Research Question 1a: How does the honors mathematics course placement of middle school students affect students' high school course trajectory and levels of achievement?
- Research Question 2: What are the perceptions and pedagogical decisions made by middle school math teachers that affect students' achievement in honors courses versus non-honors courses?
- Research Question 3: What measures of student achievement and success do middle school math teachers think should be considered when developing a placement policy for honors mathematics courses?

This chapter will begin with the quantitative data analysis to answer Research Question 1, which measured student access and achievement. It will then proceed into the qualitative data presented

in themes relating to the remaining two research questions: the differences in students' perceptions and pedagogical decisions by middle school math teachers and the measures of student achievement deemed relevant to a placement policy for honors mathematics course placement.

Student Achievement Measures

Thirty-one former students from Mandell Elementary School District (MESD) completed the anonymous student survey. Of the students that completed the survey, 29.03% were placed into an honors mathematics course in 7th grade, and the remaining (70.97%) were placed into a non-honors Common Core 7th-grade mathematics class. Additional demographics of the respondents can be found below in Table 1.

Table 1

Respondents Demographics (N = 31)

Characteristic	*n*	%
Gender		
Male	6	19.35
Female	21	80.65
Ethnicity		
White/European	5	16.13
Black/African American	2	6.45
Asian	1	3.23
Hispanic/Latinx	19	61.29
Other (includes Multiracial/Mixed)	4	12.90

Because the study intended to investigate the differences in achievement between students placed in honors and non-honors courses for 7th-grade mathematics, the data was analyzed by those subgroups.

Differences in Demographics

The results of the student achievement survey showed differences in the gender, racial distribution, and parental level of education between students in the non-honors and honors courses. Students were grouped binarily into Black and Latinx students and White and Asian students because the study aimed to look at the influences of track placement on the racial achievement/opportunity gap, and the most significant racial gap is seen between these two different racial groups. The differences in the racial groups and parental education levels can be seen in Table 2 below.

Table 2

Respondents Demographic Differences (N = 31)

	7th Grade Honors Students (n = 9)		7th Grade Non-Honors Students (n = 22)	
	n	%	*n*	%
Gender				
Female	6	66.67	18	81.82
Male	3	33.33	4	18.18
Ethnicity				
White and Asian	5	56.56	6	27.27
Black and Latinx	4	44.44	16	72.73
Parental Education Level				
Some high school or less	0	0.00	2	9.09
High school diploma or GED	1	11.11	5	22.73
Associates or technical degree	2	22.22	2	9.09
Some college, but no degree	0	0.00	3	13.64
Bachelor's degree	4	44.44	5	22.73
Graduate or professional degree	2	22.22	5	22.73

There was a difference in the demographics of students placed into honors courses versus non-honors courses, which is aligned with the differences found in the literature (Darling-Hammond, 2009; Yeung & Conley, 2008). By percentage, the placement of Latinx and Black students into honors courses was not demographically representative, suggesting the possibility of systemic

disparities that merit further examination. Additionally, the students in the honors course had parents with higher education levels, indicating a correlation between parental education levels and track placements, which may contribute to existing disparities in academic achievement.

Objective Measures of Achievement

The first part of the survey asked students to self-report on objective achievement measures such as GPA and the number of honors courses taken in high school. The nine students in honors mathematics in the 7th grade reported a higher high school GPA ($M = 3.83$; $SD = 0.27$) than those enrolled in Common Core 7th grade math ($M = 3.62$; $SD = 0.61$). Additionally, they reported being enrolled in more honors courses in high school on average ($M = 4.44$; $SD = 3.10$) compared to their non-honors peers ($M = 4$; $SD = 4.07$). Notably, however, the students with the highest GPAs and the most honor courses in high school were enrolled in a non-honors course in 7th grade. 56% of 7th-grade honors students took the ACT or SAT versus 40% of the non-honors students, and there was a large difference between the average scores of those who did take the test. The honors subgroup scored almost 70 points higher on average on the SAT and almost 5 points higher on the ACT on average when compared to the non-honors subgroup. The two subgroups also had differences in their educational plans after high school. The responses can be found in Table 3.

Table 3
Respondents Educational Goals (N = 31)

	7th Grade Honors Students (n = 9)		7th Grade Non-Honors Students (n = 22)	
Educational Plan	*n*	%	*n*	%
Community college	1	11.11	4	18.18
Obtain a bachelor's degree	5	55.56	11	50.00
Obtain a master's degree	1	11.11	3	13.64
Obtain a professional school degree	2	22.22	2	9.09
No plan to attend college	0	0.00	2	9.09

Overall, more students placed in the honors course in 7th grade planned to attend four-year universities or graduate/professional school. There were also no students who were placed in the honors course with no plan to attend college.

Subjective Measures of Achievement

The second part of the survey asked students to share their achievements through subjective questions developed through the literature review. These 11 questions were broken into four themes: effort, sense of school belonging, mathematics self-concept, and growth mindset. A Likert scale was used from 1 or "strongly disagree" to 5 or "strongly agree." The means and standard deviations for each item and the means and standard deviations of all items combined by theme are listed below in Table 4.

Table 4

Means and Standard Deviations for Subjective Measures of Achievement (N = 31)

	Honors Students (n = 9)		Non-Honors Students (n = 22)	
	Mean	*SD*	*Mean*	SD
Effort	**4.41**	**0.16**	**4.30**	**0.77**
I regularly completed my mathematics assignments.	4.78	0.41	4.32	0.97
I regularly participated in mathematics class discussions.	4.11	0.74	4.18	0.98
I regularly followed school rules, such as showing up to school on time and attending class.	4.33	0.94	4.41	0.94
School Belonging	**4.11**	**0.99**	**3.91**	**0.95**
I felt accepted in my school's social environment.	4.11	0.99	3.91	0.95
Mathematics Self Concept	**3.94**	**0.68**	**3.76**	**1.06**
I regularly attempted challenging mathematics problems, even if I was unable to come to the final answer quickly.	4.33	0.47	4.18	1.07
I enjoyed working on math assignments, even if I struggled.	3.33	1.15	3.59	1.11
I learned things quickly in math.	4.00	0.67	3.73	1.25
I was confident in my ability to do mathematics.	4.11	0.57	3.55	1.23
Growth Mindset	**4.37**	**0.35**	**4.30**	**0.90**
I believed that anyone could improve their mathematics skills with practice.	4.33	0.47	4.27	0.91
I believed that I could improve my mathematics skills with practice.	4.67	0.47	4.45	0.94
If I did not do well on a test, I believed that I could improve with more effort and practice.	4.11	0.31	4.18	0.98

The numbers above show that the participants in the survey rated themselves highly on most measures of achievement. Students in 7th-grade honors mathematics courses reported higher levels of effort, an increased sense of school belonging, a higher math self-concept, and more of a growth mindset compared to the 7th-grade non-honors mathematics students. Although, on average, there was an agreement to every statement, the lowest measured area for

both subgroups was in mathematics self-concept, with 3 out of 9 honors respondents and 5 out of 22 non-honors respondents disagreeing with the statement, “I enjoyed working on math assignments, even if I struggled.” Overall, 7th-grade honors students rated themselves higher in every theme to measure achievement than 7th-grade non-honor students. Even though, in general, they had a higher average, there were some questions where the non-honors students had a higher average. One of these statements related to the growth mindset theme stated, “If I did not do well on a test, I believed that I could improve with more effort and practice.” 50% of the non-honors students strongly agreed with this statement compared to only 11% of the honors students.

The greatest difference between the two groups was found in the statement, “I was confident in my ability to do mathematics.” The average response for the 7th-grade honors students was 4.11, and 89% of students who responded agreed with the statement. In comparison, the average response for the 7th-grade non-honors students was 3.55, with only 45% responding that they agreed with the statement. A similar difference was found between the responses to the statement, “I regularly completed my mathematics assignments.” The average response for the non-honors students was only 4.32 versus 4.78 for the honors students.

Despite all the differences in means for each of the survey items, the general themes, the GPAs, and the number of honors courses taken, after running independent sample *t*-tests on each of the general themes, none of the differences were statistically significant. The p-values can be found in Table 5 below.

Table 5

P-*value Results from Independent Sample* t-*tests (N = 31)*

General Theme	*t*(29)	*p*-value
GPA	0.96	.34
Number of Honors Courses	0.29	.78
Effort	0.37	.71
School Belonging	0.51	.61
Math Self Concept	0.48	.64
Growth Mindset	0.22	.83

However, the differences in objective and subjective achievement measures show that the honors students were outachieving their non-honors counterparts.

Expectancy-Value Theory and Achievement

The third part of the student survey asked questions about student/teacher interactions and the value that the students placed on their academic achievement at school. Survey items were created using the conceptual framework adapted Expectancy-value theory (Eccles et al., 1983). These questions fit into two themes: student/teacher interactions and perceived task value.

Student/teacher Interactions

Overall, students who were enrolled in the 7th-grade honors mathematics course reported a more substantial positive feeling about their interactions with their teachers ($M = 4.33$, $SD = 0.56$) compared to the students who were enrolled in the 7th-grade non-honors mathematics course ($M = 4.00$, $SD = 0.86$). Specifically, the average response from honors mathematics students ($M = 4.44$, $SD = 0.50$) to the statement "I believe that my math teachers had high expectations for my achievement level" was almost 0.50 points higher than the response from the non-honors students ($M = 4.00$, $SD = 0.11$). The results were nearly identical for the statement, "I believe that my math teachers cared about me being successful." The non-honors students felt less strongly about that statement ($M = 4.00$, $SD = 0.85$) than the honors students ($M = 4.22$, SD

= 0.63). Like the achievement measurements, after running a *t*-test, the differences were not statistically significant (t (29) = 1.07, p = .29). However, there was an apparent discrepancy between the two subgroups' perceptions of teacher expectations and attitudes.

Perceived Task Value

Of all the themes measured with the student survey, the responses to perceived task value had the most minor difference between the two subgroups. The 7th-grade honors students (M = 4.11, SD = 0.72) barely rated themselves higher in general than those in the 7th-grade non-honors math class (M = 4.08, SD = 0.67). For both subgroups, the average response to "I believe that what I learned in mathematics is important to my future career and college goals" was 3.55, with most students neither agreeing nor disagreeing. There was also a commonality among the subgroups with the other two statements. Students in both the honors and non-honors placements agreed with "I valued academic achievement at school" and "I expected to do well in my academic classes." The mean responses to those statements for both subgroups were 4.40 and 4.30, respectively. After running an independent sample *t*-test, it was determined that there was no significant difference between the honors and non-honors students (t (29) = 0.11, p = .91). This makes sense, as there was minimal discrepancy between the responses to these three statements, and the perceived value of mathematics and education does not appear to be affected by placement in the honors or non-honors courses.

Although this survey measured many of the components of achievement, it could not measure teacher perceptions and how teachers interact differently with their honors and non-honors students. To measure this and address the second research question, the open-ended

teacher survey was distributed to math teachers, and a focus group interview was held. The following section in this chapter will discuss the data obtained from those instruments.

Teacher Perceptions and Pedagogical Decisions

The remaining research components for this study were qualitative: an open-ended survey (N = 6) was given to teachers of middle school honors mathematics classes, and a focus group interview (N = 4) was conducted to discuss the qualities of students in honors mathematics courses and offer recommendations for a 7th-grade mathematics course placement policy. This section will offer the findings of those instruments as they relate to the differences in teacher perceptions based on track level and the differences in pedagogical decisions based on track level.

Teacher Perception Differences by Track Level

Five themes were presented when analyzing the responses to the open-ended teacher survey and the conversation. Teachers remarked on the differences between honors and non-honors students regarding classroom expectations, communication, motivation, resilience and perseverance, and growth mindset.

Classroom Expectations

Teachers in this study remarked that students in their honors classes behaved better and required fewer interventions for off-task behavior. In the open-ended survey, one teacher wrote that because of the lack of behavior problems in the honors classes, they "allow for more off-task discussion . . . because they are quicker to come back together." This sentiment was echoed in the survey by two other teachers who expressed that their honors students felt easier to redirect and that "most of the talking that takes place surrounds the topic being covered rather than side

conversations that are irrelevant to math class," as seen in with their non-honors students. In addition to behavior, many teachers noted the differences in work habits between their honors and non-honors classes in their survey responses. Half of the teachers responded that their honors students had higher work completion rates than their non-honors students.

Additionally, one teacher stated in his response to the survey question about the differences between the two groups of students that "honors students are more diligent and independent with work habits," noting that it was not just the amount of work being completed that is different but there was improved quality in work among honors students. Overall, these responses showed that teachers perceived a difference in how their classroom expectations are being met, which likely influences the pedagogical decisions they make for each group of students (Reed, 2008).

Communication

The teacher participants in this study shared the differences they felt in the ability to communicate academically between their honors and non-honor students. Half of the survey respondents agreed that honors students could communicate concepts more thoroughly with their peers and were more capable of academic discourse. Additionally, one of the teachers in the focus group echoed that sentiment, claiming that the students in his honors course could communicate better because their "academic vocabulary is a little more built-in." These responses show that, in general, the teachers perceived more participation in class discussion from the students in their honors class and value that more in their day-to-day lesson plans than they do with their non-honors classes.

Motivation

One of the most common themes in both the open-ended teacher survey and the focus group interview was the perceived difference in motivation between the two groups of students. Overall, the teachers perceived their honors students as more motivated to learn and understand mathematics concepts than their non-honors students. According to one of the teachers who responded to the survey, honors students "are more motivated and show a desire to learn." They then said these honors students are "more curious about math topics and engage in the concepts." Although the teachers noted the differences in motivation, a couple postulated why they might see a difference. One teacher in the focus group shared:

> But I also wonder how much that motivation is also because they have their foundational skills are stronger than I guess, the regular classes. So those things aren't keeping them from understanding the new content we go through.

Similarly, a teacher respondent to the open-ended survey wrote that the difference in motivation may be attributed to the fact that "Students in honors have the foundational/prereq[uisite] skills prior to [the] lesson, while non-honors need to revisit and relearn those skills to access current content." They further remarked, "Many students in the non-honors require more support and motivation to work through challenging problems." Overall, the teachers agreed that motivation for learning was a significant difference between their honors and non-honors students and affected their willingness to take retakes, understand the content, and engage with the material.

Resilience and Perseverance

The final positive difference teachers remarked on between their honors and non-honors students was the difference they felt in their students' resiliency and willingness to persevere. All

the teachers in the focus group stated they felt a difference between their students when given a challenging problem. One teacher from the focus group stated that her honors students are "super resilient," and when she "give[s] them a really hard question, they're able to persevere through it." The teachers from the open-ended survey agreed that their honors students were more willing to persevere through math problems, and one stated that they find that their honors students are "willing to put in more productive struggle." The results of the teacher instruments showed a common feeling that honors students are more resilient than their non-honors peers, which may manifest in how the students are being taught (Reed, 2008).

Growth Mindset

The final theme regarding differences in teacher perceptions was in growth mindset. However, unlike the other themes, the teachers did not note a positive difference for the honors students—it was to the contrary. Many teachers remarked that more of their honors students have a fixed mindset than their non-honors students. The mathematics TOSA that participated in the focus group stated her worries that students in the honors courses are more likely to give up when things get challenging because of their fixed mindset:

> I know that kids that are smart, you know, they tend to have a fixed mindset because everybody's always told them, "Oh, you're so smart, right?" And so they think that it's something that they were given rather than something that they've had to work for. So I worry about that with some of the, you know, accelerated kids that you know when it gets when it when it gets hard. Maybe they won't try anymore, and they'll think, oh, maybe I'm not so smart after all, you know.

Both honors teachers in the focus group confirmed the TOSA's worries and shared stories of students who gave up when the class got too challenging. The 8th-grade algebra teacher stated that she had "two in algebra that have given up" because she thought "it just got too much too hard, and they checked out." Similarly, the 7th-grade honors teacher shared that in his experience, he has one or two a year "who fail one test and then give up the rest of the year." One of the teachers who responded to the open-ended survey also noted a lack of growth mindset in their honors students. They wrote that "it is a rarity that an honors class WANTS a challenge" and wants to struggle to solve a problem. It is evident from these responses that the differences between the two classes do not always favor the honors students. The literature supported acknowledging a fixed mindset in higher-tracked students (Boaler, 2013; Lawrence, 2019). The next section of this chapter will discuss the differences in teachers' expectations for their students.

Differences in Teacher Expectations

Based on the survey results and the conversation in the focus group, there were differences in teachers' perceptions of their honors versus their non-honors students. These responses also yielded evidence that there are differences in teachers' expectations for these different groups of students based on those perceptions. The teachers who responded to the survey agreed with what they expected from their non-honor courses regarding grades. All six teachers stated that the "minimum for non-honors to achieve is 70% on all leveled work in class, including assessments." In comparison, the teachers expected their honors students to achieve higher levels. One teacher wrote that "the minimum for honors [students] to achieve in an 80% on all leveled work in class including assessments, but the expectation is always 100%." Most

teachers agreed, citing that they expected their honors students to receive an 80% or higher on all coursework.

Only one of the six teachers who completed the open-ended survey stated they had the exact same "high expectations for all students in all courses." Low expectations are a problem, specifically for the students in the non-honors courses, as literature showed that students tend to meet the expectations of their teachers (Denessen et al., 2020). One of the teachers in the focus group grappled with that exact issue during the conversation. She stated that:

> I feel like students meet the expectations I set, and so perhaps it could be a perception that I have a really high expectation of algebra, and I just expect them to ask questions and do really well. And maybe it's a problem that I lower my own expectations for my regular common core, 8th-grade students. And am I doing a disservice again because of like my expectations with my regular students versus algebra? Because maybe some of these regular Common Core students can meet my high expectations.

The other teachers in the focus group agreed that they may be at fault for holding their students to different expectations, with one stating, "I do strongly believe that teacher expectations are met." The next section of this chapter will discuss how the differences in teacher expectations for classes and the differences in students' perceptions affect the teachers' pedagogical decisions.

Differences in Pedagogical Decisions

The survey results showed that differences in perceptions and expectations of honors and non-honors classes manifest in the pedagogical decisions teachers make with their classes. These differences were seen in three main areas: classroom management, lesson pacing, and assessment strategies.

Classroom Management

The first difference reported by the teachers in pedagogical decisions was classroom management. All teachers that responded to the survey said they could be "more flexible with seating arrangements and talking level." One teacher wrote that although procedures are generally the same for both classes, the students are "given slightly more independence in exploration and activities with their honors class." Similarly, one teacher wrote that they tended to be "stricter" with the non-honors course, allowing more time for discussion and socializing than the honors course. Although some teachers recognized that there will be off-task behavior with both groups, they find it easier to redirect the honors courses and spend less time on classroom management than with their non-honors courses.

Pacing of Lessons

The next difference in the open-ended teacher survey regarding pedagogical decisions was in the pacing of the mathematics lessons. Overall, lessons for the non-honors students were 2 to 3 times as long as for honors students. For half of the teachers, a non-honors lesson is expected to take two or three days, compared to a single day for an honors lesson. These differences are mainly seen in the time necessary for review and the need for more explicit direct instruction and less independent practice. In their response to the open-ended survey, a teacher explained that for non-honor students, every unit begins with identifying the prerequisite skills and a day or two of reviewing those. In contrast, they stated that they spend less time reviewing prerequisite skills as honor students are expected to come in with that background knowledge already.

The teachers also used the open-ended survey to share differences in the time allotted for independent practice between the two classes. Multiple teachers shared that there is more time for independent practice for the honors students, both because they can move through the lesson faster and because there is less concern for off-task behavior. One teacher wrote that their non-honors students are "allowed to practice independently but only for short periods of time due to off-topic socializing concerns" compared to their honors students, who are given "more time at independent practice because they are able to stay more focused on the content." These differences are aligned with the literature that found that teachers of students in lower-tracked classes provide lower-quality and slower instruction (Gamoran, 2009; Gamoran et al., 1995; Kelly, 2004).

Assessment Strategies

The final pedagogical difference reported in the open-ended teacher survey pertained to differences in assessment strategies. Half of the teachers wrote that the assessments for their honors students are "more frequent and are more challenging with the depth of knowledge questions" compared to their non-honors students. One teacher stated in their survey that even though the caliber and types of problems are the same, the honors course assessments require more explanations and place "more emphasis on reasoning and connections."

Multiple teachers that took the open-ended survey explained that they offer more assistance and guidance to their non-honors students during assessments than their honors students. For example, two teachers provide practice tests on the days leading up to the assessment of their non-honor classes that are not given to the honors students. Additionally, one teacher wrote that the non-honors students "get more guidance on tests if necessary." The

differences in these assessment strategies are likely a result of the lowered expectations the teachers have for their non-honors students (Reed, 2008). Overall, the open-ended teacher survey and focus group interview showed stark differences in teachers' perceptions of their courses that influence the pedagogical decisions they make in their classrooms. The next section of this chapter will discuss the results as they pertain to the third research question: What measures of student achievement and success do middle school math teachers think should be considered when developing a placement policy for honors mathematics courses?

Development of an Honors Placement Policy

While the focus group offered additional insight into the different perceptions and pedagogical decisions made by teachers of honors students, the primary purpose was to gather recommendations that can be used to develop an equitable placement policy that can be implemented within the district to reduce biases in the honors courses. This section will share those student characteristic recommendations generalized into three themes: student behavior, student grades, and student standardized test scores.

Student Behavior

When conversing over the characteristics that should be considered for making honors class placement recommendations, all the focus group participants agreed that behavior should not be considered in these recommendations. One teacher shared about a previous student in his honors class who was labeled a behavior problem but was "extremely capable." The teacher found that by being in the class, he was held to higher standards by the teacher and the student's peers and could step up to the plate and behave appropriately in the classroom. The teacher remarked that:

> I think you know, sometimes we're easy to judge. And just because of behavior, we think, okay, they're not going to succeed in a more, you know, rigorous environment. But I think sometimes that again, that peer, that peer pressure. You know, it can sway them different directions.

Additionally, one teacher mentioned the link between behavior and race and how "the way we, you know, think a kid is out of line compared to another kid, [is] all very racially driven." For these reasons, all the educators agreed that behavior should not be considered an element in recommending a student for a class.

Student Grades

Due to the subjective nature of grading, the educators in the focus group were more divided when considering grades in a placement policy. One teacher was adamant that grades be considered, saying:

> I generally do think grades are important, because if I have a F or a D student that means something happened, even regardless of if it's very subjective, right? So, if it's hard to get an A in my class, or it's easy to get an A. If a student is failing my class, then then somewhere along that trimester, they didn't do what they were supposed to. So, I would say, grades are important. In a sense, it doesn't mean that they have to have straight A's, or that I'm looking at pure A+ or over 100%. But they need to be able to have the motivation to get a solid grade.

In contrast, one teacher in the focus group shared how, in their mind, grades take into consideration work habits, which is outside the goal of showing mastery. He told the story of one

of his former students who received a C, a letter grade lower than expected from honors students, but was fully capable of being in the honors course:

> I had a student who did no homework all year, but every assessment they showed mastery. You know they did well with assessments, and I think it was a just a work habit thing. So, I also kind of wouldn't weigh homework or work habits as heavily there because, again, if the goal is for them to show mastery.

Despite a slight disagreement on grades, all the teachers in the focus group agreed that the students recommended to honors should not receive a D or F, as a "D means they didn't demonstrate understanding." However, there were discrepancies on whether grades should be considered for the students with As, Bs, and Cs. In response, the teachers all suggested that standardized test scores would be the best way to measure mastery and place students.

Student Standardized Test Scores

All the educators in the focus group agreed that it was essential to look at and place the most weight on students' standardized test scores to determine whether they should be placed into a 7th-grade honors mathematics course. At both middle schools, there is a math support class where students are placed by looking at the previous three California Assessment of Student Performance and Progress (CAASPP) scores to make recommendations (California Department of Education, 2024). The teachers recommended something similar when making recommendations for the honors course placement policy—students at or above standard on CAASPP for the previous three years would be recommended to the honors course for 7th grade, prioritizing the students with the most "above standard" scores (California Department of Education, 2024).

Additionally, both middle school sites have recently started utilizing the iReady Diagnostic system (www.curriculumassociates.com), which assesses students three times a year and determines their mathematics grade level equivalent (Curriculum Associates, 2024). The mathematics TOSA at FKMS recommended this assessment as an additional diagnostic data point, supported by two other teachers. One teacher stated that CAASPP and iReady data would be the best place to look, as the goal for students is to show "proficiency in standards" before being moved into the honors class (California Department of Education, 2024; Curriculum Associates, 2024; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

The teachers felt that focusing only on these test scores, with a slight consideration of grades, would be the most equitable way to place students into the honors class. They also encouraged that the recommendations be as "blind" as possible, "looking at data . . . not looking at names." While looking for these recommendations, an unintended conversation occurred during the focus group interview between the educators—should we be tracking students in our mathematics classrooms?

Detracking the Mathematics Classroom

One teacher mentioned her recent experience at the California Mathematics Council (CMC) conference during the focus group. She shared that one of the prominent topics at the conference was getting rid of tracks in mathematics and servicing all students in heterogeneous classrooms. Although none of the educators had answers and felt the topic just brought up more questions, they shared their thoughts on some of the pitfalls of tracking students in math and their concerns about a heterogeneous classroom.

The Pitfalls of Tracking Students in the Mathematics Classroom

The teacher representing the 6th grade in the focus group shared about one of her current students, "an incredibly slow thinker . . . who is one of the top of the class." She had concerns about placing her into the honors course next year because of the pace, despite being fully capable of mastering the content in the advanced class. The other teachers in the focus group agreed that the pace of the compacted class was limiting for students, and one educator asked:

> Are we doing a disservice to students that are slow thinkers but are amazing and could benefit from higher-level thinking questions, or just, you know, going above and beyond just the regular standards?

The pace of the honors classes also concerned another teacher in the focus group when thinking about developing a growth mindset, especially in the higher-tracked students who tend to have more of a fixed mindset (Boaler, 2013). She stated:

> That's another thing that's going to be difficult when you're in a compacted class because you know, growth isn't always about speed, you know, having a growth mindset. It's not always about being fast and yet in compacted, they got to keep up with the class. So, it's kind of like we're sending them. A mixed message of, you know, math is about deep thinking and problem-solving. And yet you got to do it like this, so we can move on to the next thing.

Another concern the educators in the focus group shared with tracking the mathematics classes in middle school was "brain drain." The math TOSA shared that when she looks across all the data, all the high scores are in the two 7th-grade honors classes, leaving no models in the

non-honors classes and "no kids in those other classes that are proficient and can kind of carry the conversation right, and maybe bring other kids along."

One of the focus group teachers spoke about how she also shares the concern of "brain drain" and then reflected on her own experience being tracked in Junior High and the closed nature of the system:

> I was that kid in Junior High that got separated from all my friends to go into these honors classes, and I just didn't; I didn't understand like why they were saying my friends were dumb. And that's what happens. You know, by this separation, kids are saying, oh, I'm dumb. I didn't get into that class. And then why would they try? Why would they try? Because now they're never going to get into that class. It's closed to them. The year has already started, you know.

Another teacher in the focus group also shared their concern about how students become locked into their tracks once students are tracked, and movement in either direction is tricky. She shared how she had a great student asked to be moved into the honors class, and she had to tell her no because "she won't have the background knowledge at this point" to be successful. She went on to say that:

> I felt I was doing a disservice to that student by not agreeing for her to be in algebra, but at what cost? Because now, if she comes in mid-year in 8th-grade algebra, now she's going to be really lost and confused. And I felt really bad, cause she's very capable. And so, I don't know. That also makes me think maybe it's not a good idea to have these tracks for these students.

Despite the discussions around some of the issues with tracking students, especially in middle school, the focus group teachers also had concerns about what the classroom would look like if all different learners were in one room.

Concerns of a Heterogenous Classroom

Although the teachers could see the benefit of an untracked classroom, concerns were expressed about how they would effectively teach all different types of learners in one classroom. One teacher commented during the focus group on how challenging it is to teach all the different learners in his current class, even without the highest-tracked students who have been placed into honors:

> I guess, on that topic with like differentiating small group instruction, I find it myself a challenge to keep up with all these subgroups in my classrooms. You know, classroom size. That impacts how we're able to spread ourselves across the classroom as an individual.

Similarly, another teacher in the focus group expressed concerns with balancing effective teaching when placing the highest achievers in a class "with students that are new to the country and have a second-grade math iReady diagnostics score." The concerns were validated by the 6th-grade teacher who currently teaches heterogeneous classes, as there are no official tracks in the 6th grade. She stated that "it definitely is easier said than done and easier read than done." Although she shared some differentiation methods, such as leveled games, building thinking classrooms, and intentional grouping, she recognized that "it is messy" to ensure that all students are appropriately challenged. Overall, the teachers in the focus group believed that students

could benefit from an untracked classroom but struggled to find the answers on how to teach all learners best.

Conclusion

The effects of placing students into different math tracks based on ability influence the achievement and access the students experience in their high school educational experiences and college trajectories. The student participants in the higher track, who were disproportionately White and Asian and came from parents with higher education levels, showed higher levels of achievement and felt more supported by their mathematics teachers. This, plus the commentary from teachers in the open-ended survey and the focus group interview, confirmed that track placements also influence how teachers perceive their students and adjust their pedagogy in response. Teachers believed their honors students to be more motivated, better behaved, and more resilient. For these reasons, they have allowed more time for independent practice and placed higher expectations on their students—which are being met. Because of these differences in access and achievement, as well as the evident racial bias, it is imperative to consider the teacher recommendations of a blind placement policy that only considers objective data, like standardized test scores, and ignores subjective measures like grades and behavior. The focus group teachers also brought up the idea of detracking the math class and how that may be the answer to ensuring all students have equal access to rigorous learning and high teacher expectations. Chapter 5 will examine these results against the findings in the literature and make recommendations for future research and practice.

CHAPTER 5

DISCUSSION

The previous chapter presented the quantitative and qualitative data that evidence the differences in access and achievement for honors and non-honors mathematics students. Some of the findings were that the honors students showed increased achievement through subjective measures such as GPA and the number of honors courses, as well as objective measures such as effort and mathematics self-concept. Additionally, the teacher open-ended survey and focus group indicated that teachers had different perceptions of their different classes—they viewed their honors students as better behaved, better communicators, more motivated, and more resilient, and these different expectations for their two student groups resulted in different pedagogical decisions. Finally, the focus group interview shared recommendations for a 7th-grade mathematics placement policy and discussed detracking the mathematics class.

This chapter will examine the research outcomes against the findings in the literature and the conceptual framework that guides the study. This chapter will conclude with recommendations for practice and future research.

Discussion of Findings

The Effects of Tracking on Student Achievement

The first research question of this study asked: How does tracking students into honors mathematics courses in the 7th grade affect Latinx and Black students' access to courses and levels of achievement in high school and beyond? It was hypothesized that students tracked into honors mathematics courses in 7th grade are more likely to experience greater access to advanced courses and higher-level achievement in high school and beyond compared to their

peers who are not tracked into honors mathematics courses in the 7th grade. The findings of this study confirmed this hypothesis—the student participants placed into honors courses achieved more than their non-honors peers. The data from the student survey showed that the honors students had increased GPA scores, took higher numbers of honors courses, had greater educational goals, and rated themselves higher on most of the subjective measures of achievement.

Most of the student survey results aligned with the literature on the effects of tracking on student achievement. 75% of the honors student participants reported that they strongly agreed with the prompt "I regularly completed my math assignments," compared to only 55% of the non-honors students. This aligned with both Carbonaro's 2005 study and Gamoran's 1992 study, which found that the effort exerted in class was directly related to the class level—the higher the track, the more effort the student exerted. The research data on mathematics self-concept also confirmed the findings in the literature. Students in the honors course reported higher levels of mathematics self-concept overall ($M = 3.94$, $SD = 0.68$) compared to those in the non-honors course ($M = 3.76$, $SD = 1.06$). Self-concept was the theme under which the question with the most tremendous gap in student responses was based. The two groups differed the most in their response to "I was confident in my ability to do mathematics." 89% of honors students agreed with the statement compared to only 45% of non-honors students. The difference in responses to this question is fascinating when considering the Francis et al. (2020) study that found that mathematics self-concept increases as students spend more time in honors courses. It is possible that confidence in mathematics ability was not as staggeringly different between these students until the differences in educational experiences due to track placement made it so.

One area where students showed less difference between track levels was around growth mindset. However, the results contradicted much of the literature. Despite track level, students generally had a growth mindset ($M = 4.32$, $SD = 0.76$). Overall, students believed they could improve their skills with practice regardless of whether they were in honors courses. This contrasts with Boaler (2013), who found that tracking perpetuates "the idea that only some students are high achievers, and that ability is fixed" (p.148). However, with a strong focus recently on growth mindset in education, there is the possibility that consistent exposure to growth mindset messaging throughout the students' educational experience impacted the likelihood that these students developed a growth mindset, like the results seen by Williams (2013). This researcher found that by adding growth mindset statements such as "Remember, the more you practice, the smarter you become." to the top of the screen of an online learning platform, students increased the rate at which they were successfully solving math problems months after seeing the messages. Because students with a growth mindset "believe intelligence is malleable and can be improved with effort and strategic learning," these findings offer hope that students can avoid the trap of thinking that it is impossible to improve mathematics skills regardless of being placed into an honors course or not (Williams, 2013, p.3).

Another result that contrasted with the literature was student's sense of school belonging. Although overall, the average response for the honors students was higher ($M = 4.11$, $SD = 1.05$) than the non-honors students ($M = 3.91$, $SD = 0.97$), there was a higher percentage of honors students (22%) that did not agree with the statement "I feel accepted into my school's social environment" when compared to the non-honors students (9%). Although the literature found on this topic supports a stronger sense of belonging for students in the higher track, one of the

teachers in the focus group shared feelings that may help to explain this difference. She shared that in Junior High, she was the student who was "separated from all [her] friends to go into these honors classes," and she could not understand why she was being singled out as bright and all her friends dumb. In a 2008 study on school belonging, Nichols found that interpersonal relationships greatly impacted school belonging—students who felt as though they had friends and positive relationships with their peers felt a stronger sense of belonging. Therefore, it is possible that the discrepancy seen between the research and this study in school belonging is a result of being removed from classes with their non-honors peers to be placed into the honors track.

The Perpetuation of Systemic Racism by Tracking Practices

The, albeit limited, demographic data of the honors students and the comments shared by the teachers in this study are continued evidence supporting the literature that shows that tracking perpetuates the opportunity and achievement gap for Black and Latinx students. The rates of Black and Latinx honors students surveyed were not demographically representative of the entire sample of students that participated in the survey, in line with the research showing that Black and Latinx are placed into lower tracks at higher rates than their White and Asian peers (Flores, 2007; Oakes, 1995). Additionally, the honors student participants had parents with higher levels of education, which, from the research, likely influenced their levels of achievement before even beginning schooling (Yeung & Conley, 2008). The evidence presented in this study shows that it is more than an access issue for these students—not only are they not receiving the honors content, but they are receiving an education that is biased by their track placement.

The open-ended teacher survey results told a similar story to the research. This data from the survey aimed to answer the second research question: What are the perceptions and pedagogical decisions made by middle school math teachers that affect students' achievement in honors courses versus non-honors courses? It was hypothesized that honors course teachers will perceive their students as more capable of higher learning and having fewer discipline problems. The results of this study confirmed this hypothesis—teachers had different perceptions of their students based on placement into honors or non-honors, and non-honors students were seen as having more behavior problems and being less motivated. As hypothesized, these different perceptions of students affect their pedagogical decisions, and teachers adjust their lessons based on whether the lesson is for an honors or non-honors class.

One of the most common differences shared by teachers in the open-ended survey and the focus group was that the students in their honors classes behaved better than those in their non-honors classes. This finding is consistent with Reed (2008), where teachers of lower-tracked courses felt their students caused more behavior problems than those in the higher tracks. While this feels manageable, concerns arise regarding the demographic differences between the honors and non-honors students. The current literature showed that Black and Latinx students are "consistently rated as poorer classroom citizens" and have more behavior issues than their White and Asian counterparts (Downey & Pribesh, 2004, p.277). Because these non-honors classes appear to be made up of Black and Latinx students at disproportionate rates, it is hard to determine if the non-honors students in these teachers' classes truly require more classroom management or if there is educator bias at play, whether the bias is implicit or explicit.

While the different perceptions of students by these teachers are likely not solely to blame on bias and systemic racism, it is hard to separate the two when considering the long-term effect 7th-grade mathematics tracking is having on these students. Teachers admitted to seeing their non-honor students as less motivated and resilient and admitted to holding lower expectations for their non-honor students. This is concerning for those students as student achievement is significantly influenced by teacher interactions. Denessen et al. (2020) found that students met their teachers' expectations—teachers who expected more from their students taught students who achieved more. Similarly, Jussim et al. (2009) found that teacher expectations create a self-fulfilling prophecy. When teachers hold low expectations of students, the students adjust to meet those expectations regardless of ability. This cycle of low performance because of teacher perceptions and expectations exacerbates the "achievement" gap and offers support to findings in the literature that show that schooling is not the great equalizer but instead another cog in the wheel of systemic racism (Murnane et al., 2006).

In addition to the differences in teacher perceptions, the responses from teachers regarding the different pedagogical decisions showed that the system of tracking students at these middle schools is creating classrooms for non-honors students that are less rigorous and student-driven, supporting the current literature (Denessen, 2020). As the research showed, the teachers in this study shared that they are providing more time for review, less time for independent practice, and lower-level thinking opportunities to their non-honors students in comparison to their honors students (Gamoran, 2009; Gamoran et al., 1995; Kelly, 2004; Reed, 2008). Because of the differences in the demographics of their classes, the Black and Latinx students who are left out of the honors courses are receiving less rigorous learning experiences

compared to their peers in the honors courses (Oakes, 1985). These differences in educational experiences based on track level, even for students with the same teachers, contribute to this ever-widening achievement gap.

Tracking and the Expectations of Success

The Adapted Expectancy-Value Model used as the conceptual framework of this study connected the studied measures of student achievement and teacher expectations and pedagogical decisions with students' expectations of success and the value they place on the tasks they are completing (Eccles et al., 1983). Despite apparent differences in achievement and teacher expectations for honors and non-honors students, surprisingly, few differences were found between the two subgroups' perceived task values and personal expectations of success. Overall, the honors students participants rated themselves only slightly higher ($M = 4.11$, $SD = 0.72$) than the non-honors participants ($M = 4.08$, $SD = 0.67$). Although the survey response shows minimal discrepancy between the groups when considering task value, it is nearly impossible to consider all the different cultural milieus and student perceptions that play a role in the expectancy-value determinations. Self-concept, growth mindset, sense of belonging, effort, teacher perceptions, and teacher pedagogical decisions are only small pieces of a giant puzzle that requires and deserves more research and focus.

Recommendations

This study led to recommendations for practice to create more equitable schooling experiences for all students. These include a short-term recommendation for a 7th-grade mathematics class placement policy that districts can implement immediately and a long-term recommendation to detrack the mathematics classroom. This study also led to recommendations

for future research, such as effective methods for teaching math to all learners in a heterogenous classroom and investigating how cultural milieus like gender stereotypes and cultural stereotypes of mathematics play a role in the achievement and values of tracked students.

A Short-Term Recommendation: An Equitable Placement Policy

Although the research shows that tracking is often fraught with inequities and perpetuates systemic racism, it is likely unrealistic to expect stakeholders to be willing to move past a system ingrained in the culture of education. By suggesting the idea of detracking the mathematics class, Jo Boaler, a mathematician and one of the California Mathematics Framework writers, has been the subject of awful threats to her safety (California Department of Education, 2023a; Singh, 2022). Therefore, it is necessary to begin the recommendations with something that will make a difference in equity and access for our students but is a more manageable change—an equitable 7th-grade math placement policy.

Factors that Should Not be Considered in a Placement Policy

Through the conversations in the focus group, it quickly became apparent that teachers do not see behavior as unbiased and, therefore, do not find it necessary to consider it in a placement policy. The research agrees—that Black students are seen as discipline problems by non-Black teachers at higher rates than their White peers (Downey & Pribesh, 2004). Similarly, Black and Latinx students are more likely to be suspended from school for the same offense as their White classmates (Sullivan et al., 2013). When considering the way discipline systems in schools are biased towards Black and Latinx, there is no way to consider behavior when creating an equitable 7th-grade placement policy.

Factors that Should be Considered in a Placement Policy

The teachers in the focus group agreed that the only way to place students into 7th-grade honors courses equitably would be to look at standardized test data. Students in the district involved in the study take two standardized tests throughout the year—the iReady Diagnostic and the California Assessment of Student Performance and Progress (California Department of Education, 2024; Curriculum Associates, 2024). Both tests measure student proficiency related to meeting grade-level standards and should be used in conjunction to make placement decisions (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). It was also recommended to look at the data longitudinally—instead of just one year of scores, to consider multiple years in conjunction. Students showing mastery of grade-level content on iReady and at or above standard on CAASPP for three consecutive years would then be eligible for placement into the 7th-grade honors course (California Department of Education, 2024; Curriculum Associates, 2024). It is to be noted that there is bias in the standardized testing system as well. These tests are standardized to primarily White samples and "give differential favoritism to Caucasian Americans and other groups who naturally use or can develop a similar style of thinking" (Bazemore-James et al., 2016, p.4). However, these scores are more objective than teachers' grades and behavior ratings and should be the most heavily considered in this placement policy.

The Overall Placement Policy

It is recommended, through teacher feedback and the literature, that overall, the 7th-grade mathematics placement policy should look as such:

- Student names are removed, and students are reduced to the most recent three years of CAASPP scores and the current year of iReady diagnostic scores. There is no consideration of subjective measures such as discipline and grades (California Department of Education, 2024; Curriculum Associates, 2024).
- Students are ranked by CAASPP scores first—those with the most years above standard out of three are ranked higher than the other—and then by their iReady diagnostic score (California Department of Education, 2024; Curriculum Associates, 2024).
- Students who have been at or above standard for all three years and have an iReady diagnostic score at or above grade level are eligible for placement into the 7th-grade honors class (Curriculum Associates, 2024).
- Class spots are filled by going down the list and adding until there is no space in the classes left. It will be up to administrators at the school level to determine what to do with the remaining students. However, I recommend creating another section for honors students to ensure that all qualified learners are placed in the appropriate class level to ensure proper access.

While this policy will increase equity in 7th-grade mathematics honors placements, it should only be considered an immediate, short-term recommendation. True equity can only be achieved once the mathematics classroom is detracked and students learn together in a heterogeneous classroom. The following section will share some literature showing the benefits of a detracked classroom.

A Long-Term Recommendation: Detracking the Mathematics Classroom

> All students will make sense of rigorous mathematics in ways that are creative, interactive, and relevant in heterogeneous classrooms.
>
> —San Francisco Unified School District (2023)

In 2014, the San Francisco Unified School District (SFUSD) passed a new Math Course Sequence Policy that prevented students from being tracked until tenth grade (San Francisco Unified School District, 2024). The shift resulted from lower-than-expected proficiency scores after all 8th-grade students were enrolled in Algebra 1 (Torres & Barnes, 2019). In a presentation at the 2019 California Math Council Symposium (CMC), Torres and Barnes (2019) shared how at the end of sophomore year, less than one-fourth of the students tested proficient in Algebra 1 California Standards Test (California Department of Education, 2023b). When the administrators and teachers realized the current tracking system was not working, they had collaboration days and created public panels to address the issues. According to their presentation, by removing tracking and offering teachers training on differentiation and effective teaching methods for heterogeneous groups, SFUSD students showed increased achievements (Torres & Barnes, 2019). Across all ethnicities, there was an increase in the amount of Math and Science credits earned by the end of 11th grade. Additionally, students showed an increase in the number of advanced math courses taken in high school, with African Americans and Hispanics/Latinos showing the most substantial increase. Finally, the repeat rate of Algebra 1 decreased by around 80% (Torres & Barnes, 2019).

Cambridge Street Upper School in Massachusetts detracked 8th-grade math in 2018 and saw results like those in SFUSD (Berwick, 2019). After detracking, teachers offered an

accelerated curriculum to all students and differentiated for the different learners in their class. After their efforts, the school found that twice as many students passed the math state assessment, and 95% said they wanted to take honors math in high school (Berwick, 2019).

Like SFUSD and Cambridge Street, Jo Boaler (2008) found many benefits to detracking math classes through her longitudinal study on Railside school. In this study, the research team conducted a four-year study of 700 students in three high schools given the pseudonyms Railside, Greendale, and Hilltop. In addition to administering tests and questionnaires, students were interviewed in same-sex pairs every year of the study to consider their experiences and feelings toward math class. Greendale and Hilltop practiced tracking—students were placed into one of three levels of math classes at the beginning of high school. Conversely, at Railside, all students were placed into heterogeneous math classes from the beginning of school. The study found that the Railside students outperformed their counterparts at Greendale and Hilltop after two years despite starting at lower performance levels before entering the class (Boaler, 2008). Additionally, students at Railside reported enjoying mathematics more than their counterparts at Greendale and Hilltop. Boaler (2008) directly compared tracked and detracked schools and offered more significant evidence of the effectiveness of detracking mathematics classrooms and the increased achievement that results from it.

The results of this study showed lower achievement levels for the non-honor participants and less rigorous learning experiences because of lowered teacher expectations and skewed perceptions, so detracking the mathematics classroom can help mitigate those issues. Creating heterogeneous classrooms exposes students to the same content, pedagogical choices, and learning environments. However, this is a significant undertaking. This long-term

recommendation would first require districts to engage in conversations and investigate what heterogeneous classes would look like. Once implemented, teachers would be asked to teach learners of all levels in one classroom—a challenging task requiring significant time and money from the school district to implement correctly.

Recommendations for Future Research

Future research that would benefit this study area would examine best practices for teaching learners in a heterogeneous classroom. For the teachers involved in this research study, there were many questions about what a detracked classroom would look like and how it would be possible to reach all learners when you have the highest achievers in the same room as students who are significantly below grade level. Research into effective teaching methods utilized at currently detracked schools could prove highly beneficial and convincing to getting teachers on board with detracking the mathematics classroom. Extending current research on co-teaching models in special education can help develop strategies and plans for teaching the general population in a mixed-ability level mathematics classroom.

A second area of research would be to examine the way that cultural milieu, such as gender stereotypes and the cultural stereotypes of mathematics and honors course placement, are affecting one another. It would be intriguing research to study if and how self-perceptions of achievement are related to the cultural value placed on being in an honors class and the differences in this value based on gender. This study was limited in the number of factors that could be considered—but there is an intersectionality between gender, class, culture, and race that is at play and should be researched. Although some tracking components are well-researched, there is still much research area.

Conclusion

This study focused on the differences in students' access and achievement in high school and beyond based on the math class they were placed into in the 7th grade. This topic is relevant because recent updates to the California Mathematics Framework and the increased focus on equity to increase student success have called for detracking the mathematics class in middle school (California Department of Education, 2023a). This suggestion has been met with controversy from stakeholders in all areas of education, who worry that advanced students will not be appropriately challenged. However, as the literature showed, honors class placement is fraught with bias, and Black and Latinx students are underrepresented in these classes (Blume, 2021).

This study, along with the findings in the literature, offers evidence to support the call for the revised California Mathematics Framework to improve equity in mathematics instruction (California Department of Education, 2023a). Students in honors classes display higher levels of achievement through measures such as effort and mathematics self-concept, influencing their achievement beyond their 7th-grade year (Carbonaro, 2005; Legette & Kurtz-Costes, 2021b). Additionally, teacher perceptions of their different tracked classes are causing differences in pedagogical decisions based on achievement level. Honors students receive higher-level thinking opportunities, more time for independent practice, and are held to higher expectations (Gamoran, 2009; Gamoran et al., 1995; Kelly, 2004). While these differences make sense with the idea that students in the honors class are more capable than non-honors, that is not always the case. Subjective placement decisions do not ensure that the right students end up in these classes—students from low-socioeconomic backgrounds and minority ethnic groups are being

disproportionately placed in lower tracks despite their actual academic ability (Francis et al., 2020). Instead of school becoming the "great equalizer," these placements continue to perpetuate the opportunity and achievement gap between Black and Latinx students and their White and Asian counterparts (Murnane et al., 2006).

For these reasons, it is imperative to make changes toward equity in the mathematics classroom, and both practice recommendations shared in the above section do just that. By creating a blind, objective placement policy solely based on data, teacher bias, which often results in negative perceptions of Black and Latinx behavior and ability, is significantly mitigated (Glock & Karbach, 2015). However, a blind placement policy does not fully address the differences in achievement, teacher perceptions, and quality of education—it only helps to ensure that those receiving the benefits are more demographically representative and accurately placed into their tracks. The real change for equity comes by detracking the mathematics classroom and creating mathematics classes of heterogeneous learners. Giving students the same opportunity for high-quality education and deeper levels of thinking increases achievement for students of all abilities (Berwick, 2019; Boaler, 2008; Torres & Barnes, 2019). With a world shifting focus to STEM, it is clear that it is time to rethink middle school mathematics education and ensure that all our students receive the same education standard.

APPENDIX A

Student Achievement Survey

Part 1:

1. What math course did you take in the 7th grade?
    a. 7th grade Common Core Mathematics
    b. 7th grade Compacted Mathematics

2. What grade did you receive in your 7th-grade mathematics class?
    a. A
    b. B
    c. C
    d. D
    e. F

3. What math course did you take in the 9th grade?
    a. Integrated Math I with Intervention
    b. Integrated Math I
    c. Honors Integrated Math I
    d. Integrated Math II
    e. Honors Integrated Math II
    f. Algebra I
    g. Geometry
    h. Other:

4. What is your cumulative GPA for high school?

5. How many AP and honors courses have you taken in high school?

6. What standardized exams have you taken in preparation for college applications?
    a. SAT
    b. ACT
    c. None

7. If you took the SAT, what score did you receive?

8. If you took the ACT, what score did you receive?

9. What are your plans for after high school graduation?
    a. No plan to attend college
    b. Community college
    c. Trade school

d. Obtain a bachelor's degree
e. Obtain a master's degree
f. Professional school degree (e.g., MD, DDS, DVM, JD)
g. Doctorate (e.g., PhD, EdD)
h. Other:

Part 2:

The survey items will be followed with a 5-point Likert Scale with response options ranging from 1 = strongly disagree to 5 = strongly agree

To what extent do you agree with the following statements regarding your mathematics classes in high school:

1. I regularly completed my mathematics assignments.
2. I regularly participated in mathematics class discussions.
3. I regularly attempted challenging mathematics problems, even if I could not come to the final answer quickly.
4. I enjoyed working on math assignments, even if I struggled.
5. I learned things quickly in math.
6. I was confident in my ability to do mathematics.
7. I believe that my math teachers had high expectations for my achievement level.
8. I believe that my math teachers cared about me being successful.
9. I believe that what I learned in mathematics is important to my future career and college goals.

To what extent do you agree with the following statements regarding your experience in high school?

1. I regularly followed school rules, such as showing up to school on time and attending class.
2. I felt accepted in my school's social environment.
3. I valued my academic achievements at school.
4. I expected to do well in my academic classes.

To what extent do you agree with the following statements regarding growth mindset during your high school experience?

1. I believed that anyone could improve their mathematics skills with practice.

2. I believed that I could improve my mathematics skills with practice.

3. If I did not do well on a test, I believe that I can improve with more effort and practice.

Part 3 – Demographics:

1. Year of High School Graduation

2. Name of High School

3. How do you describe your gender?

4. Race/Ethnicity

5. Are you of Spanish, Hispanic, or Latino origin?

6. What is the highest level of education your parent/guardian has completed?

APPENDIX B

Teacher Open-Ended Survey

1. What does a standard lesson look like for your **non-honors** courses? How much time do you spend on review, direct teaching, and independent practice?
2. What does a standard lesson look like for your **honors** courses? How much time do you spend on review, direct teaching, and independent practice?
3. How do the students in your honors courses differ from the students in your non-honors courses?
4. How does your classroom management differ when teaching your honors and non-honors courses?
5. How do your assessment strategies differ when teaching your honors and non-honors courses?
6. At what level do you expect the students in your **non-honors** courses to achieve?
7. At what level do you expect the students in your **honors** courses to achieve?
8. What makes a student successful in your honors course?

APPENDIX C

Focus Group Guiding Questions

1. What difference do you see between the achievement levels of students placed in 7th-grade Honors Math and those not placed in 7th-grade Honors Math?
    a. Why do you think we are seeing these differences?
2. In your opinion, what qualities make a successful honors student?
3. What characteristics should we consider when selecting students for honors course placement?
    a. Should we consider behavior? Why or why not?
    b. Should we consider work habits? Why or why not?
    c. Should we consider test scores? Why or why not? Moreover, if so, what scores would we consider?
4. How can we make an equitable honors placement policy for all students? What does that look like?
5. Is it essential that a placement policy is blind, and students are selected for the course without knowing who they are?
6. Should we consider other aspects of student success when developing an equitable placement policy?

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