EFFECTS OF A MULTI-TIERED SYSTEM OF SUPPORTS (MTSS) ON STUDENT ACHIEVEMENT, COURSE ENROLLMENTS, TRACKING, AND EQUALITY OF EDUCATIONAL OPPORTUNITY IN A MIDWEST SUBURBAN SCHOOL DISTRICT

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ABSTRACT

Effects of a Multi-Tiered System of Supports (MTSS) on Student Achievement, Course Enrollments, Tracking, and Equality of Educational Opportunity in a Midwest Suburban School District

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Ability grouping and tracking, common practices in American elementary schools, have been criticized for perpetuating and even widening the achievement gap between lower- and upper-track students. Response to Intervention (RTI), the Kansas version of which is known as Multi-Tiered System of Supports (MTSS), is an alternative to tracking that some claim has the potential to mitigate this problem. This study examined outcomes for traditionally tracked vs. MTSS students at 5 elementary schools in a Kansas suburban school district. It found that MTSS was associated with fewer students being placed in below-grade-level classes and higher overall achievement in reading (but not math) at the start of middle school, but these effects did not persist through secondary school. The study concludes that MTSS may be a promising strategy for promoting equality of educational opportunity, especially if an MTSS-type program continues through secondary school.

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CHAPTER 1

INTRODUCTION

Introduction

A central tenet to the American dream is equality of educational opportunity. But for many students in America, educational opportunities are not equal. Access to that dream is not universal for all schoolchildren. For decades, students of color, students from lower socioeconomic and culturally diverse backgrounds have entered school with an opportunity gap. That gap is exacerbated by tracking and ability-grouping, culminating in limited opportunities upon graduation (Oakes, 2015). Multiple studies articulate a strong need for research and the crucial role it may serve to inform policy to remedy inequality (Anderson & Oakes, 2014a; CollegeBoard, 2014; Mehan, 2015; Oakes, 2015). Many of these studies further point to institutional and cultural inertia, which are deeply rooted by policies and practices that perpetuate inequality (Anderson & Oakes, 2014a; Ansalone, 2001; Werblow, Urick, & Duesbery, 2013).

This study examines one educational practice that has gained popularity, a Multi-tiered System of Supports (MTSS), which has several key differences from traditional ability grouping. One notable difference is the focus on early intervention for student growth. A central question of this study examines whether MTSS leads to greater equality in educational opportunity or if the effects mirror the outcomes from tracking and ability grouping that maintain a consistent percent of students below grade level. The main purpose is to determine whether the adoption of MTSS succeeds at getting a higher percent of students above a minimum threshold of achievement and access to curriculum. Equality in this study is defined in terms of students attaining access to grade level curriculum and earning a score considered at grade level on a norm referenced assessment. Essentially getting students to clear the "bar" that represents

minimum competency in coursework and achievement. Access means that students are enrolled in classes that are designated for their grade and age cohort. The study reviews access to grade level coursework and a student achievement indicator to determine whether MTSS affords greater equality and access. The population for this study consists of three student cohorts from the same five elementary schools. One group received Full-MTSS during their years in elementary school, one received Partial-MTSS in grades three through six, and one received No-MTSS. Each group is similar in size and includes over one hundred students. The enrollment and achievement data for these cohorts was collected longitudinally for the middle and high school years. The purpose of this research is to determine whether the adoption of MTSS realizes a higher percent of students accessing grade level coursework and achievement scores. Does the structure of MTSS overcome the existing institutional inertia that perpetuates ability grouping and the stratification of student learning?

Providing greater equality in educational opportunity is necessary as students from racially, culturally, or linguistically diverse backgrounds experience limited access to educational opportunities. The disparity remains most acutely divided by socioeconomic status. These trends in achievement gaps have been recognized by the College Board for students participating in Advanced Placement (AP) exams while studying college level coursework in high school (CollegeBoard, 2014). For example, in 2013, Black/African-American students comprised 14.5% of the total population, yet they only represented 9.2% of AP test takers. A sharper divide exists for students from lower incomes. Students qualifying for free and reduced lunch comprised 48.1% of the total population, however they comprise only 27.5% of the students taking at least one AP exam (CollegeBoard, 2014).

These achievement gaps have long been cited in research and are reflective of institutional structures that perpetuate gaps existing when students first cross the threshold of their kindergarten or preschool classroom (Darling- Hammond, 2007; Oakes, 2015). Tracking, including ability grouping, is a common formalized structure within schools that serves to foster inequity by limiting student access to curriculum. Over the course of a student's elementary and middle school years, the effects of the limited access to curriculum are magnified, eliminating the student's opportunity to enroll in courses such as calculus or physics before the student ever enters the doors of high school (Ireson & Hallam, 2009; Lleras & Rangel, 2009; Schofield, 2010). This study focuses on a Midwest, suburban school district's efforts to implement MTSS to close these achievement gaps during elementary school and provide greater equality in educational opportunities for all students.

Background

The suburban school district in this proposed study spans several inner-ring suburbs of a larger Midwestern city. The school district is comprised of eleven cities with a student population of approximately 27,000 students. The district decided to adopt MTSS in the 2006-2007 school year after acknowledging some key challenges within its student data. The district noted an over identification of students receiving special education supports as reflected by a larger than typical percent of students with an Individual Education Plan (IEP) for exceptionalities other than gifted. The district observed disproportionate enrollments in special education for black/African-American male students, representing a much higher percent of the special education population than their percent of the total enrollment. The district also noticed achievement gaps between student groups as reported in the results from Kansas Assessments for English language arts and mathematics (KSDE, 2004-2006). Implementing MTSS allows the

district to align with a statewide movement and shift their focus to equality in educational opportunity for all student groups. MTSS potentially provides the structures to reduce the over-identification of students for special education, as well as, an alternative to ability grouping that may serve to close the achievement gap.

The school district selected five elementary schools for the first cohort of early adopters. Once the cohort of schools implemented MTSS, the district continued the adoption of this framework across the second and third cohorts within the next two school years. Full implementation of MTSS within all elementary schools was realized by the 2008-2009 school year. The first selected elementary schools were identified in part based on perceived capacity of building leadership and staff to implement change.

Overview of MTSS

Response to Intervention (RTI) has been widely adopted across all fifty states in an effort to provide formalized support structures for struggling readers and to reduce the over-identification of students to special education programs (D. Fuchs & Fuchs, 2006; L. S. Fuchs & Vaughn, 2012; Hughes & Dexter, 2011; Sailor, 2009). Rather than using the traditional IQ-achievement discrepancy to identify students as learning disabled for special education, RTI provides a process to identify specific student needs, select targeted interventions to match individual needs, and monitor the student's response and growth relative to those interventions (D. Fuchs & Fuchs, 2006). The intent of this prescriptive process is to intervene early with appropriate research-based supports to advance individual student growth and learning in reading (Barnes & Harlacher, 2008).

The RTI model is designed in a system of tiers, ranging from two to four levels of instructional supports. The schools within this study utilize a Multi-tiered System of Supports

(MTSS) that is a three-tiered system. MTSS is the structure Kansas adopted as the RTI model for the state. High quality instruction at tier 1 is essential to provide a strong foundation for MTSS (D. Fuchs & Fuchs, 2006). All students receive core instruction at tier 1. Core instruction includes both the evidence-based curriculum and the instructional strategies to differentiate curriculum to meet the needs of individual learners (National Center, 2017) Students are screened using data from the prior year's standardized assessments or a universal screener administered at the start of the school year. Based on those assessments, some students are then identified for additional, targeted supports at tier 2. Students receiving tier 2 interventions receive instruction that supplements the core instruction at tier 1. For example, students may receive sixty minutes of core reading instruction and an additional thirty minutes of small group, targeted reading intervention at tier 2 (Barnes & Harlacher, 2008; D. Fuchs & Fuchs, 2006; Sailor, 2009). Data collected every few weeks from curriculum based assessments or assessments like the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) is used to monitor the progress of students receiving the tier 2 interventions (Barnes & Harlacher, 2008; D. Fuchs & Fuchs, 2006; L. S. Fuchs & Vaughn, 2012; Kaminski). Frequent data collection is necessary for the intentional monitoring of student progress to determine whether a student is responding to the selected intervention. When a student is not responding to the intervention at an expected rate, then the school team meets to adjust the plan. Adjustments may include additional supports for implementing the intervention, selection of a new intervention, or moving a student to tier 3, including a potential evaluation to assess the need for special education supports (Batsche et al., 2005; D. Fuchs & Fuchs, 2006; Sailor, 2009).

MTSS offers an alternative to prior systems of educational supports such as the common practice of ability grouping. MTSS provides a fluid, data driven, problem-solving process to

foster student growth. One intent of the MTSS adoption is to provide early intervention to improve reading performance and move all students above the minimum competency measurement, referred to as “on benchmark” for reading within this school district. Students scoring below the benchmark data point on a universal screening assessment are identified for strategic or intensive interventions. Students are then assigned to intervention groups to receive additional instruction beyond their core classroom instruction. Student response to the selected intervention was assessed by gathering data from an assessment probe, in this district the Dynamic Indicators of Early Basic Literacy Skills (DIBELS) was selected as the assessment for progress monitoring. If the student responded with improved scores, the intervention continued until the student reached the appropriate benchmark. If the student did not respond with improved outcomes, another intervention was selected. The purpose of the intervention was to provide targeted support to students and improve their reading proficiency to meet or exceed a minimum competency.

In comparison, ability grouping was to be based on a standardized measure to initially sort students into homogeneous learning groups; however, the identification process was often marked by potential bias from teacher perception and student background. Students of color and students from lower socioeconomic backgrounds were disproportionately assigned to the lower ability groups (Ansalone 2001, Anderson and Oakes 2014). Ability groups were essentially fixed throughout elementary school. Once assigned, students rarely moved to a higher group. Students in the lower ability groups did not have access to many of the grade level curriculum standards as their peers in the middle and higher-level groups (Ansalone 2001). The familiar reading-group identifiers of "bluebirds, robins", and the like, affix a relatively permanent label that serves to define a student's place in the educational hierarchy and limit his or her access to

core curriculum, high quality instruction and future educational opportunities (Chorzempa & Graham, 2006; Gamoran, 1986; Hallinan, Bottoms, Pallas, & Palla, 2003; Ireson & Hallam, 2009). By contrast, this MTSS study serves to contribute to current research by examining the institutional practice of MTSS and any potential effects to mitigate the hurdles of fixed ability groupings, thus reducing effects that often thwart student movement and access to curriculum and serve to increase dropout rates for students in the lowest tracks (Alexander, Entwisle, & Horsey, 1997; Werblow et al., 2013).

Research Questions

The study examines the student achievement data, special education data, and course enrollments archived by school and cohort from 2006 through 2017. The data set houses a variety of information, and the study narrows the focus to four central questions closely aligned to the goals of this suburban school district when adopting MTSS. The following research questions are addressed within this study. Was the implementation of MTSS associated with less below grade level tracking in secondary schools? Was the implementation of MTSS associated with higher levels of achievement? Was MTSS associated with greater equality of educational opportunity? Was MTSS associated with lower rates of identification in special education?

The study focuses on a cohort of students within five elementary schools in an inner-ring suburban school district that were early adopters of MTSS. The five elementary schools that adopted MTSS in the 2006-2007 school year were the first schools to implement this protocol within their school district. The study explores the implementation of MTSS and its potential longitudinal effects on student access to grade-level curriculum and attainment of grade-level academic performance indicators for students within the identified cohorts. The cohorts from early adopter elementary schools compared amongst three demographically similar groups: a

group that fully participated in MTSS from first through sixth grade (the Full-MTSS group), a second group that participated in MTSS during grades three, four, five, and six (the Partial-MTSS group), and a third group that never participated in MTSS (the No-MTSS group). The study monitors a cohort of students who were in first grade in fall of 2006 and were enrolled in the five elementary schools adopting MTSS that year. Students within this cohort are compared to students in those same five elementary schools that were enrolled in third grade during the fall of 2006, the group to receive Partial MTSS during their elementary education. Students in the cohort are also compared to peers exiting sixth grade classes within the same five identified schools, the group of students entering seventh grade in the fall of 2006, students never receiving MTSS.

The structure of this study allows for comparisons between similar cohorts of students, one group that received MTSS for the entirety of their elementary school experience, one group that received MTSS for a portion of their elementary school years, and one group that never received MTSS in elementary school. This design explores the potential effects of MTSS and early interventions in the primary grades. Each cohort group is monitored longitudinally through grade eleven recording data related to course enrollments and student achievement on a nationally normed assessment. Diagram A below illustrates the matriculation of the three cohorts.

Diagram A: Visual Overview of MTSS Treatment Cohorts by Grade Level Timelines

	MTSS Treatment			*Outcome variables for each cohort are compared at Grade 7, Grade 9, and Grade 11.*		
FULL MTSS Cohort	Grade 1 (2006-2007)	*MTSS beginning at Grade 1 and continuing through subsequent grade levels*		Grade 7 (2012-2013)	Grade 9 (2014-2015)	Grade 11 (2016-2017)
Partial MTSS Cohort		Grade 3 (2006-2007)	*MTSS starting at Grade 3*	Grade 7 (2010-2011)	Grade 9 (2012-2013)	Grade 11 (2014-2015)
No MTSS Cohort	*No MTSS in elementary school*			Grade 7 (2006-2007)	Grade 9 (2008-2009)	Grade 11 (2010-2011)

CHAPTER 2

LITERATURE REVIEW

Review of Literature

Schools as institutions promote social stratification through structures and practices that perpetuate advantages for students from more affluent socioeconomic backgrounds, and as a result, inequalities and achievement gaps persist. These achievement gaps are also noted between students from diverse racial or ethnic backgrounds including African-American, Black, Latino, and Hispanic students, and their white peers (Blanchett, 2006; Hallinan, 2001; Lleras & Rangel, 2009; Oakes, 2015). The focus of this research proposal is to explore one of these pervasive and persistent instructional practices that contribute to the achievement gap, the practice of tracking students.

Central to this study is an operational definition of tracking. Tracking students begins with the use of student achievement data, teacher recommendations, and some anecdotal factors to sort students into groups. The groups serve as a mechanism to provide curricular differentiation (LeTendre, Hofer, & Shimizu, 2003). Tracking ranges from a prescriptive course of study that limits student movement between programs to ability grouping that affects student access to curriculum by their assignment to a high, middle, or low ability group within a given classroom (Ansalone, 2001; LeTendre et al., 2003; Werblow et al., 2013). For the purposes of this study, the broader definition of tracking is adopted to include the practice of placing students into homogeneous learning groups based on their perceived abilities.

The practice of ability grouping limits some students' access to curriculum in their early years of education. The effect is often cumulative over the student's subsequent years in elementary and middle school, closing access to calculus and advanced coursework well before

crossing the threshold of high school (Alexander et al., 1997; Anderson & Oakes, 2014a; Ansalone, 2001; Ireson & Hallam, 2009; Werblow et al., 2013). Tracking ultimately serves to undermine the equality of education opportunity disproportionately for students arriving at elementary school from lower income and more culturally diverse homes and backgrounds (Oakes, 2015). The achievement gap for students within these groups is often present from the initial assessments of vocabulary and pre-reading skills. The gaps often reflect the variation in students' experiences at home in their pre-school years. Students from homes where their parents or guardians read to them and where a more expansive vocabulary is used often recognize a life-long advantage. Once assigned to ability groups, students predominantly remain in those groups long-term, and that gap widens over the next several school years (Alexander et al., 1997; Anderson & Oakes, 2014a; Ansalone, 2001). For the purposes of this study, equality of educational opportunity is considered to be providing all students access to achieve a grade-level standard and providing access and supports for all students to meet that given achievement criteria that opens access to educational opportunities. Equality of educational opportunity does not address the concept of moving all students towards the middle by narrowing the curricular offerings.

Tracking is an institutional practice that persists despite a growing body of research detailing the negative effects on students (Anderson & Oakes, 2014b; Ansalone, 2001; Ireson & Hallam, 2009; Kelly & Price, 2011; VanderHart, 2006; Werblow et al., 2013) . Tracking serves to limit access to curriculum for students in the lower ability groups. Students in lower ability groups consume less curriculum than their counterparts in higher ability groups. This gap widens throughout the school year as students in lower ability groupings achieve less growth than their peers in high ability groups or in non-grouped structures (Ansalone, 2001; Hallinan et

al., 2003; Lleras & Rangel, 2009). Grouping students by ability influences their self-concept as a student and their view of their own academic skills; it influences the formation of peer groups, and within the lower tracks, students often adopt non-academic skills that detract from their learning (Ansalone, 2001; Ireson & Hallam, 2009). Students acquire disruptive behaviors or avoidance techniques, refining those skills over time as their learning and achievement diminish. Students in the lower tracks academically are also at a higher risk to drop out of school (Alexander et al., 1997; Werblow et al., 2013).

MTSS, RTI, and Tracking

The framework for this study also requires a definition and review of MTSS and its key principles. Since MTSS is the Kansas term for RTI, the review of literature includes both terms depending upon the source of information. MTSS was adopted in an effort to provide early, targeted interventions for students struggling in reading and to reduce an over-identification of students in special education, specifically a disproportionate over-identification of African-American and Black students within the special education population of this suburban school district (Sailor, 2009). Adopting a data-driven framework affords a promising opportunity to eliminate potential bias within the previous IQ-Achievement discrepancy process of student identification. Given this district's practice to not administer IQ tests, teams were left to decide the intelligence-achievement discrepancy through a myriad of assessment tools and indicators.

The model of MTSS used in this study is a three-tiered system beginning with the administration of a universal screener for all students, grades one through six. The definition of the protocol is narrowed to detail the MTSS framework as it relates to the cohort of 1st grade students over their six years in elementary school. The DIBELS, 6th edition, benchmark assessment was administered to all first grade students within the cohort (Kaminski). Data cards

were then created for each student with a corresponding level of intervention and support determined by student results on the benchmark assessment. Students scoring "at-benchmark" were considered on grade-level and received only tier 1, core instruction, for reading. Students scoring at the "strategic" level were considered slightly below grade-level. This group of students received tier 2 instructional interventions in addition to their core instruction. The interventions were research-based and prescriptive programs including, but not limited to, Cars & Stars by Curriculum Associates, Peer Assisted Learning Strategies (PALS), Read Naturally, and Voyager Passports by Sopris Learning (Associates; D. a. F. Fuchs, Lynn; Ihnot; Learning).

Students scoring at the "intensive" level were identified as significantly below grade-level. Students within this group received core instruction and interventions targeting their specific skill needs. This group received interventions that are more frequent and longer in duration. An important note within this framework is that all students were engaged in core instruction in reading, in a whole-group setting. The interventions were delivered in small group or individual settings through additional time allocated for reading, time beyond the minutes of core instruction.

Students receiving instructional supports at the strategic and intensive levels were monitored to determine their response to the specific intervention. The DIBELS progress monitoring tools were used to measure student growth. The data were recorded on individual student data cards and reviewed by building teams bi-weekly. The DIBELS benchmark assessment was administered quarterly, and data reviews were conducted by building teams to monitor each student's movement. Monitoring was defined by recording student movement as students changed from intensive to strategic, strategic to benchmark, in addition to noting

students whose progress remained relatively constant or regressed. Interventions were then reassigned or adjusted, or new interventions were selected to match student needs.

The goal over time was to move students to a lower level of required support, from intensive to strategic, from strategic to benchmark. Student growth was fostered by two essential facets within the MTSS, access to core instruction for all students and research-based interventions provided as an extension of core instruction rather than a means to supplant it. The key tenet of the MTSS protocol that focuses on core instruction for all students appears obvious at first, yet previous intervention programs within the school district involved pullout supports that were often used in lieu of the core instruction. During the study, within the MTSS cohort schools, all students remained in class for core instruction while interventions were provided during another time period through small group or individual instruction (Berkeley, Bender, Peaster, & Saunders, 2009; D. Fuchs, Fuchs, & Compton, 2012; Hughes & Dexter, 2011). These two elements of MTSS, access to core curriculum and focus on student movement to attain grade-level achievement, have the potential to provide a structure to address the pervasive school practice of tracking through ability grouping, a practice that has served to widen the achievement gap by limiting access to curriculum and high quality teaching and negatively influencing students' self-perception for students in lower ability groups (Hallinan et al., 2003; Ireson & Hallam, 2009; Tach & Farkas, 2006). Those decisions at times resulted in tracking students and limiting education opportunities.

To develop a better grasp of how MTSS may serve to mitigate the detrimental effects of tracking, a review of the literature is necessary to develop a core understanding of the principles and procedures of RTI. The Individuals with Disabilities Act of 2004 permitted the use of Response to Intervention for identification of students with a learning disability or special needs.

This change provided another option for states and schools beyond the traditional IQ-achievement discrepancy model to identify students with a need for special education supports (Berkeley et al., 2009; D. Fuchs & Fuchs, 2006). RTI emerged as a strong alternative to the discrepancy model where schools were "waiting for students to fail" (Berkeley et al., 2009). The approach of RTI became widely adopted, spanning forty-seven states by 2009, with Kansas as an early adopter with its state-wide MTSS (Berkeley et al., 2009). As states began wide-scale adoptions of RTI, Barnes and Harlacher articulated the need for a flexible set of principles and procedures that may be adapted to meet local needs. Those principles and procedures are universally present in the research with slight variations in the rigidity of the approach and the system designs. Those variations are reflected in the RTI models adopted across states (Batsche et al., 2005; Berkeley et al., 2009; D. Fuchs & Fuchs, 2006).

Diagram B: Example RTI Models

RTI Principles - Barnes and Harlacher *Proactive and preventative approach to education* *Ensuring an instructional match between student skills, curriculum and instruction* *Problem-solving orientation and data-based decision making* *Use of effective practices* *A system-level approach*

RTI Procedures - Barnes and Harlacher *Multiple tiers - either 2, 3, or 4* *Assessment system - used to identify and progress monitor student achievement* *Protocol - standard, problem-solving, or hybrid* *Evidenced based instruction - a core foundation in Tier 1 and Tier 2 interventions with a strong basis in research*

Once implemented, these procedures and principles may serve to mitigate the obstacles to de-tracking, potentially affording an alternate approach to instruction to counter the detrimental

effects of ability grouping. The RTI approach focuses on improving learning experiences for all students through strong core instruction. RTI is proactive in its principles to focus on early interventions and prevention of deficits in reading skills (Barnes & Harlacher, 2008; Berkeley et al., 2009; Cummings, 2006; D. Fuchs & Fuchs, 2006). The focus on prevention through early interventions may afford more students the opportunity to access grade-level curriculum from the start of their educational career in first grade, removing the source of the educational gap.

The practice of MTSS and its focus on interventions to support and promote student movement above an achievement benchmark may serve as a structure to reduce the promotion of social stratification and serve to de-track schools (Ansalone, 2001; LeTendre et al., 2003). One study suggests greater flexibility in grouping students, allowing teachers to reassign students among groups as performance levels change, may serve to lessen the effects of student grouping on those achievement gaps (LeTendre et al., 2003). MTSS provides a series of principles and procedures to guide teachers' focus, providing clear criteria for assignment to intervention groups, and creating specific protocol to monitor and promote student movement within those performance levels (Barnes & Harlacher, 2008; Berkeley et al., 2009; L. S. Fuchs & Vaughn, 2012; Hughes & Dexter, 2011). Ongoing data reviews and progress monitoring allow teams an opportunity to examine student progress and growth. Interventions are adjusted in focus or duration if a student is not responding or if there is no corresponding improvement in skills (Barnes & Harlacher, 2008; D. Fuchs & Fuchs, 2006).

De-Tracking Schools

The following review of literature articulates the detrimental effects of tracking students, the role of tracking in school stratification, and the political and technical obstacles to de-tracking schools (Ansalone, 2001; Kelly, 2004; Kelly & Price, 2011; Werblow et al., 2013). The

criticisms of tracking are well-documented across a wide variety of studies with a detailed account of the detrimental effects of this practice. Tracking and ability grouping either between schools or within schools feeds a growing disparity in equal access to educational opportunities (Oakes, 2015; Werblow et al., 2013). Equality of education opportunity, a foundational tenet of the American dream, is arguably inaccessible to a segment of youth who cross the threshold of school with a smaller vocabulary or less social capital than their peers (Anderson & Oakes, 2014a; Oakes, 2015). Yet tracking persists in schools with studies reporting a majority of schools utilizing ability grouping within individual classes in primary grades for reading (Chorzempa & Graham, 2006). Given the breadth of research outlining the detrimental effects of tracking and given the reality of the widespread use of this practice, it becomes imperative to identify systems and structures that perpetuate tracking, as well as, barriers to de-tracking schools. Oakes (2015) cites one central tenet to this problem, "research pointing to more equitable approaches is swamped by educational structures, culture, and individual actions..." (p.8). Thus when an alternative approach is identified to provide more equitable opportunities, it is consumed by the institutional isomorphism, ending its implementation or rendering it a practice that is not replicable (Boxenbaum & Jonsson, 2008; Meyer & Rowan, 1977).

One of the most significant sources of that institutional isomorphism is the role schools play to promote school stratification and to promote privilege amongst particular groups of students (Ansalone, 2001; Hallinan, 2001; Kelly & Price, 2011). Political concerns are among the prominent issues that derail attempts to de-track schools (Anderson & Oakes, 2014b; Ansalone, 2001; Oakes, 1992). Parents with high levels of social capital fear losing an advantage that currently exists for their student (Kalogrides & Loeb, 2013). Thus, when a structure is introduced that serves to give all students access to a similar core curriculum,

essentially bringing students at the respective ends of the achievement continuum to the middle, that practice is short-lived. A realized example of this scenario might include the elimination of both remedial and honors courses within a high school, enrolling all students in standard courses while differentiating to meet individual student needs. These approaches typically fall short of implementation due to resistance from parents who desire honors courses to retain an advantage for their children.

Parent concerns regarding the elimination of higher tracks serves as the political barrier most relevant for this study. Given the social capital of parents in the inner-ring suburban district, those concerns present the greatest political challenge to efforts to de-track schools. This concern is magnified at the high school level with Advanced Placement (AP) and honors level courses creating within school segregation. Although a body of research exists citing a lack of evidence of the benefits of higher ability tracks on student achievement, little has changed over the last twenty years; no solution has been identified despite the evidence citing little to no impact on student learning when ability grouping. Ultimately, elimination of those higher tracks or opportunities at a secondary level are neither prudent nor feasible politically (Anderson & Oakes, 2014b; Slavin, 1990). Thus, the efforts to reduce inequality of educational opportunity shift to practices that provide greater access to college-level coursework for all students, especially students in underrepresented populations including Hispanic, African-American, and students from lower socioeconomic backgrounds.

Students from underrepresented groups often arrive at the doorsteps of high school so far behind that access to higher level courses is already an impossibility (Hallinan, 2001; Werblow et al., 2013). Open enrollment practices often prove an ineffective or inadequate means of de-tracking due to prior barriers and students resistance to enter the higher tracks based on their

prior experience with tracking (Yonezawa, Wells, & Serna, 2002). In addition to student self-perception, a growing body of research articulates the presence of lower expectations and a lack of access to quality curriculum for students in lower tracks, as well as, the cumulative effects of those diminished expectations over time (Anderson & Oakes, 2014a; Ansalone, 2001; Ireson & Hallam, 2009; Kelly, 2004; Oakes, 1985, 2015). Adopting protocol and practices that eliminate tracking are critical yet present a formidable challenge if something is taken away from another group, access to the higher tracks (Hallinan et al., 2003; Oakes, 1992; Slavin, 1990).

MTSS has an inherent feature to potentially mitigate this political concern, as interventions are assigned for students scoring at the intensive and strategic categories. The protocol also calls for interventions to be given to students in the highest levels of achievement (D. Fuchs & Fuchs, 2006). Curriculum is differentiated, and for those in the highest levels, supports are provided by gifted facilitators (Brown, 2011; Brown & Abernethy, 2009). MTSS provides a framework to potentially balance these political demands. The focus to provide early interventions to bring every child above a certain bar of achievement is an essential component to provide equitable access to educational opportunities. The commitment to tier 1 core instruction, affords all students access to quality curriculum and high expectations (Berkeley et al., 2009; D. Fuchs & Fuchs, 2006; Hughes & Dexter, 2011). The primary goal of MTSS is to move ALL students above a particular bar. The protocol potentially affords for students already significantly above that bar to continue their growth. Students with higher levels of achievement should continue to experience growth while MTSS offers the potential to see similar or greater growth gains for students in the intensive and strategic groups as well. Such growth is in contrast to the body of research on ability grouping detailing lower growth rates for students in the lower ability groups, an effect of several forces including limited exposure to curriculum,

diminished self-concept related to academic skills, and teacher tracking (Ansalone, 2001; Hallinan, 2001; Ireson & Hallam, 2009).

The tenets of the bureaucracies of schools that perpetuate social stratification also serve to widen the achievement gap between the member of the dominant group and members of the underrepresented group. As evidenced by the research related to tracking, elementary students' educational opportunities are defined by their placement into groups based on assessments of abilities. Those placements are disproportionate with higher numbers of minority and low-income students in lower tracks, limiting future access to higher track math and science courses (Ansalone, 2001; Hallinan, 2001; Kelly & Price, 2011; Oakes, 1992; Oakes, Wells, & Jones, 1997). The gap widens throughout elementary, and it serves to define a student's self-perception; from a political perspective it informs the student's status and expectations for future educational and employment opportunities (Alexander et al., 1997; Ansalone, 2001; Oakes, 1992, 2015). Access to college preparatory curriculum and opportunities to earn an advanced degree often fade as the achievement gap widens.

As noted in the research by Oakes, the sustainability of any de-tracking effort relies on a formal structure that can withstand political concerns (Oakes, 1992, 2015). Students within MTSS have the support to retain their advantages within a structure that includes the viable potential to narrow the achievement gap by significantly reducing or eliminating the number of students achieving below the benchmark level. A core principle of MTSS focuses on early interventions for struggling learners, with the goal to support students to attain achievement that is on grade-level (Barnes & Harlacher, 2008; D. Fuchs & Fuchs, 2006; D. Fuchs et al., 2012). Students engage in a universal screener and are assigned a level of interventions and support based on that screening tool. Unlike tracking, where students remain in their assigned ability

group for years, MTSS promotes fluid student movement amongst the levels of support. Data teams monitor that movement and adopt additional interventions and supports when student learning stagnates or regresses (Batsche et al., 2005; D. Fuchs & Fuchs, 2006; Sailor, 2009).

Progress monitoring is an integral part of the procedures, and as the name suggests, data is reviewed to determine each individual student's response to that assigned intervention. Teacher teams conduct regular data reviews, monitoring for student growth and movement (D. Fuchs & Fuchs, 2006; Hughes & Dexter, 2011). Interventions and supports are then adjusted or changed using a hybrid of standard and problem-solving protocol, gathering input from parents, building assistance teams, and school psychologists with the goal focused on moving students from tier 2 supports to tier 1, core instruction, or from tier 3 to tier 2 interventions based on a positive response to those supports (Berkeley et al., 2009; D. Fuchs & Fuchs, 2006). The expectation of each school within the MTSS cohort is to see a response to the interventions adopted. Student movement within the levels is expected and monitored. The focus on student movement with a goal to move all students above an established level of achievement provides the core tenets for MTSS to potentially serve to de-track schools. Reducing the number of students mired by tracking at the early stages allows access to a larger portion of grade-level curriculum and potentially generates more opportunities for students at the secondary level.

A second and equally formidable challenge to de-tracking schools rests within the technical aspects of teaching, curriculum and instruction. The technical dimension relates directly to curriculum and instruction. Oakes (1986) noted, “Much of the practical concern about tracking reform centers on the extreme difficulty of teaching classes with a wide range of ability” (p.150). The challenges are exacerbated by the use of a traditional scope and sequence approach to curriculum with a focus on checking off objectives within a certain timeline. This

checklist approach is more successful with homogeneously grouped students moving through the curricular objectives at similar rates. Teachers are often less familiar with a thematic, concept-based approach that may successfully facilitate heterogeneous groupings (Lleras & Rangel, 2009; Oakes et al., 1997; VanderHart, 2006). The technical aspect of tracking can be challenging, as teachers are most successful when they are confident and comfortable. For most teachers, the traditional approach to curriculum and the practice of grouping is familiar (Lleras & Rangel, 2009; Oakes, 1992; VanderHart, 2006). Many teachers feel successful in an ability grouping model, even if the group includes students placed in lower tracks. Mitigating the technical aspects of tracking requires a formalized system that allows teachers to identify how instruction may be delivered to a heterogeneous group of students while supporting individual student needs (Anderson & Oakes, 2014a; Oakes, 1992). State-wide adoptions of the formal MTSS system include a key component central to the technical sphere, professional learning. Kansas has existing professional development for MTSS as noted in the 2009 study by Berkeley, et.al. Professional learning provides the support teachers need to find a new way forward from the familiar instructional practices of ability grouping to the new principles and procedures of MTSS (Berkeley et al., 2009).

CHAPTER 3

RESEARCH METHODS

Methods

The first research question seeks to determine if the implementation of MTSS resulted in less below grade level tracking at the secondary school levels. Less tracking at the middle and high school levels is evidenced by more students in the Full- and Partial-MTSS cohorts enrolled in on-grade level coursework and fewer students enrolled in courses defined as below grade level or remedial. Descriptive statistics and logistic regression are used to examine any potential effect and determine if the effect was significant. The second research question explores any possible association between the implementation of MTSS and higher levels of student achievement. The measures used to determine student achievement are the NWEA MAP scores for each cohort as they enter grades 7 and 9. This school district uses a two-year model for middle school comprised of grades 7 and 8. Therefore, collecting data at grade 7 captures students entering middle school, grade 9 captures their entry into high school. Descriptive statistics and multiple regression comparisons were used to determine any potential association and if that effect was significant.

The third research question examines whether MTSS is associated with greater equality of education opportunity. Any potential effect on the equality of educational opportunity is determined by a variety of measures describing access and achievement. Data collected includes access to grade level coursework, access to college level coursework while in high school, achievement measured by a norm-referenced assessment, and identification for both special education for learning disabilities and gifted educational services. Improved equality of educational opportunity is represented by greater access to grade level coursework and college

level coursework for students in the MTSS cohorts that is sustained through high school years. Student achievement data reflects more students from the MTSS cohorts achieving at or above grade level on a standardized measure with those gains sustained through high school. Equality of educational opportunity related to identification for special education services is reflected by whether the representation of students identified for special education services for a learning, emotional, or physical disability, or gifted services is proportionate to or mirrors the overall demographic composition of the grade level.

This study examines whether MTSS and the interventions used resulted in greater equality of educational opportunity by assisting students to attain a minimum level of competency. MTSS provides a framework of interventions to afford access to grade-level curriculum to all students while maintaining opportunities for students to engage in enrichment activities and advanced coursework. MTSS includes heterogeneous grouping of students for core instruction while providing interventions for both academic supports and enrichment. The discussion of the data examines if this approach results in a greater number of students accessing advanced coursework as evidenced by AP and IB enrollments.

The final research question seeks to determine if MTSS is associated with lower rates of identification in special education. Did this district recognize a proportionate percent of students identified for special education services for non-gifted categories, a primary goal of the introduction of MTSS? The district included in this study had a disproportionately large number of students identified for special education services. The special education enrollment data is examined for each cohort to determine if there is a difference for students identified for special education for a disability in the Full-MTSS and Partial-MTSS cohorts.

The cohorts for this study include the Full-MTSS, Partial-MTSS, and No-MTSS. As previously defined, students enrolled in first grade during the fall of 2006 in the five elementary schools adopting MTSS comprise the Full-MTSS group. The Partial-MTSS group consists of students enrolled as third graders in 2006-2007 at the same five elementary schools that were among the early adopters of MTSS. Students in this group received partial access to MTSS during grades three, four, five, and six. The no-MTSS group included students entering grade seven during the 2006-2007 school year, this group did not participate in MTSS. Students within these cohorts are demographically similar though the five schools noted an increase in the percent of students receiving free or reduced lunch support during this six-year period. This study controls for mobility as the data set includes only those students enrolled in the district from first through eleventh grade for each cohort group.

The school district began wide-scale administration of the NWEA MAP exam in the fall of 2006 (NWEA). The comparison data for the cohorts includes the NWEA MAP exam administered in August of 2006, when the students in the no MTSS group entered seventh grade, and the NWEA MAP exam administered in the fall of 2012 as the Full-MTSS cohort entered 7th grade. The course enrollments are compared for these cohorts as delineated by "at or above grade-level" courses and "below grade-level" courses. The NWEA MAP and course enrollments are monitored longitudinally through grade eleven for all three cohorts to determine the effects, if any, of MTSS and if those effects are sustainable over time.

The student achievement data and course enrollments reflect both reading and mathematics. The implementation of MTSS within the initial five elementary schools included protocols targeting early interventions in reading. The initial assessments, progress monitoring, and research-based interventions focused on reading. Although mathematics was not included in

the formal MTSS protocol in 2006, the mathematics achievement and course enrollment data provide a data point of comparison regarding other school factors that potentially impact the outcomes. The associated results are clearer if the effects on student achievement are noted in reading and not mathematics since the MTSS protocol focused exclusively on reading in the initial years. Examining the mathematics course enrollment data informs any potential carry-over effects of the larger dialogue surrounding student access to core curriculum. The focus on all students having access to Tier 1, core instruction, has the potential for residual effects in other content areas beyond reading. The mathematics data points serve as context when interpreting the results in this study.

This study defines the following courses as "below grade-level" standards: math workshop and reading courses at the middle school level, reading expeditions and mathematics extension at the high school level. In addition, students enrolled in off grade-level mathematics courses at the high school level including Algebra 1 in grade ten or higher, geometry in grade eleven or higher, and intermediate algebra in grades eleven or twelve are considered below grade-level. An additional question remains regarding the MTSS model adopted by this school district and whether the effects serve to de-track and afford students access to college-level courses at a higher rate than their peers in the late-adopter MTSS cohort. This question is marked by student enrollments in Advanced Placement (AP), International Baccalaureate (IB) and/or dual credit college courses while in high school.

The archival data related to enrollments in special education is reviewed to determine any significant reductions in the total percent of students identified to receive special education services, as well as, the demographic characteristics of that group. The data are collected for grades seven, nine, and eleven. If there are effects of MTSS on the rate of placement in special

education, data from the middle and high school grades is examined to determine if the effects were sustainable. The data may also reveal any potential bounce-back effect or increase in special education placements after the MTSS are no longer present in the middle and high school levels.

Archival data does not include any identifiers for either individual school or individual student. Data was organized to track student enrollments and achievement as an aggregate group. The three student cohorts are compared longitudinally using results from the NWEA MAP reading and mathematics assessments in seventh and ninth grade. Similar comparisons are made for average RIT scores for these cohorts and course enrollments that are considered below grade-level and enrollments considered at or above grade-level. No individual student data is reported, and all identifiers were removed prior to the analysis in an Excel spreadsheet. The sample population size ranges from 128-150 students for each of the cohorts. The number of students for this study also takes into consideration the mobility of students between and out of schools. Controlling for mobility allows for a more valid comparison with students from the Full-MTSS group with the Partial-MTSS and no-MTSS cohorts. All three cohorts include students that completed grades 1st through 6th at the five identified elementary schools within the study.

Measures/Protocol/Observations

The standardized assessment for measuring student achievement is the MAP from NWEA. The NWEA MAP is an adaptive assessment experience designed by the Northwest Evaluation Association. The assessment is nationally normed and serves as the measure to track growth and progress grades seven through ten for this study. The NWEA MAP assessment system assigns each student a standardized score known as a RIT score. As cited by NWEA: "Our scale, the RIT (**R**asch Un**it**) scale, is a stable equal-interval vertical scale. You can compare

the performance of your students and school/district relative to national achievement and growth norms state standards, including the Common Core State Standards (CCSS)" (NWEA). The RIT score in turn corresponds to a grade-level equivalent score and a national percentile ranking, both comparative measures available for this study.

The longitudinal progress of individual students and trends of the group is summarized by data tables. One data table summarizes the number of students moving from one level to the next and the sustainability of that movement over time. The percent of students attaining growth to reach grade-level achievement targets and the percent of those students sustaining that achievement over time is also be noted in a table format. The goal is to create a similar table with students from the no MTSS schools. Once those tables are constructed, descriptive statistics and multiple regression analyses are conducted to determine whether there is a difference between students in the MTSS cohorts and students in no MTSS schools, controlling for factors such as socioeconomic status.

Analysis

Descriptive statistics and multiple regression analyses are produced to determine whether there is a statistically significant difference between students in the MTSS cohorts and students never or partially receiving MTSS during their elementary school experiences, controlling for factors such as socioeconomic status through the data collection from the same five elementary schools. Analyses were conducted in two models, one model that examined the effect of each treatment group on the enrollment or achievement variable and a second model that examined the effect including background characteristics such as race, disability, and socioeconomic status.

The students from the Full-MTSS, Partial-MTSS, and No-MTSS cohorts are monitored longitudinally to determine the rate of students consuming below grade-level coursework. The

tables and analyses are replicated with course consumption indicators between the student sample populations. Courses such as reading workshop, math workshop, math extension, Reading Expeditions, and math study skills are indicators of students consuming below grade-level coursework. Again, descriptive statistics and multiple regression analyses are conducted to determine if there is a statistically significant difference in sustainable growth between students in the MTSS cohort and students in elementary schools having never or partially received MTSS interventions and supports, controlling for factors such as socioeconomic status. Student growth and progress in mathematics and reading are reviewed for both students in the selected group with the MTSS protocol and students in a comparable group attending schools that have not adopted the MTSS protocol. The question rests in whether the schools with MTSS available in first grade have a statistically significant difference in the number of students accessing the grade-level curriculum and enrolling in grade-level courses than their counterparts in the no MTSS cohort.

CHAPTER 4

RESULTS

Overview

This chapter is divided into three sections based on the research questions and type of analysis used. The first section includes a summary of descriptive characteristics for background information. Table 1 and Table 2 describe the size and demographic characteristics of students within this study. Table 3 describes the demographic characteristics of students within the group receiving special education services for a disability. The second section examines the descriptive statistics related to student achievement in grades seven, nine, and eleven. The measure of student achievement for this study is the NWEA MAP. The third section includes descriptive statistics related to course enrollments and access to grade level courses for students within the three treatment cohorts. The student achievement and course enrollment data serve to answer the research question if MTSS improves equality of educational opportunity. The two additional research questions review whether there is less tracking at the middle and high school levels and if there are fewer below grade level course enrollments for the students in the MTSS cohorts. There is a summary of observations at the end of each section as well as a summary of all findings at the end of this chapter.

Summary of Descriptive Characteristics

Diagram C provides an overview of each of the MTSS treatment cohorts over time. The Full-MTSS cohort are students who received MTSS starting in first grade in the 2006-2007 school year. The Partial-MTSS cohort are students who received MTSS starting in third grade in the 2006-2007 school year. The students who did not receive MTSS treatment in elementary

school are represented by the No MTSS cohort. This group of students was enrolled in grade 7 in the 2006-2007 school year.

Diagram C: Overview of MTSS Treatment Cohorts and Outcome Measures

	MTSS Treatment			*Outcome variables for each cohort are compared at Grade 7, Grade 9, and Grade 11.*		
FULL MTSS Cohort	Grade 1 (2006-2007)	*MTSS beginning at Grade 1 and continuing through subsequent grade levels*		Grade 7 (2012-2013)	Grade 9 (2014-2015)	Grade 11 (2016-2017)
Partial MTSS Cohort		Grade 3 (2006-2007)	*MTSS starting at Grade 3*	Grade 7 (2010-2011)	Grade 9 (2012-2013)	Grade 11 (2014-2015)
No MTSS Cohort	*No MTSS in elementary school*			Grade 7 (2006-2007)	Grade 9 (2008-2009)	Grade 11 (2010-2011)
Outcome Measures -				NWEA MAP & Course Enrollments	NWEA MAP & Course Enrollments	AP/IB Courses

Table 1 offers an overview of the size of each of the MTSS treatment cohorts over time. These are students who were enrolled in the designated elementary schools in grade 3 and remained enrolled in the school district in Grade 7, Grade 9, and Grade 11. Inspection of this table reveals that the cohorts are similar in size, with a minimum group size of 112 and a maximum of 150. The table also reveals that there is some attrition as students matriculate from Grade 7 to Grade 9 and to Grade 11. Between Grade 7 and Grade 11, the treatment cohorts lose between 16 and 29 students. The reduction in students within each treatment group was larger for the Partial and no MTSS cohorts than for the Full-MTSS group. Additional data is needed to determine if the reductions from grades 9 to 11 reflect a decrease in the dropout rate for the Full-MTSS group. That data is currently not available, but is forthcoming when the cohort graduates in spring of 2018.

Table 1: Count of Students in MTSS Treatment Cohorts

Treatment Group	Grade 7	Grade 9	Grade 11
FULL	128	123	112
Partial	150	136	121
None	150	135	122
Total	**428**	**394**	**355**

Table 2 contains descriptive characteristics for all students who participated in the MTSS treatment cohorts. Inspection of this table reveals that the student background characteristics of each group is similar with a few notable differences. At Grade 7, the Full and Partial treatment cohorts are more diverse compared to the group receiving no MTSS treatment. The percentages of students identified as White in the Full (74.2%) and Partial (76.7%) cohorts are about 10% less than the percent White for the cohort that did not receive MTSS treatment (85.3%). Similarly, the percent of students receiving free or reduced lunch support is notably smaller for the cohort receiving no MTSS, 15.3% compared to 20.7% for Partial-MTSS and 22.7% for Full-MTSS. At Grade 9, the Full and Partial treatment cohorts are also more diverse compared to the group that did not receive MTSS treatment with 74.2% and 76.7% White compared to 85.3%. However, the pattern changes at Grade 9 among students receiving free or reduced lunch support where the percent of students receiving Partial treatment (18.4%) is nearly the same as the percent of students who did not receive MTSS treatment (18.5%). The trend also changes for race/ethnicity at Grade 11 with the percent of students identified as White in the Full-MTSS treatment cohort at 75.9% and the no MTSS cohort at 77.9% and the percent of students receiving free and reduced lunch support at 13-14% for all three cohort cohorts. The fluctuations in the percentages for race and ethnicity are affected by the students moving out of the cohort to change both the numerator and denominator of the given percent. As noted in Table I, each cohort lost between 16 and 29 students from Grade 7 to Grade 11.

Table 2: Demographic Overview of the Treatment Cohorts

	Male	Black	Hispanic	White	ELL	Disabled	Gifted	Free / Reduced
Grade 7								
FULL	50.8%	6.3%	10.9%	74.2%	6.3%	17.2%	11.7%	22.7%
Partial	55.3%	4.0%	12.0%	76.7%	5.3%	14.7%	8.7%	20.7%
None	52.0%	3.3%	6.7%	85.3%	2.0%	16.7%	6.7%	15.3%
Grade 9								
FULL	47.2%	4.9%	10.6%	76.4%	5.7%	15.4%	10.6%	14.6%
Partial	54.4%	2.9%	11.0%	79.4%	5.1%	15.4%	7.4%	18.4%
None	50.4%	0.7%	5.9%	87.4%	1.5%	16.3%	6.7%	18.5%
Grade 11								
FULL	47.3%	5.4%	11.6%	75.9%	5.4%	15.2%	11.6%	13.4%
Partial	53.7%	2.5%	9.1%	81.8%	4.1%	14.9%	7.4%	14.0%
None	51.6%	0.8%	8.2%	77.9%	2.5%	14.8%	7.4%	13.1%

Table 3 contains descriptive characteristics of students from each treatment cohort receiving special education services for a disability. There is no notable difference in the number of students identified for special education among the three cohorts and the overall group size is relatively small. The majority of students entering grade seven with special education services are male. The percent of males in the group of students receiving special education services decreased from 72% in the no MTSS cohort to 63.6% in the Partial-MTSS group, and 59% in the Full-MTSS group. A visual comparison of Table 3 and Table 2 reveals students from lower socioeconomic status are disproportionately represented in the special education population. One example is Partial-MTSS group in grade 7 where students receiving lunch support comprised 45.5% of students with a disability while comprising only 20.7% of that population.

Table 3: Demographic Overview of the Treatment Cohorts – Students with Disabilities

	N	Male	Black	Hispanic	White	ELL	Free / Reduced
Grade 7							
FULL	22	59.1%	9.1%	13.6%	68.2%	4.5%	31.8%
Partial	22	63.6%	4.5%	18.2%	77.3%	13.6%	45.5%
None	25	72.0%	4.0%	8.0%	84.0%	8.0%	24.0%
Grade 9							
FULL	19	57.9%	10.5%	15.8%	68.4%	5.3%	26.3%
Partial	21	61.9%	4.8%	19.0%	76.2%	14.3%	42.9%
None	22	68.2%	0.0%	4.5%	90.9%	4.5%	31.8%
Grade 11							
FULL	17	58.8%	11.8%	17.6%	64.7%	5.9%	17.6%
Partial	18	61.1%	5.6%	11.1%	83.3%	11.1%	33.3%
None	18	77.8%	0.0%	11.1%	77.8%	11.1%	22.2%

Student Achievement

Cohort Performance on Assessments in Reading

Table 4 contains descriptive statistics for the outcome variable, the NWEA MAP RIT score, which is the standard score that students received after completing the NWEA MAP assessment in reading in August of their respective grade level year. RIT stands for Rasch Unit, which is a unit of measure that uses the difficulty values of individual test questions to estimate student achievement (NWEA). Providing context to the RIT score, a student earning a RIT score of 219 in the fall of Grade 7 is on track to score a 22 or higher on the ACT exam, if the student continues to progress at a similar rate (Thum & Matta 2015). A ninth-grade student earning a 227 RIT score is on track for a 22 or higher on the ACT exam. The standard of 22 on the ACT reading portion is considered the "benchmark score indicating student readiness for college-level coursework with a 50% chance of obtaining a B or higher and a 75% chance of obtaining a C or higher in the corresponding credit-bearing college courses" (ACT).

At Grade 7, students from the Full-MTSS treatment cohort have the highest mean RIT score (224.9) and the lowest standard deviation (11.1), and the students who did not receive treatment have the lowest mean RIT (220.9) and the highest standard deviation (13.1). All three treatment cohorts are above the 219 benchmark score, with the Full- and Partial-MTSS treatment cohorts scoring above the 223 RIT that is the benchmark score for indicating the student is on-track to score a 24 or higher on the reading section of the ACT. The scores in Grade 9 reflect the highest mean RIT score shifting to the cohort receiving no MTSS (230.9) with the cohort that received full MTSS in elementary school marking the lowest mean RIT (228.9). All three Grade 9 cohort cohorts remained above 227 RIT score for fall, the 227 RIT correlates with the college readiness benchmark of 22 on the reading portion of the ACT exam (Thum & Matta 2015). The RIT averages by grade level for reading and math are detailed in Table 4 and Table 6 respectively.

Table 4: Descriptive Student Outcomes – NWEA MAP Reading RIT (Standard Score) Averages

Treatment Group	Grade 7		Grade 9	
	Mean	**Std Dev**	**Mean**	**Std Dev**
FULL	224.9	11.1	228.9	13.0
Partial	223.5	12.3	230.7	11.6
None	220.9	13.1	230.9	13.8
Total	**223.0**	**12.4**	**230.2**	**12.8**

Table 5 contains the results of multiple regression analyses comparing each of the treatment cohorts at Grade 7 and at Grade 9. For each grade level, Model 1 examines the effects of each treatment group on NWEA MAP reading RIT scores without controlling for student background characteristics. Model II examines the effect including those background characteristics. The analysis indicates that at Grade 7 there is a relationship between receiving

the Full or Partial MTSS treatment and subsequent performance in reading, after controlling for student characteristics. The effect of the four point increase in the mean RIT score between the Full-MTSS cohort and the No-MTSS cohort is equivalent to approximately one year of growth by the national norms for NWEA. At grade seven, the typical expected growth for a student in one year is 4 RIT points. However, the data suggests that the Full or Partial MTSS treatment does not affect any differences in reading performance when the cohorts reach Grade 9. The analysis also reveals that students identified as Disabled and students receiving Free or Reduced lunch support have a negative effect on NWEA MAP reading scores at both Grade 7 and Grade 9. Students from these two groups score below the constant, an average RIT of 220.45.

Table 5: Multiple Regression Comparison of NWEA MAP Reading RIT Scores by MTSS Treatment Cohorts and their Demographic Characteristics

	Grade 7 (N = 422)		Grade 9 (N = 386)	
	MODEL I	**MODEL II**	**MODEL I**	**MODEL II**
FULL	4.02**	4.29**	-1.97	-2.18
Partial	2.64	2.85*	-0.19	-0.03
Male		-1.57		-1.23
Black		-0.80		-0.64
Hispanic		1.00		1.47
White		3.09		4.71
ELL		1.41		1.48
Disabled		-8.46***		-9.00***
Gifted		12.89***		13.01***
Free/Reduced		-6.53***		-5.28**
(Constant)	220.88***	220.45***	230.88***	228.71***
R^2	0.018	0.279	0.005	0.235

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Descriptive Student Outcomes – NWEA MAP Math RIT (Standard Score) Averages

Treatment Group	Grade 7		Grade 9	
	Mean	Std Dev	Mean	Std Dev
FULL	234.1	12.9	240.6	14.9
Partial	234.9	12.9	242.7	14.3
None	232.8	14.8	243.7	15.0
Total	**233.9**	**13.6**	**242.4**	**14.7**

Table 7 contains the results of multiple regression analyses comparing each of the treatment cohorts at Grade 7 and at Grade 9. For each grade level, Model 1 examines the effects of each treatment group on NWEA MAP mathematics RIT scores without controlling for student background characteristics. Model II examines the effect including those background characteristics. The analysis indicates that at Grade 7 there is no relationship between receiving the Full or Partial MTSS treatment and subsequent performance in mathematics for either model. The data continues to suggest the Full or Partial MTSS treatment does not affect any differences in mathematics performance when the cohorts reach Grade 9. The analysis also reveals that students identified as Disabled and students receiving Free or Reduced lunch support have a negative effect on NWEA MAP mathematics scores at both Grade 7 and Grade 9.

Table 7: Multiple Regression Comparison of NWEA MAP Math RIT Scores by MTSS Treatment Cohorts and their Demographic Characteristics

	Grade 7 (N = 425)		Grade 9 (N = 391)	
	MODEL I	MODEL II	MODEL I	MODEL II
FULL	1.34	1.59	-3.11	-3.69*
Partial	2.11	2.40	-1.00	-0.90
Male		0.68		2.78*
Black		-6.04		-2.03
Hispanic		-4.94		-3.86
White		-0.42		1.88

ELL		-4.34		0.54
Disabled		-9.89***		-11.42***
Gifted		17.03***		19.99***
Free/Reduced		-6.38***		-5.64**
(Constant)	232.76***	234.78***	243.71***	242.39***
R^2	0.004	0.346	0.008	0.331

* p < 0.05, ** p < 0.01, *** p< 0.001

Summary of Student Grade-Level Course Enrollments

Related to course enrollments, the data in Table 8 and Table 9 identifies a higher percent of students from the Full- and Partial-MTSS cohorts enrolled in grade-level English courses for grade 7. The grade level course enrollment for seventh grade is marked by enrollment in both English 7 and communications, while Advanced English 7 is the above grade level course. Students enrolled in English 7 and a reading course are defined as below grade level based on the identification criteria for the reading course. The Full-MTSS cohort marked 94.5% of students enrolled in grade level or above courses, while the Partial-MTSS cohort marked 88% of students enrolled in grade level or above English courses. Those percentages are compared to the 78.7% of the no MTSS cohort enrolled in grade level or above courses.

The data in grade 9 reflect a narrowing of the enrollment gap between cohorts with statistical significance for the Partial-MTSS cohort, controlling for student characteristics. The Partial-MTSS group included 94.9% enrolled in a grade level course or above, the Full-MTSS cohort marked 94.3% enrolled in a grade level course or above, and the No-MTSS cohort included 88.9% of students enrolled in a grade level course or above. The below grade level course enrollment was identified as enrollment in a Reading Expeditions course, in addition to the grade level English 9 course, essentially a double-block course enrollment to provide targeted

interventions to students performing below grade level on achievement measures including the NWEA Map. Comparing cohort matriculation from grade 7 to 9, the percent of students within the Full-MTSS cohort enrolled in an English course at grade level or above remained nearly the same with 94.5% of students in grade 7 and 94.3% of students in grade 9. The Partial and no MTSS cohorts mark improvement over the middle years with the percent of students in the Partial-MTSS cohort at or above grade level in English course enrollments moved from 88% of students in grade 7 to 94.9% in grade 9. The students that did not receive MTSS in elementary school moved from 78.7% of students enrolled in the grade level courses or above in grade 7 to 88.9% of students enrolled at grade level or above in grade 9.

Table 8: Descriptive Student Outcomes – Percent on/above Grade Level in English Courses

Treatment Group	Grade 7	Grade 9	Grade 11
FULL	94.5%	94.3%	97.3%
Partial	88.0%	94.9%	98.3%
None	78.7%	88.9%	96.7%
Total	**86.7%**	**92.6%**	**97.5%**

Table 9: Logistic Regression Comparison of Grade Level English Course by MTSS Treatment Cohorts and their Demographic Characteristics

	Grade 7 (N = 428)		Grade 9 (N = 365)		Grade 11 (N = 355)	
	MODEL I	MODEL II	MODEL I	MODEL II	Model I	Model II
FULL	1.54***	2.50***	0.73	1.01	0.21	0.25
Partial	0.69*	1.12**	0.83	1.14*	0.70	0.68
Male		0.11		-0.57		0.76
Black		-1.53		-0.74		0.85
Hispanic		-0.37		1.49		-18.31
White		0.83		1.14		-17.14
ELL		0.32		-0.50		18.48
Disabled		-2.57***		-1.27**		-1.20
Gifted		18.86		18.23		17.12
Free/Reduced		-0.92*		-1.32**		-0.72
(Constant)	1.30***	1.38	2.08***	1.98*	3.38***	20.52

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The data for math included in Table 10 and 11 reflects a meaningful difference for students in the Full- and Partial-MTSS cohorts in grade 7, yet those differences are not significantly recognized in grades 9 and 11 as the overall percent of students accessing a grade level mathematics course falls below 70%. The data reflect less tracking of students as they enter grade 7 with 89.3% of students in the Partial-MTSS cohort and 89.8% of the Full-MTSS cohort enrolling in pre-algebra or above. The Math 7 course is defined as below grade level for this study. Students in the No-MTSS cohort marked a 68% enrollment in pre-algebra or above in grade 7. Student math enrollments separate in high school to reflect a higher rate of tracking and more students in below-grade level courses. While nearly 90% of seventh grade students from the Full- and Partial-MTSS cohorts were enrolled in a grade level math course or higher, that number dropped to 69% for Partial-MTSS and 64.2% for Partial-MTSS cohort students in grade 9. The Partial-MTSS cohort remained relatively stable with 71% enrolled in a grade level math course or higher in grade 11 while the Full-MTSS cohort dropped to 60% enrolled in an on-grade level math course or higher. The trend for the No-MTSS cohort remained relatively consistent dropping to 60% in grade 9 and 63.1% in grade 11 for students enrolled in a grade level course or higher in mathematics. Overall, any positive effects of the MTSS treatment on mathematics course enrollments noted in grade 7 dissipated by grade 11as all student cohorts marked an overall decline in grade level enrollments for math courses.

Table 10: Descriptive Student Outcomes – Percent on/above Grade Level in Math Courses

Treatment Group	Grade 7	Grade 9	Grade 11
FULL	89.8%	64.2%	60.7%
Partial	89.3%	69.1%	71.1%
None	68.0%	60.7%	63.1%
Total	**82.0%**	**64.7%**	**65.1%**

Table 11: Logistic Regression Comparison of Grade Level Math Course by MTSS Treatment Cohorts and their Demographic Characteristics

	Grade 7 (N = 428)		Grade 9 (N = 394)		Grade 11 (N = 355)	
	MODEL I	**MODEL II**	**MODEL I**	**MODEL II**	**Model I**	**Model II**
FULL	1.43***	2.22***	0.15	0.13	-0.10	-0.19
Partial	1.37***	2.00***	0.37	0.49	0.36	0.43
Male		0.22		0.19		0.17
Black		-1.25		-0.27		0.06
Hispanic		-1.04		-0.63		-0.93
White		0.17		0.45		0.34
ELL		0.45		0.31		1.64
Disabled		-2.59***		-1.50***		-2.01***
Gifted		19.09		20.38		20.43
Free/Reduced		-0.90*		-1.19***		-1.14**
(Constant)	0.75***	1.16	0.44*	0.36	0.54**	0.59

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Advance Placement (AP) and International Baccalaureate (IB) courses are course enrollment indicators reflecting the potential effect of MTSS on the equality of educational opportunity. Advanced Placement and International Baccalaureate courses allow students to potentially earn college credit and engage in college level coursework while in high school. The data in Table 12 and Table 13 indicate more students from the Full or Partial MTSS cohorts accessed AP or IB courses in grade eleven. Approximately 60% of students in Full or Partial MTSS cohorts enrolled in an AP or IB course and only 43.4% of students with No-MTSS enrolled in an AP or IB course. During the span of this study, the percent of AP and IB enrollments increased while the percent of students from lower SES also increased. However, the demographic overview of the AP/IB course enrollments in Table 14 reflects a continued underrepresentation of students from diverse backgrounds and lower socioeconomic status in these college level courses. While a larger percentage of students receiving MTSS treatment enrolled in advanced coursework, the group remained predominantly white and affluent.

Table 12: Descriptive Student Outcomes – Percent in One or More AP/IB Course**

Treatment Group	Grade 11
FULL	59.8%
Partial	62.8%
None	43.4%
Total	**55.2%**

** AP/IB courses include any core area (English, Math, Science, or Social Studies). Most of these courses also provide students with an opportunity to earn dual college credit through a local partner institution.

Table 13: Logistic Regression Comparison of AP and IB Course Enrollments by MTSS Treatment Cohorts and their Demographic Characteristics

	Grade 11 (N = 355)	
	Model I	**Model II**
FULL	0.66*	0.78*
Partial	0.79**	1.04***
Male		-0.64*
Black		-0.07
Hispanic		-1.82
White		0.20
ELL		1.10
Disabled		-1.46***
Gifted		21.36
Free/Reduced		-0.86*
(Constant)	-0.26	0.04

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 14: Demographic Overview of the Treatment Cohorts –Students in AP/IB Courses

	N	Male	Black	Hispanic	White	ELL	Disabled	Gifted	Free / Reduced
Grade 11									
FULL	67	46.3%	4.5%	3.0%	85.1%	6.0%	9.0%	19.4%	7.5%
Partial	76	48.7%	1.3%	6.6%	85.5%	1.3%	3.9%	11.8%	9.2%
None	53	41.5%	0.0%	3.8%	79.2%	3.8%	5.7%	17.0%	7.5%

Table 15: Summary Analysis of All Outcomes

Outcome Variable	Grade 7	Grade 9	Grade 11
NWEA MAP Reading	Full & Partial cohorts increase scores	No significant effects by treatment cohort	
NWEA MAP Math	No significant effects by treatment cohort	Full cohort reduces scores (weak p-value)	
English Course – On Grade Level	Full and Partial cohorts more likely to be on/above grade	Partial cohort more likely to be on/above grade	No significant effects by treatment cohort
Math Course – On Grade Level	Full and Partial cohorts more likely to be on/above grade	No significant effects by treatment cohort	No significant effects by treatment cohort
Enrolled in AP/IB Course(s)			Full and Partial cohorts more likely to be in one or more AP/IB course

In summary, the data indicates students from the Full- and Partial-MTSS cohorts are more likely to be in on-grade level courses. With regard to student achievement, the effects realized for students entering grade 7 from the Full-MTSS and Partial-MTSS cohorts are not sustained. By grade 9, there is no difference in achievement in either reading or mathematics for students receiving Full- or Partial-MTSS. Students from the Full- and Partial-MTSS cohorts are more likely to be enrolled in an AP or IB course than their peers in the No-MTSS cohort.

CHAPTER 5

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Overview

The conclusion to this study is divided into three sections. The results section reframes the purpose of the study and discusses the outcomes related to the research questions. For this study, the student achievement data reflected by the scores from the NWEA MAP provides the strongest indicator of any meaningful effect of MTSS. The criteria for course enrollments are subjective and vary over time and across schools while the achievement data remains a consistent indicator. The implications section discusses the findings within the theoretical framework of prior literature. The final section outlines areas for future research and study.

Conclusions

This study sought to determine whether the implementation of MTSS in one suburban school district had an effect on equality of educational opportunity. For the purposes of this study, equality of educational opportunity was defined by student access to coursework at grade level or above, student achievement defined by a normative measure, and enrollment in accelerated or college level coursework. The study also proposed to determine whether MTSS reduced the over identification of students qualifying for special education services, one of the initial factors prompting the district's implementation of MTSS.

The study examined three cohorts over a span of eleven years. The data tracked course enrollments and achievement on a norm referenced assessment to identify any effects of Full-MTSS treatment for the cohort entering first grade in 2006, Partial-MTSS treatment for the cohort entering grade 3 in 2006, and No-MTSS treatment for the cohort entering grade 7 in 2006.

Since MTSS focused on providing all students access to the core curriculum with early, targeted interventions to move students above a minimum threshold of achievement, this structure had the potential to reduce ability grouping, which served as a common form of tracking within elementary schools (D. Fuchs & Fuchs, 2006; Oakes et al., 1997). This study determined that the use of MTSS was associated with less tracking at the middle level for reading in both achievement and course enrollments and for mathematics at the middle level in course enrollments.

A review of the longitudinal data within this study describes a significant difference for students entering grade 7 in both improved access to grade-level courses and higher achievement in reading for students in the Partial- and Full-MTSS cohorts as compared to their peers in the cohort receiving No-MTSS. The differences noted in grade 7 were no longer significant by grade 9 as there are fewer students enrolled in below grade-level courses for English language arts for all three cohorts. Even if MTSS had some small effect, the effect did not persist. One effect persisted to grade 11, the percent of students enrolled in an Advanced Placement or International Baccalaureate course remained higher for students in the Full- and Partial-MTSS cohorts as compared to students in the No-MTSS cohort. However, the students participating in AP and IB coursework remained disproportionately white and from more affluent backgrounds. The subsequent discussion examines each of the research questions individually in reference to the longitudinal data and reviews the overall effect on equality of educational opportunity for students in the cohorts.

The data indicates fewer below grade level enrollments for the MTSS cohorts in grade 7 for both English language arts and mathematics. Fewer enrollments in below grade level courses indicates less tracking. The results are statistically significant for both models, the one

controlling for student characteristics and the one that does not control for those factors. The percent of students needing an additional reading course for support was significantly reduced for students entering grade 7 after receiving MTSS in elementary.

The data in grade 9 reflect a narrowing of the enrollment gap in English language arts between cohorts. One potential explanation for these results is described by the model of support provided in middle school. The middle school model providing English 7 core instruction to all students and an intensive intervention through enrollment in an additional reading course maintains similarities to the types of support offered by MTSS in the elementary years. The Partial and No MTSS cohorts gained access to an intervention previously not available to students or available for only part of their elementary school years. The additional support for all students below grade level, provided by the reading intervention may explain the percent of students enrolled in an English course below grade level by grade 9.

The enrollment gap narrows again for student course enrollments in English at grade 11 with all three cohorts reporting percentages for grade level enrollments in the high nineties. These results are influenced by the interventions all students received in middle school and freshmen year of high school. Another factor influencing the high percentages of students in grade level courses is the context of grade 11 course enrollments. The school district does not offer any additional courses for intervention or support after grade 9, so a student enrolled in English 9 or English 10 as an eleventh grade student is considered to be enrolled in a course that is below grade level. Students enrolled in English 11, English 11AP, or English 11 IB are considered to be enrolled at or above grade level. The high percent of students enrolled in these courses is perhaps influenced by the students reclassified for a second ninth or tenth grade year, or students dropping out of high school. The students that struggle to attain grade level

proficiency are at a higher risk of dropping out or repeating grade levels and once those students are removed from the grade 11 cohort data, the data becomes more homogeneous. At the time of this study, the drop-out rates are not available for the Full-MTSS cohort given their graduation date is spring of 2018 and those calculations are verified and reported in the fall of 2018. When the data becomes available, one question to explore would be to determine whether the drop-out rates were lower for the Full-MTSS cohort as compared to the Partial- and No-MTSS cohorts.

While the data indicates less tracking for students entering grade 7 mathematics courses from the Full- and Partial-MTSS cohorts, the effect is reduced considerably during grades seven and eight and not sustained. One primary reason the effect is not realized in grade 9 mathematics enrollments is due to the notable reduction in the percent of students from Full- and Partial-MTSS cohorts now accessing grade level curriculum. By comparison, students in the MTSS cohorts retained their access to grade level curriculum in English throughout middle and high school, the students from MTSS cohorts did not retain their access to grade level curriculum for mathematics through the middle level. The data does not provide one clear indicator to explain the twenty to thirty percent reduction of students accessing grade level courses from grade 7 to grade 9. One possible explanation may include the lack of clearly defined MTSS protocols for mathematics in the elementary schools. The schools in this study were early adopters of MTSS and initial focus was on reading progress and interventions. As the larger conversation changed from ability grouping to a broader focus on access to the core curriculum, students may have been referred to a mathematics course at or above grade level in larger numbers to provide access to that core curriculum. Those numbers were unsustainable with the structure of mathematics courses at the middle level. While the achievement scores for mathematics on the MAP showed there was no difference between the cohorts in grade 7, the enrollments in grade level math

courses reflect a noticeably higher percentage for students in the Full- and Partial-MTSS cohorts. The data indicates the structure of the middle level mathematics courses were unable to sustain those high percentages of students in grade level courses, so the tracking effect reappears by grade 9 and remains through grade 11. Additional qualitative data examining the structure and delivery of mathematics instruction in the middle level is needed to fully explain the sharp drop in students accessing the grade level curriculum.

The data for mathematics course enrollments does indicate the continuation of tracking for the No-MTSS cohort consistently from grade 7 through grade 11. While the data for students accessing grade level courses in English improved for this group of students throughout middle and high school, that was not the trend in math course enrollments. The No-MTSS cohort entered grade 7 with fewer students accessing grade level courses in math and those percentages remained relatively fixed through successive grades. One potential explanation for this difference between the math and English model at the middle level centers on access to the core curriculum while receiving additional time for an intervention. Students entering below grade in English from the No-MTSS cohort had access to English 7 and an additional class period for the reading course intervention, a model that is consistent with the approach of MTSS. Students receiving mathematics interventions were enrolled in a course that is below grade level and covers fewer concepts than the grade level mathematics course. Students were enrolled in two class periods of mathematics and spent a greater amount of time accessing fewer mathematics concepts. Access to a grade level, core curriculum is a key element of MTSS and was an area lacking for the middle school mathematics model.

Overall, students from the Full- and Partial-MTSS cohorts entered middle school with less tracking and by the end of middle school, tracking was evident. Student access to grade

level mathematics courses was diminished for students among all three cohorts by grade 9. Any difference noted in access to grade level mathematics courses for students entering grade 7 from the Full- and Partial-MTSS cohorts were diminished by grade 9 and not sustained. In effect, MTSS did not serve to improve the equality of educational opportunity for these cohorts of students throughout high school level mathematics.

The achievement data indicates MTSS had a significant effect in reading as students from the Full- and Partial-MTSS cohorts had higher average scores for reading when entering seventh grade. The effect for the Full-MTSS cohort was equivalent to one full year's expected growth. The effect in reading reflected in the grade 7 MAP appears closely attributed to the implementation of MTSS for reading as the grade 7 MAP for mathematics did not reflect a significantly higher average for the MTSS cohorts as compared to the No-MTSS cohort. While the effects dissipated over the middle level years, the achievement data for students entering grade 9 in math and reading reflects all three cohorts performed above the college readiness benchmark and the variation between cohorts was not remarkable. The achievement data remained largely similar between cohorts while the access to grade level curriculum increased notably. This trend introduces another consideration in the interpretation of the data, the potential change in mindset and dialogue that accompanies implementation of MTSS.

The final research question to determine the effect of MTSS on the number of students receiving special education support for a disability yielded no definitive results. The specific student group of black and African-American males, previously over-identified for special education support, was a group recognized for improvement by this school district. However, this study had insufficient numbers of students within that group to determine any meaningful conclusions. The group of students identified as black for this study totaled approximately

twenty students and thus further dividing that group to students receiving special education services for a disability did not yield adequate numbers for a conclusion. Future studies may examine the district-wide, longitudinal data for all elementary schools to determine any potential effect MTSS may have on special education identification.

The overall percent of students receiving special education support among the three cohorts was relatively consistent with nearly identical percentages of students receiving support in grade 11. Males comprised the majority of students with a disability, but their representation was more proportionate for the Full-MTSS group as compared to the No-MTSS group. The group of students from lower socioeconomic backgrounds remained disproportionality represented in special education. There are several possible explanations for these results and additional research is needed to identify specific factors. Many students are identified for special education services during early childhood education, prior to receiving supports through MTSS. The Full- and Partial-MTSS cohorts represent the early years of the MTSS adoption within the school district. Examining the data of future cohorts may provide additional insight as fidelity of implementation improved.

One branch of special education services marked a notable increase, the number of students receiving special education services for gifted education. Students from the Full-MTSS cohort posted a noticeably larger percent of student receiving gifted education services than the No-MTSS cohort. The tiered system of supports allows for interventions at the higher level and the lower level when determining adequate interventions for those students that have already mastered the concepts as well as those that have not. The district's referral process for gifted education shifted during the MTSS adoption, removing the use of one specific IQ or Achievement assessment to identify students. The identification process was reliant on the tiers

of support and the additional interventions high achieving students received. The school team identified students for gifted education based on an individual student's response to the intervention of more challenging content work. If students continue to master the more challenging work, the team may decide the student needs special education services for his or her exceptionality. The referrals for gifted services became more process driven and no longer involved data from IQ exams. A student's MAP scores were one factor within this process, but not the sole criteria for determination.

Implications

The data presented in this longitudinal study indicate progress towards students attaining a minimum level of access to grade level courses and achievement, yet those gains were not sustained. Students entering grade 7 from Full- or Partial-MTSS cohorts were more likely to enroll in on grade level or above grade level courses, for both mathematics and English language arts, and to earn a higher average RIT score to mark their reading performance. The trends also reflect findings from prior research as MTSS did not mitigate the risk factor and effects of family socio-economic status. Within all models, a lower socioeconomic status, defined by students receiving free or reduce lunch support, and students with a disability persistently had a meaningfully negative impact on the outcome variables of course access and achievement.

Though MTSS did not entirely mitigate for socioeconomic status and disability status, the data may indicate progress in the percent of students clearing a minimum threshold for access to grade level courses in English through grade 11. For the aggregate cohorts of Full- and Partial-MTSS attaining access to grade level courses for students entering middle school, improved reading performance, and access to college level coursework in grade eleven. The percent of students qualifying for lunch support increased from across the span of this study from 2006-

2017, with the No-MTSS cohort posting the lowest and the Full-MTSS group posting the highest percent of students qualifying for lunch assistance. While a lower socioeconomic status retains a negative effect on achievement indicators, over the time period within this study, the Full-MTSS group comprised of the highest percent of students with a lower socioeconomic status also posted the highest achievement data. The Full-MTSS group realized the highest average RIT score as compared to the No-MTSS group and the highest percent, 94.5, of students enrolling in on grade level or above grade level courses entering middle school as compared to the No-MTSS group with 78.7%. Overall, a large percent of the two hundred and seventy-eight students entering grade 7 from Full- or Partial-MTSS cohorts realized a benefit, students were progressing toward a more equitable educational opportunity. Attaining nearly ninety-five percent of students accessing grade level courses with nearly twenty-three percent of the population defined as lower socioeconomic status, it appears adoption of MTSS may provide a more equitable educational opportunity than when the school district did not implement MTSS. To clarify, more equitable educational opportunity as evidenced by clearing the bar to attain a minimum threshold of enrollment in grade level coursework.

The progress continues through grade eleven for the aggregate of students in Full- or Partial-MTSS cohorts enrolled in Advanced Placement (AP) or International Baccalaureate (IB) courses at higher rates than their peers in No-MTSS cohort. Enrollment in these courses indicates engagement in college level coursework in high school. The increased participation in these courses may reflect a district-wide shift to a more open enrollment process for AP and IB courses based on student interest rather than the previous system of recommendations and contracts. However, the demographic characteristics of the group of students enrolling in AP and IB courses remained relatively flat with a persistent underrepresentation of students from

lower socioeconomic backgrounds participating in these courses. Implementation of MTSS did not result in greater access to college level coursework for students from lower socioeconomic backgrounds.

The MTSS treatment may have some institutional inertia to achieve an effect on the overall equality of educational opportunity as more students are attaining a minimum course enrollment for mathematics and English and achievement standard for reading in grade 7. The equality is also reflected by increased number of students gaining access to AP and IB courses. While the statistical significance of the effect of the MTSS treatment is reduced in grades 9 and 11 for English language arts, the reduction is largely attributed to the increase in the percent of students from the No-MTSS group accessing grade level courses. Given those trends, the increased enrollments in AP and IB courses in grade 11 represent the only area in which the MTSS treatment remains statistically significant. This effect may be attributed to a change in the larger conversation of student access sparked by the implementation of MTSS. As noted in the prior review of literature, MTSS reframes educational practices from a reliance on ability grouping to a model providing all students access to the core curriculum with additional intervention time targeting deficits in reading skills (D. Fuchs & Fuchs, 2006). The district-wide conversation began to shift to an approach of open enrollment to access AP and IB courses by student interest and choice. The shift in the approach to open enrollment may explain the increases in access to AP and IB enrollments while achievement indicators such as the average RIT score for reading remained relatively consistent between all three cohorts in grade 9.

All three cohorts marked an average RIT score that correlates to college readiness and a projected score of 22 on the reading portion of the ACT exam. The No-MTSS cohort posted the highest average RIT score in grade 9, yet the No-MTSS cohort had fewer students enrolled in AP

and IB courses. The increase in access reflects a shift in educational practices from a fixed mindset centered on ability grouping and limited access to grade level courses or above to a growth mindset centered on early interventions to move students above a certain level of achievement and access to grade level curriculum. As more students access grade level course and above, more students are prepared to enroll in college level coursework in grade 11. Gathering additional data to determine if a higher percent of students from the Full- and Partial-MTSS treatment cohorts enrolled in advanced coursework in grade 7 and honors coursework in grade 9 may serve to strengthen this rationale for increased AP and IB enrollments.

The results of this study support the conclusion there appears to be less tracking with both the Full and Partial implementation of MTSS as students entered grade seven. Sorting students within the No-MTSS cohort into the familiar ability cohorts of the bluebirds or robins resulted in a large percent of students falling below grade level for seventh grade coursework, retaining over twenty-one percent of students in lower tracks for English language arts and thirty-two percent for mathematics. The trend persisted through grade eleven with a high of thirty-seven percent of students from the No-MTSS cohort enrolled in courses considered below grade level for mathematics. In contrast, the percent of students from the Full- and Partial-MTSS cohorts marked only approximately five percent and twelve percent of students falling below grade level for seventh grade English language arts coursework and approximately ten percent for mathematics. Given MTSS is designed primarily for early interventions for reading, the effects on mathematics may be two-fold: stronger reading skills supporting the development of stronger mathematics skills and the change in dialogue and mindset from ability grouping and limited access to MTSS with inclusive instructional practices. While opening the dialogue is a positive first step, the data indicate a potential need to expand MTSS to include formal supports

for mathematics in the middle level. Any gains in access to grade level mathematics courses for students entering grade 7 dissipate by grade 11 with students in the Full-MTSS cohort model representing the lowest percent of enrollments in grade level mathematics courses at 60%. Once the supports and instructional practices utilized within elementary school are removed, the data note the effect is removed.

While the cohorts are fairly homogenous for reading by grade 11, with all treatment cohorts marking over ninety-six percent of students enrolled at or above grade level in reading courses, additional data is recommended as the numbers do not include students dropping out of high school. Since four years of English language arts is required within this school district, the vast majority of students attaining the credits necessary to be classified as grade 11 are enrolled in English 11. Students not making adequate progress in the English course sequence, failing English 9, are at a higher risk of dropping out. This at-risk population is either no longer enrolled or fails to attain the necessary credits are therefore are not included in the group of eleventh graders in the study.

The results of this study indicate there may be less tracking in this school district after the implementation of MTSS, though the effects may not persist. These results appear to align with the research regarding tracking. The data support how the district may have navigated the potential political and technical barriers while minimizing tracking as students enter middle school. The district marked a strong increase to nearly ninety-five percent of students from the Full-MTSS cohort accessing grade level curriculum or above when entering seventh grade, the vast majority of student cleared the minimum threshold established to mark improved equality in educational opportunity.

The district recognized improved equality while also realizing a potentially greater stratification of achievement marked by an increase in the percent of students receiving services for gifted education. Within the No-MTSS cohort, approximately seven percent of students qualified for an Individual Education Plan for gifted education services. The percent rose to nearly twelve of students qualifying for gifted education in the Full-MTSS cohort. Currently, The Office of Civil Rights estimates six percent of students nationwide are in gifted education (National Association for Gifted Children). Similarly, the percent of students accessing AP and IB courses rose for the Full- and Partial-MTSS cohorts. While the district attained marked improvement in the percent of students accessing AP and IB courses, the enrollments remained largely disproportionate for students from lower socioeconomic status. The percent of students identified for gifted education also remained largely disproportionate for students from lower socioeconomic status. Although MTSS provided a structure to improve grade level access, this system did not mitigate stratification and continued to promote privileges to cohorts with the highest social capital. Thus, the MTSS treatment successfully avoided the potential political barrier to less tracking as the supports moved students over a minimum threshold of access while retaining and/or increasing the stratification of learning opportunities at the upper levels.

The data appear to support a potentially successful implementation of a new technical approach to instruction. The data indicate a significantly higher percent of students accessing grade level curriculum or above in seventh grade and a significantly higher average RIT score to mark reading achievement. While students in the Full-MTSS cohort entered first grade at a variety of learning levels, by the close of the elementary school years, the vast majority had attained a minimum threshold of achievement within the structures of support and access to core curriculum provided by the MTSS model. This is in contrast to prior practices of ability

grouping utilized in the model with no MTSS. While students were still grouped for interventions within MTSS, the core curriculum was accessible to all students. The No-MTSS practices of ability grouping provided limited access to the core curriculum for some students. That limited access is reflected by a significantly higher percent of students enrolled in courses below grade level for mathematics and English language arts when entering seventh grade from the No-MTSS cohort. While the data in this study do not indicate the teachers successfully navigated the technical aspects of the transition to MTSS, the data do indicate any technical challenges encountered were not significant enough to present a barrier to de-tracking. The research presented by Jeannie Oakes articulates the political and technical barriers to de-tracking schools (Oakes, 1992; Oakes et al., 1997). While MTSS may present some political and technical challenges by expanding student access to educational opportunities and shifting instructional practices for educators, the data from this study indicate MTSS has the potential to withstand those challenges and prevent them from becoming barriers to significantly reducing and potentially eliminating tracking.

Recommendations

The implementation of MTSS in the elementary years appears to have improved the equality of educational opportunity for students entering grade 7, though the effects did not persist through the middle level once supports were removed. Within this study, the no-MTSS cohort recognized increased access to grade level coursework from grade 7 to 9 in English language arts as the middle level model provided both access to core curriculum and targeted reading interventions. Though no formal MTSS existed at the middle level for English language arts, the middle schools had adopted key tenets of MTSS with a double block model for students

identified as achieving below grade level in reading. This group of students were typically enrolled in both English 7 and a reading workshop course or English 8 and reading workshop. Student access to grade level coursework in mathematics declined for all three cohorts during middle school as the middle level model included a system of ability grouping. Students identified as below grade level were enrolled in courses that covered fewer grade level standards. Over time, this may have resulted in a more limited access to core content resulting in thirty to forty percent of students below grade level for mathematics by junior year as compared with about three percent in English language arts. One recommendation is to expand the formal implementation of MTSS to the secondary level for both English language arts and mathematics at the middle and high school levels. Increased access to a core curriculum for all students with targeted and monitored interventions for many students may serve to decrease tracking and improve access to grade level coursework for students at the secondary level.

Since MTSS, or RTI, has been adopted across all fifty states, another recommendation includes replicating similar longitudinal studies across other school systems that have already moved to a tiered system of supports in RTI or MTSS. If repeated studies yield similar results, then a stronger conclusion may be drawn. Those conclusions may inform policy and practice at the district level to adopt a system of supports to ensure greater access to educational opportunities. Perhaps answering the call from researchers like Jeannie Oakes to de-track schools and provide access for all students to the American dream.

Future Research

The longitudinal data collected in the study may be replicated by other longitudinal studies of the late adopter cohorts within this school district. This study included two hundred and seventy-eight students receiving the Full or Partial MTSS treatment within five elementary

schools. Expanding the study to include the elementary schools adopting MTSS in the following years would serve to expand the data set and draw potentially stronger conclusions regarding the effects of MTSS on equality of educational opportunity. Replicating the study with other cohorts of elementary schools may also serve to determine if the outcomes are similar to the ones within this study.

In future years, the students within the Full-MTSS cohort will have graduated. Additional studies may include graduation rates and dropout rates as indicators of equality of educational opportunity. Additional studies may examine the dropout rates to determine if there is a difference in the dropout rate for the Full- and Partial-MTSS cohorts as compared to the No-MTSS cohort.

Another potential area of study may include a longitudinal comparison of students receiving Full-MTSS support from demographically similar elementary schools to determine any differences to accessing grade level coursework and achievement between the schools. This type of study may inform about any potential effect the school level implementation of MTSS may have on equality of educational opportunity for students. Did some elementary schools realize greater access and achievement than others? Did those schools have a greater fidelity to implementation of MTSS? Were any schools able to mitigate the effects of socioeconomic status in student access to grade level coursework, college level coursework, and achievement?

The results from this study indicate MTSS has a potential effect on access to grade level course enrollments for students entering grade 7 in English and mathematics. The sustainability of the effects of MTSS is questionable and further research would serve to clarify the persistence of any of these effects.

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