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The Role of Teachers in Ability-Tracked Mathematics Classrooms

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Abstract

Tracking, or ability grouping, is a salient feature of the American education system. As opposed to most studies on tracking which investigate student achievement and student experiences, this study investigates the role of teachers in a tracked curriculum. The goals of this study are to discover how teachers feel about tracking and to understand how teachers operate their classrooms with respect to the different ability groups. I conducted observations of tracked middle and high school mathematics classrooms and directed interviews with the teachers of these tracked classes. I found that teachers alter their language, classroom pace, quality of review, and individualized attention for each ability group and that, with the exception of pace, teachers are unaware of the alterations they make between tracks. I also found that teachers view students in the higher tracks as innately smarter than their peers in lower tracks. There are several implications of this study including the suffering of the middle-level student as a consequence of teachers' practices and preconceived notions of intelligence.

Introduction

Tracking is the process of placing students in different classrooms according to academic ability. Throughout the United States, students are tracked into different classrooms in a variety of subjects with highly-tracked subjects including mathematics and reading. Since the mid-1970's, there has been academic debate over the advantages and disadvantages of tracking and whether or not it has a place in schools. Scholars debate whether tracking is advantageous or detrimental to a student's academic and personal growth, yet the general public does not seem to be aware about this discourse. Tracking is simply seen as something schools "just do," and people often see tracking as necessary in the allowance of academic growth of all students. Yet regardless of whether its effects are positive or negative, it is unanimous that tracking does have an effect on students.

For my project I will be focusing on the teacher's role in the tracking system. I will be looking to see how teachers alter their teaching methods between the lower and higher tracks and I will also be investigating how teachers understand the alterations they make. I will be aiming to answer the question: *How do mathematics teachers' views on tracking inform how they operate their classrooms with respect to the different ability groups they teach?*

Most scholarship on tracking focuses on the student aspect of tracking such as student achievement, self-confidence, who is tracked, and students' experiences (Gamoran, et al., 1995; Murphy & Hallinger, 1989; Gamoran & Mare, 1989; Mulkey, et al., 2005; Oakes, 1985). However, scholars have largely under-investigated the teacher aspect of tracking. Anyone who has gone through the educational system can testify that teachers play a major role in a student's educational experience and encourage a student's growth and development. By investigating teachers' practices in tracked classrooms, we can further understand the advantages and disadvantages of the tracking system. A greater understanding of how teachers alter their teaching styles from one track to the next will allow us to better view the link between the classroom and students' positive and negative experiences in tracking, and will therefore allow us to improve upon the system as a whole. The case of the mathematics classroom is also significant. According to the National Assessment of Educational Progress, since 1990 roughly 75% of eighth-grade students in the United Stated are tracked in mathematics (Loveless, 17). This percentage is much higher than any other subject. The next highest-tracked subject is English language arts which in 2003 tracked only 43% of its eighth-grade students nationwide (Loveless, 17). Therefore the investigation of mathematics teachers in tracked classrooms is a case which is significant nationwide.

I argue that teachers alter their teaching style in the different tracks they teach. Teachers change their teaching styles in several ways such as quality of review, level of individual attention, and pace. Teachers generally give a higher quality of review, give a higher level of individualized attention, and move at a slower pace for the lower-track classrooms than the higher-track classrooms. Additionally, teachers alter their language by portraying the material as overly "difficult" to the lower tracks, and overstatedly "easy" to the higher tracks. Teachers

acknowledge that they alter their teaching methods between tracks but, with the exception of change of pace, they are unaware of exactly how. Teachers are unaware that their amount of individual attention and review time changes and are unaware that they alter their language. Also, teachers believe that the students in the higher tracks are innately smarter than the students in the lower tracks which can lead to problems for middle-level students.

Literature Review

Linking teachers and tracking has been an under investigated topic in recent scholarship, yet teachers and tracking have each been highly examined as separate topics. Since the mid-1970's tracking has been a highly debated issue in the educational realm. In the 1980's, the educational world saw an influx in studies conducted on tracking and since then there has not been much addition to the scholarship. The majority of the scholarship on tracking focuses on student aspects of tracking such as achievement, who is tracked, and overall experience. The investigation of teachers also has focused on students, with particular attention paid to how teachers affect student achievement. Collectively these topics provide a background for my study on the connection between teachers' practices and tracking.

Within the highly-examined field of tracking, the topic which is most highly investigated is student achievement. Studies have shown that tracking can directly affect student achievement by either improving or diminishing a student's academic performance (Gamoran, et al., 1995; Murphy & Hallinger, 1989; Gamoran & Mare, 1989; Mulkey, et al., 2005). However, the extent to which student achievement is affected by tracking is not agreed upon throughout these studies. In 1995, Gamoran et al. found that the track a student is placed into has a slight but significant effect on a student's achievement. However, in 2005 Mulkey, et al. found that although tracking

has persistent instructional benefits for students in all tracks, students in high tracks in middle school become at risk for depressed achievement in subsequent years. Although it is not understood exactly how student achievement is affected by tracking, much scholarship supports that there is a connection between the two concepts.

Track placement is one aspect of the tracking system which has been investigated. In her 1985 book *Keeping Track: How Schools Structure Inequality*, Jeannie Oakes discusses her discovery of how poor and minority students are disproportionately placed into low tracks. Of the six schools she studied which had an average of a 50% white student population, Oakes found that only 29% of the students in the low-track English classes were white (Oakes, 66). In 1995, Gamoran et al. (1995) supported Oakes's findings and he and his colleagues found that although 20% of his sample consisted of minority students, only half of that proportion was found in honors classes at the schools he examined. He also found that in one particular school, 26% of the students in honors classes were minority students, 52% of the students in regular classes were minority students, and 65% of the students in the remedial classes were minority students thus demonstrating that the lower the track the higher the percentage of minority students. This separation of race and socioeconomic status can further exacerbate the achievement gap between white and minority students and between high and low socioeconomic status students.

Gamoran et al. (1995) and Oakes (1985) both also found that higher tracks dedicate more time to instruction than lower tracks and that students in higher tracks learn about more advanced topics and engage in more critical thinking than students in lower tracks. Each of these aspects can significantly contribute to a student's overall educational growth and expansion of knowledge. As poor and minority students are disproportionately placed in low tracks, this lack

of exposure to certain kinds of knowledge and lack of critical thinking can further widen the achievement gap.

Conversely, certain studies have been conducted which show the positive effects of detracked mathematics classrooms (Boaler, 2006; Horn, 2006). After conducting a case study in an urban, ethnically diverse school in 2006, Jo Boaler found that as a result of student collaboration (due to range in ability) in detracked math classrooms, students gained respect, responsibility, and high achievement. Horn (2006) found that schools with detracked mathematics departments had commonalities in curricula focused on important mathematical concepts, a focus on creating connections and finding meaning in the material, and other related concepts which are designed to help students create a deeper understanding of the material. This focus on a deeper understanding of the material would have significant benefits to students in their achievement and critical thinking skills.

Whether a classroom is tracked or detracked, teachers play an intimate role in the classroom experience. Rockoff (2004) conducted a study investigating the connection between teachers and student achievement. After observation and analysis Rockoff found that an increase in teacher quality, determined by a number of factors including experience and training, increases students' test scores in reading and math. He also found that teaching experience significantly raises students' test scores.

In my study I investigate how teachers' views on tracking inform how they operate their classrooms with respect to the different tracks they teach. Boaler (1997) found that a teacher's preconceived notions of intelligence in the highest track can be detrimental to student achievement. During his study he noticed that once teachers identified a student as a high track student, students were held to a set of unrealistic expectations as to what they could handle

academically. Students to whom he spoke expressed that the fast pace was simply too much to handle and that they could not keep up. Due to teachers' idea that students in the top tracks are much smarter than all other students, students did not receive the necessary instruction needed for their success.

In summary, scholars have devoted space to the study of tracking but most studies focus on student achievement and the student experience. Most scholarship has indicated that tracking is a negative element of the American education system and some more recent scholarship has pointed out the positive effects of detracked mathematics departments. Scholars have also noted that teachers play an integral role in student achievement and the student experience inside the classroom. For my study I will attempt to create a connection between teachers' views on tracking and their instructional techniques between tracks.

Methods

In order to conduct my research, I observed tracked mathematics classrooms and conducted interviews with mathematics teachers. For my observations I observed four mathematics classrooms from both middle and high school levels. I attended about four class sessions per classroom for a total of roughly twenty hours of observation. As my study focuses on tracking, per classroom I typically observed two class sessions of a higher track of math and two class sessions of a lower track. This was to ensure that I was observing a true pattern of the teachers' methods and not an anomaly. While observing I was searching for the alterations teachers make to their teaching styles between tracks. For example, I looked for what teacher X does in a higher track that he or she does not do in a lower track.

I conducted interviews with the teachers I observed. This constituted four teachers with roughly twenty minutes of interview time per teacher. I waited until after my observations were complete to conduct the interviews. While conducting the interviews, I used a list of questions I prepared, however I did probe and also ask teachers for more information on certain things I noticed while observing their classrooms. The interviews were audio recorded and later transcribed. In order to preserve confidentiality, all interviews were de-identified. After interviews were complete, I compared what teachers said about their teaching styles with what I observed in the classroom in order to see how the teachers' perceptions of their actions related to their actual teaching practices. The interviews also allowed me to understand teachers' views on tracking which allowed me to understand how their views on tracking inform their teaching methods in regards to the different tracks they teach. The combination of observations and interviews allowed me to see the full picture of how mathematics teachers relate to tracking in their subject area.

Context

I conducted my research at City School which is a school located in the northeast region of the United States and includes both a middle school and a high school. According to City School's strategic school profile, City School's student body is 45.0% Hispanic, 22.4% black, and 26.9% white with the other 5.7% being of other races or of more than one race. 5.7% of its students are not fluent in English as compared to the state's average of 3.4%. Also, 30.1% of the school's students come from homes where English is not the primary language. Reflecting the relatively low socioeconomic status of the student population as a whole, 56.9% of the school's students are eligible for free or reduced lunch. Although this number is less than the percentage

of students in the school district who are eligible (71.0%), it is higher than the percent of students statewide who are eligible (30.0%). City School also has 1.8% of its students identified as gifted and 12.3% of its students identified as having disabilities. On state-wide tests in the 2011-2012 school year, 65.4% of City School's sixth-grade, 59.7% of City School's seventh-grade, and 61.3% of City School's eighth-grade students met the state's goal in mathematics (Strategic School Profile 2011-12). These test scores reflect City School's relatively average academic achievement.

City School tracks its mathematics classes beginning in the sixth grade. Once a student is placed in to a track at City School, it is difficult to change tracks. Students who do not do well enough in a certain track will possibly move down a track in the following year. However it is difficult to move up a track due to the extra material higher tracks receive. The tracking in middle school is not limited to one high track and one low track. At City School the mathematics department has levels, which means A block is the highest track, B track is slightly lower than A, C is slightly lower than B, and so on. For my research I consider blocks A and B to be the higher tracks and blocks C, D, and E to be the lower tracks as these blocks are very similar in curriculum.

Analysis and interpretation of data

Throughout my observations I found that mathematics teachers did alter their teaching practices between tracks. The main ways in which they changed their teaching techniques were through quality of review, level of individualized attention, pace, and the language they used.

Quality of Review

From higher to lower tracks teachers modified the quality of review they had in class, such as when they were reviewing homework or classwork. I found that in the lower tracks teachers reviewed the solutions to the problems much more often than they did for higher tracks. In the lower tracks they made a pointed effort to go over most or all problems, regardless of whether or not a student had asked to review it. Teachers also did a problem multiple times if a student did not understand the problem or if the teacher got the sense that the students did not fully comprehend the solution. The thoroughness of the review ensured that every student in the room had their questions answered and finished the review with at least a basic understanding of how to do the problems.

The style of questioning during review was much different in the higher tracks. During review periods in the higher tracks, teachers rarely demonstrated solutions on the board or even explained the solutions orally. In the higher-track classes, teachers tended to say the answer to the problem, and then move on. The teachers offered little to no explanation to the students as to how he or she had arrived at the solutions. In Mrs. Vance's sixth grade classroom, she did one activity for review which showcases this review method. After students had completed their classwork worksheet, Mrs. Vance sat on a stool in the front of the class, called out names of students randomly, and then shouted three consecutive .question numbers for that student to answer. If the student answered the questions correctly, Mrs. Vance moved onto the next three questions. This left no room for explanation of how the student had arrived at his or her answers. Therefore any student who did not get the same answers was never told what he or she did incorrectly or how he could have arrived at the correct answer. If a student said the wrong answer when asked, Mrs. Vance would say, "nope," and then immediately ask someone else for the answer. Again this left no room for review and the student who answered incorrectly never

learned how to do the question correctly. This kind of review with the higher-track students was common throughout the four classrooms I observed. The higher tracks are receiving a poorer quality of review time as the students in these tracks are rarely told how to do the problems or what they could have done better.

This difference in review quality from the low tracks to the high tracks was evident. Students in the lower tracks received a better quality of review time as they were given full explanations of how to find the solutions to the problems. Teachers in these tracks also gave more attention to the students' misunderstandings in these tracks as they went over problems multiple times if students seemed to be having trouble. Yet in the higher tracks students received a poorer quality of review time as they were seldom given explanations as to how to find solutions to the problems or even asked if they had issues with a question. This difference in quality of review time assures that most students in the lower tracks understand the material, while it leaves students behind in the higher tracks.

Level of Individualized Attention

In addition to altering their quality of review, math teachers alter the level of individualized attention they give to their students in different tracks. Throughout my observations it was evident that the students in lower tracks received more individualized attention that students in higher tracks. While doing in-class assignments in lower-track classrooms, teachers walked around the room and helped students. They looked over students' shoulders to make sure they were doing their work correctly. Sometimes they helped them work through problems, answered questions, or told a student when he/she had done a problem incorrectly. This was helpful for students who either did not know they were doing things

incorrectly or were too shy to ask for help. The one-on-one attention helps ensure that the students have a strong understanding of the material.

However, in the higher tracks, teachers did not follow this same protocol. Instead of walking around the room helping students, teachers frequently sat and waited for the students to complete the assigned work. In one instance in Mrs. Vance's classroom, after Mrs. Vance distributed a worksheet to her students she sat in the front of the classroom and waited for them to be finished. She also never mentioned to students that they could ask her if they needed help. This was in stark contrast to when she handed out a worksheet to her lower track classes as for her lower track classes she walked around the room and helped students. In another situation in Mr. Hudson's higher track classroom, Mr. Hudson assigned work and then sat behind his desk. He told the students, "I'm not comin' to you. If you have questions you can come up here to me." This again was in contrast to when he assigned work to his lower track classes in which he walked around the room helping students with the assignment. The lack of individual attention can be detrimental to students in the higher tracks. Teachers are not ensuring that their higher track students fully understand the material. This lack of individualized attention can also lead to teachers not catching certain mistakes that students are making. Also, if teachers are walking around the room offering their assistance, students are more-likely to ask questions. However, because the teachers remain stationary while students are working and are not offering their assistance outright, students are less-likely to ask questions and therefore less-likely to understand the material if he or she is having difficulties.

The lack of individual attention in conjunction with a lower quality in review time can be detrimental to the students in the higher track classes. This combination could lead to a compounded misunderstanding of the material as students are not having their issues with the

material addressed at most points in the class sessions. Teachers in these higher tracks are not noticing the issues students are having with the work, and then during review students do not have the opportunity to fix those issues. This could mean that students who do not understand the material could go an entire class session, or multiple class sessions, not comprehending the material and the teacher would not notice.

Change of Pace

An expected alteration in how teachers operate their classrooms differently between tracks is pace. Teachers in the lower track classrooms move their classes along at a slower pace than they do in their higher track classrooms. In my interview with Mrs. Vance, she explained that, "…my A block is the highest, they do a completely different curriculum at a different pace. They are done with 6th grade curriculum by December. By Christmas they'll be done with 6th grade." Clearly from this we know that higher tracks move at a much quicker pace through material. But in order to accommodate this change of pace, teachers have to alter how quickly the class moves through material and how quickly the class must operate. Students have less time to do classwork and they move from task to task more quickly than they do in the lower tracks. As a result, students are expected to grasp the material more quickly than students in lower tracks. Because the lower track classrooms move at a slower pace students have a longer period of time to digest the material and ensure that they have a full comprehension of the material.

Language Usage

The last, but arguably most intriguing, difference in how teachers operate their classrooms with respect to the tracks they teach is in their language usage. In both tracks teachers exaggerated the level of difficulty of the material, but they did so in very different ways. In the lower tracks teachers exaggerated the difficulty of the material whereas in the higher tracks teachers oversimplified the difficulty of the material. In the lower tracks, teachers tended to make the material sound more difficult than it really was. In Mr. Martinez's lower track classrooms he played up the difficulty of the material frequently. In one instance, he put a problem on the board which he expressed was difficult. But next he put a problem of equal difficulty on the board, but simply added a negative sign. However upon adding the negative sign he expressed to the class how much more difficult this problem was. He then explained how much harder things would get once he added another step to the problem. These were clearly exaggerated comments which inflated the difficulty of the topic. Mrs. Vance used similar language with her lower-track classroom. She frequently said things such as, "I know these numbers are huge!" when discussing finding factors of eight, and "I know this is really hard" when discussing simplifying fractions. Yet in the higher tracks, teachers tend to overstate the simplicity of the material and make it seem easier than it actually is. In Mr. Martinez's higher track class, when discussing a topic that is advanced for this grade level, he made comments such as, "All you have to do is____!" and "I thought this was just a gift for [name of class] students."

This exaggeration of the difficulty of the material can have either positive or negative effects on the students. For certain students in the lower tracks who are told that the material is more difficult than it is, this could be positive. For students who find the material to be difficult, the reinforcement that the material is truly difficult could be comforting and could make the students feel better about not fully understanding the material. However, this could also make

students feel that they are in over their heads. Students could be getting a preconceived notion that this material is difficult and may then be "freaked out" by the difficulty. The negative association of difficulty with the material could hinder the students from doing as well as they could. This could also lead to a lack of effort on the students' part if they feel that it is hopeless for them to even try because the material is "so difficult".

On the other hand, the oversimplification of the material for the higher track students could also have positive or negative effects on the students. For students who believe the material is difficult, hearing that the material is easy could calm their nerves and could make them see that the material may not be as difficult as they had imagined. However for students who believe the material is difficult and are then told how easy it is, they could feel unintelligent. This could lead to a loss of self-confidence and could also lead a student to feel too embarrassed to ask questions in fear that his or her teacher will feel he or she is unintelligent. On the other hand, for students who feel that due to their teacher's comments that the material must be easy, students may not work as hard on the material. This could lead to a student's underperformance. Therefore in both the higher and the lower tracks, the exaggeration of the difficulty of the material could have both positive and negative effects on the students.

Teacher Awareness of Instructional Practices

Upon conducting the interviews with the teachers I observed, I found that teachers are aware that they change their teaching methods from track to track. However the only change of which they are aware is pace. They are unaware that between tracks they change their quality of review, level of individual attention, and language usage. In regards to pace, teachers mentioned this as the main difference in their teaching style between tracks. All four teachers mentioned

going at a slower pace in their lower track classrooms than in their higher track classrooms. Mr. Hudson explained that, "For all classes you have to figure out how fast or how slow you can go. And the challenge for me for [my lowest-tracked class] is understanding that my students need to go at a certain pace. And being able to make sure that they all have it before we move on." Other teachers explained the necessity to go at a quicker pace for the higher tracks. Mrs. Palmer said in regards to her higher track class, "So it's a little more rigorous, a little bit more challenging, it's also a little bit more faster pace for an honors class," and, "Not necessarily that there's more material but you just go at it at a quicker pace." Teachers are therefore aware that they change pace between tracks whether it be speeding up their class or slowing it down. However this was the only change they noticed in themselves from one track to another. Despite probing during the interviews, teachers did not express that they changed their quality of review, level of individual attention, or language usage.

Preconceived Ideas of Intelligence

During the interviews I also found that teachers believe that students in higher tracks are innately more intelligent. Teachers described the students in their higher tracks as, "innately smart," "geniuses," and "brilliant." As I described earlier, at City School A block is a higher track than B block and B block is a slightly higher track than C block, and so on. Teachers expressed that the level of intelligence corresponds to the block level. One teacher while discussing her B block class expressed,

> My B block is the easiest to teach. Those are the kids who are the good students, they're smart, they get it, they're just not innately smart like my A block kids. A block is a mixture of kids who are smart and good students and a group of children who are just smart.

Here she is saying that students in the highest track are the smartest students in the grade she teaches and that the subsequent blocks are not as smart. However teachers never said that students in the lower tracks were unintelligent. They expressed that they needed to "hold their hands" a bit more than they do for other students, and one teacher said that his lower track was composed of the "lowest-functioning kids" in the grade, but they did not describe the students as unintelligent.

Implications

The implications of this study are that the middle-level students suffer the most as a result of teachers' alteration of practices from track to track and that teachers' lack of awareness leads to their unchanged actions. In the higher tracks, teachers give a lower quality of review time, give a lower level of individualized attention, go at a faster pace, and oversimplify material to their students as compared to the lower tracks. Middle-level students, or students who are in the higher tracks but are not necessarily the most outstanding learners are suffering from this model. These middle students who may have a difficult time with the material are not given a high quality of review time. They are not given the chance to ask questions, are not being told how to improve upon their work, and are not given the adequate amount of reinforcement with examples or explanation pf material. Teachers are offering little chance for these middle students to improve their academics while inside the classroom.

The lack of individualized attention also hurts the middle-level student. Without individualized attention, teachers fail to identify issues students are having with the work. If a middle-level student is struggling with his or her work but no teacher is walking around the room to provide help or feedback, this student could not receive the help he or she needs. This could

allow the student's problems with the material to compound if such issues are not identified by the teacher. This again allows the middle student to leave class without having improved his or her academics while inside the classroom.

The oversimplified language teachers use in their higher tracks can also be detrimental to the middle students' learning. Teachers in the higher tracks express the low level of difficulty of the material, calling the material "easy" or "simple." However, students who are struggling and do not find the material to be easy or simple can consequently lose self-confidence by feeling that they must not be as intelligent as their classmates if they are struggling with such simple material. This also de-incentivizes these middle students to ask for help in fear that their teacher may believe that they are unintelligent. A student's fear of asking for help can compound the earlier issues these students are having due to a low quality of review time and a lack of individualized attention. Therefore the alterations teachers make from track to track can have detrimental effects on middle-level students.

Similar to Boaler's (1997) findings, teachers' perceptions of intelligence in the higher tracks also have negative consequences for the middle students. Teachers perceive students in the higher tracks to be innately smart. This perception makes teachers unaware of the struggling middle student. Their assumption that all students in the higher tracks as innately smart leads them to overlook students in the class who may be struggling as they have assumed that all members of the class are easily catching on to the material due to their high level of intelligence. In this situation again, the middle-level student is forgotten and their needs are not met. Naturally, as a result of quizzes and tests, teachers do know which students are struggling. However, their inflated assumption of innate intelligence prohibits teachers from making the

appropriate accommodations needed to identify these struggles early enough. Again, it is the middle-level student who suffers the most.

However, as I found, teachers are unaware of the alterations they make in their teaching practices from one track to the next and they are also unaware of the consequences of their assumption of innate intelligence of the students in the higher tracks. Teachers' lack of awareness can only lead to unchanged action. As teachers do not know about the adjustments they make between tracks, teachers cannot fix them. Therefore a teacher's lack of awareness only leads him or her to continue with the same practices as they are currently using which means that the middle students will continue to struggle. It is only in their awareness that teachers will ever be able to cater to the needs of these middle-level students.

Limitations and Suggestions for Further Research

The limitations of my research are related to time constraints. I would have liked a larger sample size and I would have preferred more hours of observation. This could have allowed for further investigation of patterns of teaching modifications between tracks. However due to time constraints this was a manageable sample size and number of observation hours.

In regards to further research on this topic, there are multiple options for expansion of this study. A suggestion for further research would be an expansion of the sample size and the number of observation hours as to further investigate patterns in teacher behavior. Additionally, an investigation of teachers from high school compared to teachers from middle school would provide allow us to understand if the level of schooling effects teachers' practices. Finally I suggest that this research be conducted in different tracked subjects such as English Language Arts, or at the high school level, subjects such as science and history which are tracked by

honors, college preparatory, and sometimes Advanced Placement. This would allow us to see whether teachers make these alterations in quality of review, level of individualized attention, pace, and language in all subject areas and not only mathematics. It is important that this research be continued and expanded in order to eventually meet the needs of the struggling middle student.

Conclusion

Throughout my research I discovered that mathematics teachers alter their teaching methods from track to track, specifically changing aspects of their practices such as quality of review, level of individualized attention, pace, and language used. Lower tracks receive a higher quality of review time, receive a higher level of individualized attention, and move through the material at a slower pace than higher tracks. Also, teachers in the lower tracks use language which portrays the material as more difficult than it truly is while in the higher tracks teachers use language which portrays the material as simpler than it truly is. During my interviews I discovered, with the exception of change of pace, teachers are unaware of the alterations to their teaching methods that they make between tracks. Upon asking interview questions and high amounts of probing, teachers never expressed that they changed their quality of review, level of individualized attention, or language from the high tracks to the low tracks. I also found that teachers perceive students in their higher tracks as innately smart as was shown through the comments they made during the interviews. This perception leads teachers to make the adjustments to their teaching methods that I observed. Teachers' perception of the high-track students as innately smart informs their decision to have a low quality of review time, a low level

of individualized attention, and a quick pace as they feel that the students' intelligence compensates for such actions.

As a result of these practices, the students who suffer the most are the middle-level students. These students who are in the higher tracks but are not the best students are struggling with the material yet are not receiving sufficient accommodations to eradicate their struggles. The low quality of review and low level of individualized attention allows these students to leave class without having been helped much at all. The message that they receive as a result of the language which portrays the material as simple can result in these middle students to not want to ask for help in fear of being perceived as unintelligent. This allows for these students to not have their needs met outside of class in addition to not having their needs met inside of class. Therefore the middle level students remain in a state of struggle with the material, quite possibly until it is too late.

My study is both consistent and inconsistent with previous research on the topic. My study was very consistent with Boaler's (1997) research which found that teachers' preconceived notions of intelligence resulted in teachers moving at a much quicker pace than students could necessarily handle. However, in regards to Oakes (1985) and Gamoran et al. (1995) I discovered that my research uncovered something dissimilar to what they had found. Oakes (1985) and Gamoran et al. (1995) found that higher tracks spend more time on instruction than lower tracks. Yet in my research I found that teachers in the lower tracks had a better quality of review time. These lower-track teachers went over more examples and gave more explanation of the material to the students in the lower tracks than they did in the higher tracks. As a result of these inconsistencies with past research, I call for further investigation of this topic. By investigating

this topic more we can be more informed about how to improve the tracking system overall and provide adequate support for the middle student.

References

Boaler, J. (1997). When even the winners are losers: evaluating the experiences of "top set" students. *Journal of Curriculum Studies*, *29*(2), 165–182.

Boaler, J. (2006). "Opening our Ideas": How a detracked mathematics approach promoted respect, responsibility, and high achievement. *Theory into Practice*, *45*(1), 40–46.

Gamoran, A., & Mare, R. D. (1989). Secondary School Tracking and Educational Inequality: Compensation, Reinforcement, or Neutrality? *American Journal of Sociology*, *94*(5), 1146–1183.

Gamoran, A., Nystrand, M., Berends, M., & LePore, P. C. (1995). An Organizational Analysis of the Effects of Ability Grouping. *American Educational Research Journal*, *32*(4), 687–715.

Horn, I. S. (2006). Lessons Learned From Detracked Mathematics Departments. *Theory into Practice*, *45*(1), 72–81.

Loveless, T. (2013, March). The 2013 Brown Center Report on American Education: How Well Are Students Learning? Brown Center on Educational Policy at Brookings.

Mulkey, L. M., Catsambis, S., Steelman, L. C., & Crain, R. L. (2005). The long-term effects of ability grouping in mathematics: A national investigation. *Social Psychology of Education*, *8*(2), 137–177.

Murphy, J., & Hallinger, P. (1989). Equity as access to learning: Curricular and instructional treatment differences. *Journal of Curriculum Studies, 19*, 341-360.

Oakes, J. (1985). *Keeping Track: How Schools Structure Inequality* (Second.). New Haven: Yale University Press.

Rockoff, J. E. (2004). The Impact of Individual Teachers on Student Achievement: Evidence from Panel Data. *The American Economic Review*, *94*(2), 247–252.

Strategic School Profile 2011-12, Middle and Junior High School Edition. (2011, 2012). X School District.

Appendix A: Interview Questions

1. How did you decide to become a teacher and what was the process of getting into teaching like?
2. What is your favorite thing about your job as a teacher?

3. How would you describe your teaching style? How did you develop it?
4. What classes do you currently teach?
5. Do you have a favorite class to teach? Why is it your favorite?
6. How would your students describe you as a teacher?
7. Do you think students in different classes would describe you differently?
8. Can you explain more to me the differences in teaching the different kinds of math?
9. How do you handle some of the challenges of teaching kids different kinds of math?