

**THE EFFECT OF TEACHER MINDSET ON LOW-TRACKED STUDENTS**

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# **THE EFFECT OF TEACHER MINDSET ON LOW TRACKED STUDENTS**

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It is found that students in low tracked classes do not achieve as much academic growth as those placed in high tracked levels. Although educational psychologists have extensively studied the effect of “teacher expectations” on achievement, more recently, the concept of Mindset has been introduced. Teachers who are unaware of the advances in neuroscience regarding malleability of intelligence often believe students’ intelligence is fixed, and they view struggles as failures instead of struggling as a critical part of learning. To explore this problem, a study of instruction in low tracked classrooms was conducted.

A regional sample of teachers (n=36) participated in the initial survey. The survey has its roots from Carol Dweck’s *Mindset Assessment Profile Tool* (Dweck, 2006) as well as consultation from experts in the field. Findings indicate that 76% of the teachers score in the growth mindset range. The study included observations of twelve classes to determine the rigor of classroom activities based upon Webb’s Depth of Knowledge and interviews with six teachers who teach low tracked students regarding lesson planning, assessment creation, and instruction in low tracked classrooms. According to the literature and the information found in this study, although many schools are touting the idea of detracking, tracking is still thriving in America’s schools. Expectations that lower track students are unlikely to achieve academically could

potentially set these students up for failure from the start. Supporters of this viewpoint argue that teachers generally hold limiting expectations for students in lower educational tracks (Wheelock, 1992). This study aimed to look at teachers with differing mindset scores and their approach to and perception of teaching students in low academic tracks. While survey responses indicated that study respondents generally adopt a growth mindset, observational data reveal some growth mindset techniques such as student-centered learning are used infrequently.

## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2.0</b>	<b>REVIEW OF LITERATURE.....</b>	<b>4</b>
<b>2.1</b>	<b>TRACKING IN EDUCATION .....</b>	<b>4</b>
	<b>2.1.1 Conceptual Framework .....</b>	<b>6</b>
	<b>2.1.2 Theories of Tracking .....</b>	<b>7</b>
	<b>2.1.3 Current Practices in Tracking.....</b>	<b>10</b>
<b>2.2</b>	<b>TEACHER’S PERCEPTIONS OF TRACKED STUDENTS.....</b>	<b>16</b>
	<b>2.2.1 Teachers’ Perceptions of Tracking: Functional or Beneficial.....</b>	<b>18</b>
	<b>2.2.2 Teachers’ Perceptions of Student Academic Achievement in Low and High Tracked Classes .....</b>	<b>19</b>
	<b>2.2.3 Teachers’ Perceptions of Student Behavior in Low and High Tracked... Classes .....</b>	<b>22</b>
	<b>2.2.4 Teachers’ Future-Expectations of Students in Varying Tracks.....</b>	<b>23</b>
	<b>2.2.5 Formation of Teacher Expectations.....</b>	<b>25</b>
<b>2.3</b>	<b>MINDSET AND LEARNING .....</b>	<b>26</b>
	<b>2.3.1 Educator’s Mindsets.....</b>	<b>29</b>
<b>2.4</b>	<b>RESEARCH QUESTIONS.....</b>	<b>35</b>
<b>3.0</b>	<b>RESEARCH METHODOLOGY .....</b>	<b>38</b>

<b>3.1</b>	<b>INTRODUCTION .....</b>	<b>38</b>
<b>3.2</b>	<b>DATA COLLECTION AND ANALYSIS .....</b>	<b>41</b>
<b>3.2.1</b>	<b>Participants .....</b>	<b>41</b>
<b>3.2.2</b>	<b>Survey .....</b>	<b>41</b>
<b>3.2.3</b>	<b>Independent Variables: Mindset Variables .....</b>	<b>42</b>
<b>3.2.4</b>	<b>Independent Variables: Tracking Variables.....</b>	<b>44</b>
<b>3.2.5</b>	<b>Observations.....</b>	<b>44</b>
<b>3.2.6</b>	<b>Interviews .....</b>	<b>46</b>
<b>4.0</b>	<b>FINDINGS .....</b>	<b>49</b>
<b>4.1</b>	<b>TEACHER REPORTS OF TRACKING POLICIES .....</b>	<b>49</b>
<b>4.2</b>	<b>MINDSET SURVEY .....</b>	<b>51</b>
<b>4.3</b>	<b>OBSERVATIONS.....</b>	<b>53</b>
<b>4.4</b>	<b>INTERVIEW FINDINGS.....</b>	<b>56</b>
<b>4.4.1</b>	<b>Differences in Instruction and Environment .....</b>	<b>56</b>
<b>4.4.2</b>	<b>Student Behavior, Work Habits, and Interest in Learning .....</b>	<b>59</b>
<b>4.4.3</b>	<b>Differential Teacher Expectations .....</b>	<b>60</b>
<b>5.0</b>	<b>DISCUSSION AND CONCLUSION .....</b>	<b>62</b>
<b>5.1</b>	<b>SUMMARY .....</b>	<b>62</b>
<b>5.2</b>	<b>TRACKING .....</b>	<b>63</b>
	<b>SELF-REPORTED MINDSET SCORE.....</b>	<b>65</b>
<b>5.3</b>	<b>.....</b>	<b>65</b>
	<b>THEORIES OF INTELLIGENCE AND TEACHER INSTRUCTION.....</b>	<b>67</b>
<b>5.4</b>	<b>.....</b>	<b>67</b>

<b>5.5</b>	<b>LIMITATIONS.....</b>	<b>68</b>
	<b>IMPLICATIONS FOR RESEARCH AND FUTURE PRACTICE.....</b>	<b>69</b>
<b>5.6</b> .....		<b>69</b>
	<b>CONCLUSION.....</b>	<b>71</b>
<b>5.7</b> .....		<b>71</b>
<b>APPENDIX A</b> .....		<b>73</b>
<b>APPENDIX B</b> .....		<b>78</b>
<b>APPENDIX C</b> .....		<b>79</b>
<b>APPENDIX D</b> .....		<b>81</b>
<b>APPENDIX E</b> .....		<b>82</b>
<b>APPENDIX F</b> .....		<b>83</b>
<b>BIBLIOGRAPHY</b> .....		<b>84</b>

## LIST OF TABLES

Table 1: Tracking in 8th Grade (Percent of Students) .....	15
Table 2: Research Matrix .....	40
Table 3: Webb's Depth of Knowledge: Activities Sorted by Rigor .....	46
Table 4: Survey Questions Regarding Tracking Procedures .....	49
Table 5: Mindset Survey .....	52
Table 6: Observation Data Summary .....	54

## **DEDICATION**

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## 1.0 INTRODUCTION

Throughout the history of American education and reform, one thing has remained constant: the “select and sort” method of tracking students by achievement. Students are placed in certain classes of varying academic level based upon a variety of variables: test scores, teacher evaluations, previous academic performance, parental and, even, student choice. In one school, a student may be tracked in a high or low academic level for all classes, while other schools allow students to be discrepantly tracked. In this style of tracking, students may take a high-level English class and a lower level math class. While it is possible for students to move between levels, when students are tracked into a low-level class as high school freshmen, it is rare that they exit from that level. On average, low-track students experience less achievement growth than high-track students (Gamoran 1989). While there are many possible explanations for such lower achievement, teacher expectations—including perceptions, and attitudes—for and about low-track students may influence the quality of instruction in low-track classrooms (Brophy, 1985; Kelly & Carbonaro, 2012; Worthy, 2010; Harris, 2012; VanHoutte et al., 2013; Caughlan & Kelly, 2004; Rattan et al., 2012).

Much of the research pertaining to teacher expectation and student performance supports the assertion that teachers do form expectations, and they treat students differently based on those expectations. Prior achievement, test scores, anecdotal information from other teachers, current grades, socio-economic status, ethnicity, or appearance can drive these expectations. In

Kelly and Carbonaro's (2012) study concerning curriculum tracking and teacher expectations, specifically related to students who are discrepantly tracked, they focus on students with discrepant track placements to determine how different teachers evaluate the same student. In their analysis of the nationally representative NELS data, Kelly and Carbonaro find that: "Track placements affect teacher expectations above and beyond student achievement and other characteristics" (p. 289).

While educational psychologists have extensively studied the effect of "teacher expectations" on achievement, more recently, the concept of mindset has been introduced. Can understanding the difference between fixed and growth mindsets affect the education of students? In Carol Dweck's book *Mindset: The New Psychology of Success* (2006), she states, "In a fixed mindset, people believe their basic qualities, like their intelligence or talent are simply fixed traits. They spend their time documenting their intelligence or talent instead of developing them. They also believe that talent alone creates success – without effort." She goes on to argue, "They're wrong" (p. 62). Furthermore, Dweck explains, "In a growth mindset, people believe that their most basic abilities can be developed through dedication and hard work – brains and talent are just the starting point. This view creates a love of learning and resilience that is essential for great accomplishment" (p. 63).

In her book, she dedicates numerous pages to how teachers might be instilling a growth mindset in students; however, it is necessary to review research with a focus on growth mindset and its application to teachers as well as students. When a teacher does not believe that intelligence is malleable it can be detrimental to the learning of students. When students are tracked, teachers with fixed mindsets may believe that a student in a lower level course will never be able to fully understand Algebra II instead of understanding that it may take the student

longer to fully achieve proficiency. In this case, teachers may teach a watered down version of the curriculum or they may even coddle the lower level students instead of fully preparing them. In addition, teachers with fixed mindsets do not give students an opportunity to learn from failure, nor do they teach students how to learn from failure. While this is disadvantageous to student learning on a number of levels, in the era of high stakes testing, at a time when students are expected to pass state standardized tests in order to graduate, teacher mindset could harmfully affect graduation rates.

## **2.0 REVIEW OF LITERATURE**

### **2.1 TRACKING IN EDUCATION**

Throughout the history of American education and reform, one thing has remained constant: the “select and sort” method of tracking students according to achievement. Students are placed in certain classes of varying academic level based upon a variety of variables: test scores, teacher evaluations, previous academic performance, parental and, even, student choice. In one school, a student may be assigned to a high or low academic level for all of his classes, while other schools allow students to be discrepantly tracked. In this style of tracking, students may take a high level English class and a lower level math class. While it is possible for students to move between levels, when students are tracked into a low level class as high school freshmen, it is rare that they exit from that level. On average, low-track students experience less achievement growth than high-track students (Gamoran 1989). While there are many possible explanations for such lower achievement, teacher expectations—including perceptions, and attitudes—for and about low-track students may influence the quality of instruction in low-track classrooms (Brophy, 1985; Kelly & Carbonaro, 2012; Worthy, 2010; Harris, 2012; VanHoutte et al., 2013; Caughlan & Kelly, 2004; Rattan et al., 2012).

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those expectations. These expectations can be derived from prior achievement, test scores, anecdotal information from other teachers, current grades, socio-economic status, ethnicity or appearance. In Kelly and Carbonaro's (2012) study concerning curriculum tracking and teacher expectations, specifically related to students who are discrepantly tracked, they focus on students with discrepant track placements to determine how different teachers evaluate the same student. In their analysis of the nationally representative NELS data, Kelly and Carbonaro find that: "Track placements affect teacher expectations above and beyond student achievement and other characteristics" (p. 289).

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### **2.1.1 Conceptual Framework**

In order to determine how schools group students in the present era of education, one must first designate a definition of tracking and determine the difference between tracking and ability grouping. Tracking takes place between academic classes, primarily occurring in high schools and middle schools, while ability grouping is the grouping of students within classes and is primarily found at the elementary level. The present tradition of tracking groups students for individual classes; students are not assigned a specific track for all course work. While that practice was commonplace in the 1960s and 1970s, it is now rare in the United States. Most European and Asian school systems practice “streaming” which is akin to the early form of tracking in the United states, where students take placement exams, and based on the scores, are sorted into separate schools (Loveless, 2013).

In tracked academic subjects, students study a different curriculum that is subject-specific. They may receive instruction from different teachers, for example. Advanced tenth

graders may attend an “honors English” class, while other students may attend “English 10;” tracking is decided on a subject-by-subject basis (Loveless, 2013). For the purpose of this literature review, tracking will be viewed as separating students by ability within the same high school on a subject-by-subject basis.

### **2.1.2 Theories of Tracking**

The research on tracking is extensive. While it seems that most of the literature denies the benefits of tracking there are a variety of researchers who support the practice. An early analysis of tracking supported by Turney (1931) suggested that tracking can facilitate instruction by individualizing it while empowering educators to modify teaching techniques according to class level and eliminating the probability that advanced students will experience boredom. He goes on to note that tracking will “encourage slower students to participate since they will not be overshadowed by more capable peers” (Ansalone, 2010, p.3). The efficiency perspective describes tracking as a means of increasing societal efficiency by contributing to the proper selection and channeling of national human resources. This perspective links the education system to the labor market, and focuses on improved cognitive achievement, which it notes as a significant and valuable contribution of tracking (Mosteller et al., 1996).

The self- development perspective views tracking as a pedagogical device that assists overall learning and improves student self-concept. This perspective aligns itself with early research revealing evidence that a positive self-concept will result when low achieving students are grouped homogenously (VanFossen et al., 1987). This is derived from Festinger’s classical social comparison theory (1954) explaining an individual’s need to have accurate appraisals of their abilities, arguing that to form these appraisals, people compare themselves with others

holding similar abilities. Festinger hypothesized a unidirectional drive upward with regard to the evaluation of these abilities (Suls & Wheeler, 2000). Several researchers have continued to study this theory.

Mac Iver (1987) found pupils' performance level in class determined the extent to which pupils relied on social comparison information as a basis for self-evaluation. In looking at 1,570 fifth and sixth graders, he noted that students who performed well in math in comparison to their classmates were more likely to decide they were good at math. Furthermore, Huguet et al. (2001) found a similar beneficial effect of upward comparisons on course grades, and Mulkey et al. (2005) showed that ability grouping, where students then compared themselves with similar performing students, had positive instructional benefits. The authors found that tracking in 8<sup>th</sup> grade was positively associated with 12<sup>th</sup> grade test scores, suggesting, in conjunction with the other studies, that when students compare themselves with others who perform similarly, it may inspire them to improve themselves (Blanton et al., 1999). However, this also could depend on the tracking type. In a study examining how different types of tracking shape students' mathematics self-concept, Chmielewski et al. (2013) found that students in course-by-course tracking, high track students had higher mathematics self-concepts and low-track students had lower mathematics self-concepts. For students in between-school and within-school streaming the pattern is reversed suggesting that reference groups to which students compare themselves differ according to the type of tracking utilized.

Those studies that support tracking argue that students differ in both their academic goals and their learning environments, and schools should compensate for that. Despite the intended benefits of tracking, it has been criticized because students in high tracks tend to widen their achievement advantages over the students in low tracks. Gamoran (2009) notes that tracking

exacerbates inequality with little or no contribution to overall productivity, and this occurs because gains for high achievers are offset by losses for low achievers (p.4). In looking at students assigned to high, middle, low, and mixed ability classes within different types of schools, there are no overall benefits to average achievement in contexts that levels instruction as compared with classes that work with mixed-ability; however, sorting students into selective schools and classes is associated with increasing gaps between high and low achievers (Kerckhoff, 1993). Because of uneven quality of instruction attached to non-college tracks, some students may learn less or be less likely to realize their goals when assigned to a low, or non-college, tracking level (Gamoran & Mare, 1989). In fact, Gamoran (2009) identifies three elements that would need to change to make low-track classes more effective: 1. The assessments should be tied to futures that are more meaningful to students. He notes that the current standardized multiple-choice tests are call for fragmented knowledge instead of coherent mastery of a subject. 2. Assessments should offer incentives for students as well as schools. Gamoran goes on to explain that schools are held accountable, but students are not. The assessments should be tied to positive incentives like access to jobs or postsecondary education. 3. The course curriculum should be more aligned to the assessment (p. 14).

Oakes, Quartz, Ryan, & Lipton's (2000) research supports the opposing view point contending that lower tracks are characterized by an inferior education. In addition, she argues that lower tracks contain a disproportionate number of Black and Hispanic students, and that tracking facilitates the separation of social classes. Those who support this view agree that the students in the upper tracks receive an extensive range of curriculum choices compared to the emphasis on obedience and discipline stressed in the lower tracks. Other researchers argue that instruction in the lower tracks is over-simplified (Ansalone, 2010). Although some educators

contend that low tracked, or non-college programs keep students attention and keep them from dropping out of school (Mirel & Angus, 1986), according to Gamoran and Mare's (1989) study this is not the case. Even with creating models designed to reveal differences among students that would show that some are more suited to benefit form one track of the other, this hypothesis could not be supported. They found that the effects of tracking overcome an existing positive selection biases, so that, in reality, fewer non-college students graduate as a result of their tracking assignment (p. 1177). While there is a strong debate regarding the benefits of both sides, there is clearly a strong tracking presence in the American education system.

### **2.1.3 Current Practices in Tracking**

In a content analysis of curriculum guides, Kelly and Price (2011), looked at 128 high schools in North Carolina to identify school tracking policies. This study examines differences in tracking policies among diverse high schools, theories of social stratification and corresponding tracking policies, and changes in tracking policies in recent years. Kelly and Price further investigated the prevalence of course-taking policies on three core dimensions of tracking: selectivity, scope, and electivity. Schools differ in the number of distinct tracks present in each subject, the most important element of selectivity. Inclusiveness describes the proportion of students in the highest tracks, while the extent to which students can choose courses of different track levels is referred to as electivity. Scope is defined as the likelihood that students take all of their subject matter courses in the same track level (p. 562). Through the data from North Carolina, they found that tracking systems in schools are created through a variety of policies, and while some schools increase the scope of tracking with co-requisites, in schools

without these requirements, students can be discrepantly tracked, accessing a high-track course in their strong subject (p. 580-581).

In regard to selectivity in their sample of North Carolina schools, Kelly and Price (2011) found that in social studies and English selectivity tends to be lower; however, it is not uncommon for schools to have three or more levels of courses available in these subjects. Some schools offer three or more levels of geometry, while 35% of schools offer four or more levels of science courses. In the sample, other than three small “early college” schools that sent students to community colleges for upper-level courses, all schools differentiated students into tracks in at least some subjects (p. 572).

Kelly and Price (2011) also studied scope and electivity, noting that in a school where the tracking system is high in scope, students are more likely to be enrolled consistently in high- or low-track courses across all subjects. However, some schools use co-requisites, most commonly in science, requiring students to take the same level of math and science courses. Almost all schools in the study have some policies restricting enrollment in high track courses including test score or grade minimums and teacher recommendations. Interestingly, the study also notes that policies limiting electivity were used with similar frequency across subjects, with the exception of upward mobility in mathematics, which was highly restricted (p. 573-574). These studies determine that despite reports of detracking, all 128 schools in the sample engage in some form of curriculum tracking. While there are differing policies to determine how students are placed into various levels of classes, the tracking of students into varying class levels is a common practice in most school systems. However, in the current school system, the explicit tracking systems characterized by extremely high scope are not as prevalent as they were in the past.

While there are lower levels of scope, this study shows that the system has become more complex. Policies have been created to limit course-taking opportunities (p. 579).

Although specifically we cannot compare today's tracking system to that of the last century due to the lack of research and data, the results of this study can be compared to Kelly's (2004) study of tracking policies in the 1997-1998 school year. The data collected in the 2011 study was compared to the previously collected data for 91 of the original 92 schools. The comparison indicates that tracking policies have changed primarily on the dimension of electivity. The prevalence of test and grade score requirements has increased in nearly all subjects; however, the overall selectivity has not changed. While social studies is more highly differentiated, English is less differentiated. This data does not show a change in the co-requisite requirements affecting the scope of tracking systems (Kelly & Price, 2011).

LeTendre et al.'s (2003) study focuses on tracking as part of curricular differentiation and student placement practices in public K-12 school systems. This study uses 1994-95 data from the Case Study Project of the Third International Math and Science Study (TIMSS) to analyze patterns of curricular differentiation in the United States, Germany, and Japan. The TIMSS database provides detailed textual data that highlight national extremes, sub-patterns common to various groups or regions, and inconsistencies between stated beliefs and observed actions of the respondents. While the analysis shows that respondents to the TIMSS Case Study Project expressed no single set of beliefs about tracking, types of differentiation where reported and individual's perceptions of the process of tracking in general were described (p. 48).

It is important to note that the LeTendre et al. study (2003) was not able to provide a uniform definition of tracking; however, it did provide an overview of national patterns of school organization and curricular differentiation noting that placement in differentiated secondary

tracks is determined by a wide range of procedures and processes. Movement between secondary tracks is possible; however, there is a wide range of variation in difficulty, procedures, and rates (p. 49). Without a uniform definition, the researchers identified five types of curricular differentiation. Type 1 is based on school type, a form seldom practiced in the United States. Type 2, also uncommon in the United States, is based on distinct within-school courses of study that are common across a nation – such as electrical engineering courses in Japanese vocational high schools. Type 3, the most common, is based on streams or tracks. For example, the majority of U.S. students are given freedom of choice in choosing between a college preparatory or vocational concentration. Type 4 differentiation, also common in the United States, is based on ability grouping. Type 5 differentiation refers to a strong overlap between tracking and socioeconomic status (usually overlapping with geographic location). Type 5 differentiation is common in the U.S. insofar as district boundaries create high levels of segregation by socioeconomic status (SES), and SES is associated with course taking within schools as well. This study describes the confusion among parents that the U.S. school system creates about how curricular differentiation occurs. The study explains that some respondents believed that parents could play a role in the placement of their child while others thought that parents were kept in the dark, as teachers could only assign students to groups or classes based on previous grades (p. 65). LeTendre et al. (2003) point out that the case study data suggest that more affluent parents are likely to try to influence their child's educational opportunities in elementary school; however, there is a high degree of variation from school to school and district to district in the degree to which parents select their teacher or course placement at the secondary level. Kelly (2004) also noted that there was little support for the idea that students of a high social class have

an advantage in math sequence placement because their parents are directly involved with the placement process.

In “The 2013 Brown Center Report on American Education: How Well Are American Students Learning,” Loveless (2013) includes a section entitled, “The Resurgence of Ability Grouping and Persistence of Tracking.” The study examines the use of ability grouping and tracking in America’s schools and focuses on surveys of ability grouping dating back to 1961 and NAEP data from 1990-2011. For the purpose of this study, we will focus on tracking at the secondary level. Because tracking is a school level practice, the surveys were given to school principals. In order to gather his data, Loveless looked at the NAEP surveys given from 1990 to 2011. While the wording of the survey varies somewhat from year to year, NAEP asks principals, essentially, whether “students are assigned to classes based on ability so as to create some classes that are higher in average ability or achievement than others.” Of the subjects studied in NAEP, the most data is available for math, as it is surveyed ten times between the eleven year span. While tracking in math dipped slightly in the 1990s and showed a small increase in the 2000s, most fluctuations were too small to be considered significant. According to Loveless (2013), this data shows about three-fourths of students attending tracked math classes over the past two decades. The other subjects exhibit much less tracking than math. In 1990, principals reported that approximately 60% of students were tracked in English/Language Arts (ELA); however, that number dropped to 32% in 1998. Tracking increased to 43% in 2003, the last time the question was asked regarding that subject. Therefore, one cannot determine if tracking endured and continued to increase in the 2000s. In looking at the subjects of science and history, less data is found. While both subjects noted their highest figures in 1990, the data indicates diminished tracking after that. It can be noted that for all subjects, the least amount of

tracking occurred between 1994 and 1998, which Loveless notes may be due to the detracking movement. Loveless also mentions that the national patterns are consistent with studies of California and Massachusetts. In those states, detracking was most intense in the early to mid 1990's; however, mathematics classes seemed to resist the detracking movement. Table 1 shows the percentage of students placed in a tracked class in eighth grade from 1990-2011 (Loveless, 2013).

**Table 1: Tracking in 8th Grade (Percent of Students)**

<b>Year</b>	<b>Mathematics</b>	<b>English</b>	<b>Science</b>	<b>History</b>
<b>2011</b>	<b>76</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>2009</b>	<b>77</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>2007</b>	<b>75</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>2005</b>	<b>73</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>2003</b>	<b>73</b>	<b>43</b>	<b>-</b>	<b>-</b>
<b>2000</b>	<b>73</b>	<b>-</b>	<b>26</b>	<b>-</b>
<b>1998</b>	<b>-</b>	<b>32</b>	<b>-</b>	<b>15</b>
<b>1996</b>	<b>71</b>	<b>35</b>	<b>21</b>	<b>-</b>
<b>1994</b>	<b>74</b>	<b>37</b>	<b>19</b>	<b>17</b>
<b>1992</b>	<b>73</b>	<b>50</b>	<b>-</b>	<b>-</b>
<b>1990</b>	<b>75</b>	<b>60</b>	<b>29</b>	<b>29</b>

Values reprinted from Brown Center on American Education, Loveless, T, 2013

According to Table 1, heterogeneously grouped classes became the norm in ELA, science, and history. In fact, in 2009, a survey of Massachusetts schools with eighth grades recorded 15.6% of schools offering heterogeneously-grouped classes in math; 49.2% offered classes with two ability levels; and 35.2% offered three levels. However, in other subjects, 72.7% offered only heterogeneously grouped classes in ELA, 89.8% in history and 86.7% in science (Loveless, 2013). While this data does show how tracking is being used, there are limitations in looking at the national data. Although there is a significant amount of data for mathematics, the data for ELA, science, and history is limited. One can look at the data from the Massachusetts survey to understand that there are still schools using tracking while others are minimizing it in various subjects; however, one cannot generalize how the remainder of the nation is sorting students (Loveless, 2013). In fact, in Sean Kelly's (2004) study on tracking teachers, he notes that over 95% of schools use their teachers to teach different levels of classes, thereby engaging in some type of tracking. While there is a pronounced difference in the tracking data, it could be due to the methodology. Kelly looked at actual, official district policies while the NAEP data relies on principal surveys. Principals may understand that tracking is not a best practice, and therefore, social desirability may cause them to under-report the use of it in a survey.

## **2.2 TEACHER'S PERCEPTIONS OF TRACKED STUDENTS**

While detracking seemed to be a popular reform in education during the 1990s, with heterogeneous grouping becoming the answer to the research that spoke out about the negative impact of homogeneous groups, it seems that, presently, tracking still persists. According to

Loveless (2013), “Despite decades of vehement criticism and mountains of documents urging schools to abandon their use, tracking and ability grouping persist-and for the past decade or so, have thrived” (pg. 20). In this section, I provide a review of research on teacher perceptions towards tracking as educational practice and differently tracked students. It is important to understand how teachers perceive students in differently tracked levels. These perceptions can influence lesson planning, assessments, and classroom environment. Furthermore, do teachers have varying expectations of future outcomes for students in differently tracked levels? Finally, how do teachers form their perceptions?

For decades, educational researchers have agreed that teachers’ opinions about students can impact their educational growth. It was in 1968 that Rosenthal and Jacobson first presented evidence regarding self-fulfilling prophecies in education. In fact, their argument contended that students bring certain characteristics to the school context that are used by teachers as an indication for their later educational success (Rosenthal & Jacobson, 1968). If this is the case, do teachers form opinions about students based on the tracked level in which they have been placed? In order to determine if teachers have biased opinions of differently tracked students, it is important to look at the research regarding teachers’ perceptions of the act of tracking? Do teachers hold poor expectations of success for lower tracked students? It is pertinent to understand if teacher perceptions are affected by how a student is grouped academically before they create their own expectations based on the student’s academic performance. However, research on differential teacher expectations and perception in varying educational tracks is rare (Kelly & Carbonaro, 2012). These questions are significant to the value of this study. It is also important to understand how teacher perceptions and expectations are formed. Without a proper

understanding of teacher perceptions and expectations, raising standards will not benefit student learning.

### **2.2.1 Teachers' Perceptions of Tracking: Functional or Beneficial**

Across the United States, secondary teachers teach varying levels of the same classes. A teacher's schedule may include three different levels of the same class including 9<sup>th</sup> Grade English, College Preparatory 9<sup>th</sup> Grade English and Pre-Advanced Placement 9<sup>th</sup> Grade English. In the math department, the same teacher may teach Algebra II and Advanced Algebra II. Teachers can view these classes and levels in a variety of ways. Some teachers believe that students may need more time to reach the same curriculum; others believe not all students are capable of reaching the same standards, so the curriculum should be watered down. Regardless of how the class is viewed, do teachers believe that selecting and sorting students is a relevant strategy?

Some teachers view tracking as an efficient approach to meeting individual student needs, in that, if all the students in the class are the same ability level, the teacher does not need to spend excess time adapting instruction to meet the needs of specific students. In fact, many teachers continue to support some form of tracking, not because they believe it will improve student achievement, but instead, because it makes their jobs more manageable (Anasalone & Biafora, 2004).

Other teachers believe tracking is important to help advanced students. Caughlan and Kelly (2004) discuss the differences between a high and low tracked English classes noting a

teacher who argues that many of the kids in the regular class would hold back brighter students in the advanced classes (p. 39).

Hallam and Ireson's (2008) study compared the attitudes about tracking of teachers teaching different subjects. These teachers teach low, high, or mixed ability classes in grades 7-9 in 45 secondary schools. The study found that teachers of mathematics and modern foreign languages are more in favor of structured ability grouping than those who teach English or humanities subjects.

English teachers responded to statements in favor of mixed ability teaching more consistently than teachers in any other subject area, and math teachers disagreed most strongly with most statements. In fact, when the teachers were asked if they thought their subject was suitable for mixed ability teaching, the results indicated that while 80% of English teachers agreed, only 18% of math concurred (Hallam & Ireson, 2008).

### **2.2.2 Teachers' Perceptions of Student Academic Achievement in Low and High Tracked Classes**

For decades, studies have been completed on teacher expectations and perceptions of students. In fact, Brophy and Good (1974) point out that several aspects of pacing, and of student opportunity to learn are affected by teacher expectations, and Brophy (1985) argued that "differential teacher treatment of intact groups and classes may well be a much more widespread and powerful mediator of self-fulfilling prophecy effect on student achievement than differential teacher treatment of individual students within the same group or whole class" (p. 309). However, no one had empirically studied the possibility that there may be teachers who have high or low expectations for all students in their classrooms (Rubie-Davies, 2006).

Kelly and Carbonaro (2012) argue that teachers and students respond poorly to low-track classroom learning environments. The result is often classroom instruction that is less rigorous and engaging for students, and ultimately, less rewarding for teachers. Their study indicates a strong effect of track location on teacher expectations has been found, and students in the academic and honors/advanced track are more likely to receive a positive response (Kelly & Carbonaro, 2012). A study of teachers in a large urban district focusing on teachers' perceptions of students in lower tracks notes the discrepancy between teacher's perceptions of high and low tracked students.

Worthy's (2010) study of 25 sixth grade teachers of "regular" and "honors" language arts classes began as a study of instruction and materials in middle school language arts classes. Although the interview protocol did not include questions about differentiation among students or classes, teachers spoke about the distinctions between students in their two levels of classes. Data was gathered from eight middle schools in a large urban district in Texas (Worthy, 2010).

Worthy (2010) used four characteristics to code the transcripts: differences in instruction and environment between honors and regular classrooms, students' behavior, work habits, interest in learning, differential teacher expectations, and causes for regular students' problems. Only four out of 25 teachers supported the idea that homogenous grouping does not have to mean deficient instruction for students in lower level classes. Teachers generally provide honors classes with creative instruction and sophisticated materials giving freedom to work interactively. Regular classes focus on isolated and basic skills and use simple materials. The teachers require less work and make assignments and academic discourse less intellectually demanding for regular classes (Worthy, 2010).

While Worthy (2010) found that teachers' perceptions of students can be affected by the student's tracking placement, Harris (2012) examines how teacher expectations regarding the implementation of academic standards promotes curriculum differentiation in middle schools. In her findings, she argues that despite the fact that standards are supposed to promote equity, these aims can be compromised by the contradictory expectations regarding standards. Harris' analysis examines how the deficit beliefs among middle school teachers involved with America's Choice influenced the application of content standards. She specifically looked into how teacher's beliefs about students influenced the teaching of standards.

Harris (2012) worked with five middle schools located in urban contexts from the northern and southern regions of the United States. Research teams interviewed teachers, school administrators, guidance counselors, and school-level coaches who were responsible for implementation of the design. The questions focused on various aspects of the America's Choice implementation and the use of standard-based curriculum and instruction over 3 years. The analysis draws on approximately 270 teacher and school leader interviews (Harris, 2012). Data was drawn from surveys and interviews, and case studies from the five middle schools were studied in order to get insights about teacher beliefs and the role of standards within America's Choice Schools. While the information presented here concerns standard based curriculum, some of the responses directly pertain to student levels. Some of the teachers attributed the challenges they confronted to student IQ, home life, and culture. Although when surveyed about whether they thought that most of their students could reach standards, 59% of America's Choice middle school teachers strongly or somewhat agreed with the statement (Harris, 2012), some interview responses differed. One teacher noted, "I'm not really sure...They want us all to be similar. I don't know what they base the standards on. America's Choice gives you a

curriculum, but it is impossible that they [the kids] will meet the standard because it's no one's fault they just can't because of IQ or home life or whatever. They have problems outside of school larger than anything else I can imagine" (Harris, 2012, p. 137).

This study points out that while teachers can implement standards, they also vary their expectations for students based on their perceptions about student academic preparation. Although 67% of the teachers surveyed strongly or somewhat agreed they use the same criteria to judge the quality of an assignment, 32% disagreed with this statement (Harris, 2012). In fact, one teacher remarked, "Once I get a sense of where students are coming from, I assign grades based on both quality and effort." This relates to the perception that teachers expect students in different levels to perform differently. Harris explains that deficit beliefs held by teachers about students and their families can become an institutional barrier for expanding opportunities to learn, stressing that, these perceptions of student capacity to achieve standards may lead to the stratification of curriculum and instruction (Harris, 2012) thereby leading to a new form of tracking.

### **2.2.3 Teachers' Perceptions of Student Behavior in Low and High Tracked Classes**

VanHoutte, Demanet, and Stevens (2013) worked with 46 Flemish secondary schools utilizing self-reported student measures and teachers' evaluations of 6,545 students. Their study examined if teachers' evaluation of secondary school students' cognitive capacity, effort in class, and diligence in doing homework varied by track, and whether teachers' perceptions are informed by three variables. These variables include: typical students' background features, students' resistance to school, and the label of students' attendance in certain tracks. This study

found that school type appeared positively associated with the teachers' evaluation of students' effort in class. Students attending academic schools were perceived to be significantly more diligent in doing homework by classroom teachers. (Van Houtte et al., 2013). This research suggested that teachers who perceive students from lower tracks as less able, more disruptive and less interested in schooling, compared to students in higher tracks, seem to adapt their pedagogy, curriculum, and expectations in line with those perceptions. Therefore, lower track students' efforts eventually are estimated higher than those of higher track students.

According to Kelly and Carbonaro (2012), low track students are frequently inattentive and disruptive. It is also noted that both teachers and students respond poorly to low-track classroom learning environments. Classroom instruction becomes less rigorous and engaging for students and less rewarding for teachers (Kelly & Carbonaro, 2012). Indeed, the study describes how behavior varies for the same student in different classrooms, depending on the track level of the class. For example, Kelly and Carbonaro explain, "They behave like college students in high track classes (where such behavior is normative), but they adjust their behavior "downward" in lower track classes" (p. 276).

#### **2.2.4 Teachers' Future-Expectations of Students in Varying Tracks**

Teachers can develop expectations about a student's future based on a variety of student characteristics. Much like the expectations that teachers have concerning student performance in the classroom, teachers can carry over those expectations regarding students' future plans. Lesson-plans, classroom discussions, and teacher student interactions can develop based on those expectations.

In Caughlan and Kelly's (2004) study regarding the effects of tracking in two English classes, they observed one teacher teaching two different tracks of English classes. The study tracks the time Mrs. Vernon spends on "linking literature to life." In the high track classes, she spent 12 minutes and 42 seconds discussing the future while she only spent 25 seconds discussing the future in the low track classes. When asked about it in the follow up interview, she expressed statements using high degrees of certainty. In describing the high-track students' success in college, she showed confidence in their ability to succeed; however, when discussing the future of the low-track students, she seemed uncertain, using phrases like, "boy, I worry about them" and "I can see some of them going to a junior college" (Caughlan and Kelly, 2004, p. 51).

In "Curriculum Tracking and Teacher Expectations: Evidence from Discrepant Course Taking Models," Kelly and Carbonaro (2012) examined curriculum tracking and teacher expectations specifically related to students who are discrepantly tracked. Kelly and Carbonaro (2012) used data from NELS, a large national representative longitudinal study from the United States of the graduating class of 1992 to focus on students with discrepant track placements and determine how different teachers evaluate the same student. The sample consisted of the eighth grade panel with teacher-reported track and expectations data and achievement and grade data at the student level encompassing 15,357 teacher reports. Of the student reports, 5,852 students had reports from two teachers. The analysis looked at two areas: establishing the effects of tracking on teacher expectations in conventional regression models and examining the effects of within student differences in tracking on teacher expectations using multilevel models (Kelly & Carbonaro, 2012).

Results of this study show that approximately 90% of high-track teachers expect their students to go to college while only 40% of low-track teachers mirror those expectations. However, this varies from the students' perspective, in that, 96.4% of higher track students expect to attend college, and 74.8% of regular track students report expected college attendance (Kelly and Carbonaro, 2012).

### **2.2.5 Formation of Teacher Expectations**

While expectations can be derived from a variety of influences such as commonly held stereotypes or cultural models, it is easy to imagine that several students in class might be deemed to be poor achieving regardless of their actual performance, simply because they are in a low-track class. Expectations that lower track students are unlikely to achieve academically could potentially set these students up for failure from the start. Supporters of this viewpoint argue that teachers generally hold limiting expectations for students in lower educational tracks (Wheelock, 1992).

Family socioeconomic status/gender/race/ethnicity affect teacher expectations (Kelly & Carbonaro, 2012), and track placement is positively correlated with socioeconomic status (Epple, Newlon, & Romano, 2002); therefore, if a teacher creates positive expectations based on higher socioeconomic status, she could create negative expectations about lower tracked students based on the number of students in a lower socioeconomic bracket.

Other factors that affect expectations include status that can be accompanied with track levels. Caughlan and Kelly (2004) argue that tracking provides students with a powerful institutional identity. Teacher's expectations regarding abilities and preferences of two differing groups can be linked with the official status assignments of the students.

### 2.3 MINDSET AND LEARNING

Is it practical and unproductive to keep trying to educate students when they struggle? Instead of assuming that they will learn with extra time and effort, many educators teach a watered down curriculum to students who are assumed to be a lower ability level. Teachers who are unaware of the advances in neuroscience regarding malleability of intelligence often believe students' intelligence is fixed, and they view struggles as failures instead of struggling as a critical part of learning. Yet, research clearly shows that students can learn more with persistent effort from those who educate them (Dweck, 2006).

If teachers have a fixed mindset, this could be detrimental to students. When people hold a fixed mindset, they tend to quickly form judgments of others (Molden, Plaks, & Dweck, 2006). Because they believe traits are fixed, once they have labeled or stereotyped a group or an individual, they tend to disregard information that runs counter to their beliefs (Plaks, Stroessner, Dweck, & Sherman 2001).

The studies of personalities and attitudes toward learning have shaped educators beliefs for decades. Mindsets, according to psychologists, are people's basic beliefs about the nature of human attributes, such as intelligence or personality (Dweck, 2012). Some people believe that these attributes are fixed traits, in that, a person has a fixed amount of intelligence or a certain personality, and that cannot be changed. Those with a fixed mindset, or entity theory, believe these ideas. However, others with a growth mindset, or an incremental theory, believe that all people can become substantially more intelligent, and that anyone can develop their personality over time (Dweck, 2012).

In conjunction with Dweck's theories of intelligence, it is important to note Covington and Beery's (1976) self-worth theory that assumes that the highest human priority is the search

for self-acceptance, and that one's worth often comes to depend on the ability to achieve competitively (Covington, 1998). The premise of this theory is that one's sense of worth is directly linked to one's accomplishments; therefore, unless a person is successful at something of value, he or she "will be cut off from a major source of self-esteem" (Covington, 1984, p.8). Covington (1984) also notes that effort is directly related to self worth, in that, strong effort is sometimes rewarded and is recognized as a necessary component of successful performance. Describing effort as a "double-edged sword," (p. 10) Covington explains that while effort in school is necessary to avoid teacher punishment, it can put students at risk because "a combination of high effort and failure also leads to suspicions of low ability" (p. 10).

The research of Covington and Dweck intersect at this point in looking at how students face failure. Covington (1984) indicates two self-serving strategies to avoid failure including excuses and the assurance of success. These strategies specifically include not studying, responding vaguely, not trying, asking questions whose answers are already known, and copying from another student's paper. Dweck (2006) explains that fixed mindset people see failure as an indictment of their personal stupidity and incompetence. Therefore, those with a fixed mindset may give up easily, avoid obstacles, and are more likely to consider cheating.

Students' implicit theories of individual (not social) intelligence predict their academic performance over time, and this, specifically, can be seen when the students face challenging work (Blackwell et al., 2007). Students with a growth mindset tend to look for opportunities to learn, develop learning strategies, and look for assessments of their weaknesses in order to develop them (Dweck, 2006).

Experiments in intervention have also shown that changes in theories of intelligence can affect academic behavior over a period of time. Blackwell et al. (2007) assessed middle school

students' mindsets before they transitioned from elementary school to middle school and then tracked their math performance for the next three years. At the end of the eighth grade year, students who initially held a malleable mindset performed 5% better on average on a standardized math exam than those with an initial fixed mindset (Blackwell et al., 2007).

Aronson, Fried and Good (2002) completed a study with an incremental theory treatment group. They provided students in this group with scientific information concerning brain functions and potential malleability, and they taught them that the brain grows stronger and smarter by forming new connections. The treatment was compared to two control groups. The first control group was taught the idea that different people have different intellectual strengths, so people should not worry about performing poorly in a certain area. The second control group was simply monitored over time. Upon comparing the three groups, the incremental theory group showed a significant increase of overall grade point average at the end of the year of approximately .23 grade points (Aronson, Fried and Good, 2002).

Good, Aronson, and Inzlicht (2003) examined two groups of seventh grade students. The first group received a series of weekly mentoring e-mails over a period of one school year explaining that a student holding an incremental theory would perform better on the statewide achievement tests at the end of the year. Comparing that group of students with students randomly assigned to a control group, students in the incremental group showed significantly higher math and verbal achievement test scores. In fact, on the math portion of the test, middle school girls' scores were improved by more than one standard deviation in comparison to the control group that did not learn an incremental theory of intelligence (Good et al., 2003). Noting the evidence that mindset does affect learning, it is important to know if one person's mindset can affect the learning of another person.

### **2.3.1 Educator's Mindsets**

Anne Gutshall (2013) examined the extent to which there is a relationship between teachers' general views about the stability of ability and the stability of hypothetical students' ability given a series of specific scenarios. Gutshall's participants were teachers from a large school district in the southeastern United States, who she recruited by attending faculty meetings and asking for voluntary participation. The 238 teachers who completed the survey were then asked to read one of four student scenarios detailing a student who was struggling in school in specific areas but who also had positive attributes. The students in the scenarios were either male or female and either had or had not been recently diagnosed with a learning disability. All teachers were administered an initial paper-and-pencil survey that included the three-item mindset scale created by Henderson and Dweck (1990). The percentage of teachers with a fixed mindset, growth mindset, or no mindset was then calculated using the method created by Henderson and Dweck. In this sample, 12.1% of teachers demonstrated no clear mindset, and they did not participate in the scenario conditions (Gutshall, 2013).

After determining teacher mindset, teachers were asked to read one of four student scenarios detailing a student who was struggling in school. The hypothetical scenarios consisted of difficulty grasping main concepts and poor classroom assessment or poor classroom assessments and failing grades. The students also had positive attributes such as leadership skills or eagerness. Finally, the students were noted as having been recently diagnosed with a learning disability (Gutshall, 2013). The Teachers were then asked to rate the students on three questions, which were almost identical to the questions used to determine mindset but this time specific to the student in the scenario, using a scale from 1 (strongly disagree) to 6 (strongly agree). An

example of the question follows: “Michael may be able to perform better in school; however, his real ability will not change.”

After removing the 29 participants with no discernible theory regarding the stability of intelligence, 209 respondents remained. Of the 209 remaining subjects, 70.3% exhibited a growth mindset, and 29.6% showed a fixed mindset on the initial survey. Next, the mindset scores were tabulated for the four different scenarios. Comparing the initial mindset scores to teachers’ responses about specific students in the scenarios, it was found that teachers were about equally likely to have a growth mindset when responding to a scenario as on the initial questionnaire. However, some of the teachers who demonstrated a fixed mindset on the initial questionnaire exhibited no defined mindset after reading the scenario. In examining the ratio of fixed versus growth mindset, results indicate that teachers share characteristics similar to the general population, and in comparing teachers’ initial mindsets with teachers’ mindsets for scenarios, it was found that they were highly correlated (Gutshall, 2013).

While the findings of this research suggest that classroom teachers’ mindset views may in fact remain the same in spite of learning disability, status or gender, the study is limited by homogenous geography, in that, all teachers were from one school district. In this district, males with disabilities outnumber females with disabilities two to one. This sample was also limited by the voluntary nature of the study. Another limitation is the hypothetical scenarios. There was also a procedural change identified in the method’s section, in that, the first set of teachers were given two surveys, and only one was used for data analysis. This may have caused the participants to be influenced by the information on the first survey (Gutshall, 2013).

Another study focusing on fixed and malleable intelligence looks at the question, “can comforting struggling students demotivate them and potentially decrease the pool of students

pursuing math-related subjects?” In order to answer this question, Rattan, Good, and Dweck (2012) completed four studies (Rattan et al., 2012).

In Study 1, 41 undergraduates at a competitive private university on the West coast completed an online study about math education that started with a “general math attitudes” survey. The participants were asked to agree or disagree with four statements that portrayed math ability as fixed. While in Study 2, 95 undergraduates at a public college on the East coast first read an article that manipulated implicit theories of math intelligence. The article presented expert evidence indicating that math intelligence was either fixed or malleable. Following the article they read the scenario described in Study 1, assuming the role of a 7<sup>th</sup> grade math teacher about to meet with a student who scored 65% on the first test of the year. In this study, gender was also manipulated. Participants indicated how they would respond to the student using a 7-item index measuring the degree to which they would choose to comfort students for their low ability and enact potentially unhelpful pedagogical practices. Participants in both Study 1 and Study 2 were compensated through either course credit or pay (Rattan et al., 2012).

Study 3 addresses the same questions as Study 2; however, the participants were 41 graduate students who were instructors or teaching assistants at a competitive private university on the West coast. All participants were Ph.D. candidates in a math related field. Participants completed the 4-item implicit theories of math intelligence measure described in Study 1 followed by an 8-item questionnaire asking about their attitudes towards teaching. Students were given another scenario adapted to the undergraduate teaching context. Again, participants were compensated with pay (Rattan et al., 2012).

In Study 4, comfort-oriented feedback was compared to feedback more focused on concrete strategies and control feedback that contained only the statements of support present in

all three conditions. Fifty-four students at a competitive private university on the West coast completed an online study in which they imagined being in a calculus course, and they read scenarios regarding differing types of feedback (Rattan et al., 2012).

The results in studies 1-3 indicated that instructors holding an entity (fixed) theory of math intelligence more readily judged students to have low ability than those holding an incremental (malleable) theory. Studies 2-3 also revealed that those holding an entity theory were more likely to both comfort students for low math ability and use “kind” strategies unlikely to promote engagement with the field. This could mean assigning less homework. In Study 4, students responding to comfort-oriented feedback not only perceived the instructor’s entity theory and low expectations, but also reported lowered motivation and lower expectations for their own performance. While the information resulting from this study is compelling, the study itself is limited due to the hypothetical scenarios (Rattan et al., 2012).

Moving from a very broad perspective, looking at groups of students, to a singularly focused case study of one middle school student, Kathleen Collins (2013) spent approximately 700 hours collecting data on Jay, a middle school student identified as learning disabled. Through interviews, video and audiotaping, observations and field notes, and textual and graphic artifacts, Collins gathered information on an African American boy living in a predominantly white, rural community. Collins’ aim was to connect her work to recent research into the overrepresentation of minority students in special education and explore social stereotypes in determining how some students are identified as “disabled.”

Jay’s classroom teachers indicated failing grades in every academic subject; however, state-mandated achievement tests rated his reading score as moderate. Collins (2013) remarks that despite invitations to consider evidence of several positive performances, Laura, his teacher,

still responded to Jay as though he were less than capable. Collins conceptualizes ability profiling as responding to a student as though he is disabled, or reading all of his actions and interactions through a lens of deficiency (Collins, 2013). Collins notes in her findings that Laura's expectations for Jay's contributions were so low, that she did not listen to him fully. Because she had identified him as learning disabled, she viewed him in this light, and therefore, treated him differently. Jay had moved to this school from another community; therefore, Collins remarks, this caused Laura to look at him as an outsider. As a result, he was looked upon as different, and due to the possible identification of a learning disorder, he is excluded from the classroom community. However, Collins also notes that in other contexts, where he was not positioned as an outsider, he participated successfully. Upon reflection of her study, Collins asserts, "I had hoped that one of its outcomes would be Laura's recognition of the ways in which she contributed to Jay's demonstration of [dis] ability by designing learning contexts that did not allow him to use his intellectual and interactional strengths." She hoped that this change would result in a positive representation of Jay and the withdrawal of the referral for a special education assessment; however, this was not the case (Collins, 2013).

Collins' approach to the organization of the case study is a narrative analysis. While Collins does thoroughly explain her methods, also including interview questions and tools, noting her triangulation and analysis, Collins' seems too close to the research which may skew her views. She even notes, "My teacher sensibility clashed with my researcher sensibility on more than one occasion during this work, and these tensions are made visible throughout the narrative" (Collins, 2013).

Teachers' attitudes and mindsets can certainly affect individual students, but the negative stereotypes may disrupt more than performance (Good, Rattan, & Dweck, 2012). Many people

use the phrase, “I’m not a math person,” to explain the reason that they do not do well in math. It is as if math is a special talent that only a few special, chosen people are blessed to obtain. In fact, this fixed nature of math ability can be extremely evident in the mathematics community, where there is a “talent-driven approach to math” (National Mathematics Advisory Panel, 2008). Due to these beliefs, research has shown that students can turn away from challenges that might undermine their belief that they have high ability (Nussbaum & Dweck, 2008).

Good, Rattan and Dweck (2012) tested and supported the hypotheses that students’ sense of belonging can predict their desire to pursue math in the future, and two messages women may hear in their math environments—the messages that math ability is a fixed trait and that women have less of this ability than men—may work together to erode women’s sense that they belong in math which could affect their desire to pursue math in the future. This study took place at a highly selective university in the Northeast United States, where participants, including 471 males and 534 females completed the Sense of Belonging to Math scale as well as other measures during their calculus course. This scale was completed three times throughout the course. Furthermore, it is important to note that the average SAT score was 720 for males and 705 for females indicating that this sample represents students with a high skill level in math (Good et al., 2012).

Findings indicated that the males’ sense of belonging was significantly greater than females’ sense of belonging at the time of the second completion of the scale. The study showed that although a women’s initial sense of belonging did not predict a later desire to continue in math, the reduction in the women’s sense of belonging over time did predict lower intentions to pursue math in the future. However, for males, none of the variables emerged as significant factors to predict intentions to take math in the future (Good et al., 2012).

The study found that the more women perceived their math environments to convey either a high degree of stereotyping or a fixed view of math intelligence; the lower was their sense of belonging. This shows that women's perceptions of their learning environment can impact their sense of belonging but also, importantly, that their sense of belonging to math can have real consequences for their career aspirations and achievement (Good et al., 2012).

## **2.4 RESEARCH QUESTIONS**

While there is no modal policy, in either the U.S. or abroad, on how students are tracked, it remains a common form of curricular organization. Students are being tracked into different levels according to teacher recommendation, previous grades, standardized test scores, parent and student choice. While some schools allow students to move between tracks, others require students to remain in one track for all classes. It is evident that tracking is commonplace; however, while there are commonalities between each type of differentiated placement, the guidelines are at the discretion of the local school district. Studies found teachers who perceive students from lower tracks as less able, more disruptive and less interested in schooling compared to students in higher tracks, seem to adapt their pedagogy, curriculum, and expectations in line with those perceptions (Kelly & Carbonaro, 2012). Teachers freely discussed lowered expectations and watered-down instruction of students in regular classes (Worthy, 2010).

The teacher has a central role in establishing a supportive classroom environment, and the teacher's attitude (shown by tone of voice, comments), enthusiasm, and interest in the subject affect learners directly and indirectly (Dent & Harden, 2001). Moreover, teachers vary in

supportive practices, with the same student reporting substantially different levels of support from different teachers (Kelly & Zhang, 2016). Teachers' views about how students learn, their mindset towards intelligence and achievement growth, may differ substantially across tracked classrooms.

To address this issue, this study proposed three research questions. Research Question 1: *How are students tracked in the 21<sup>st</sup> Century United States educational system?* In school systems where tracking is prevalent, exploring the rationale behind how each student is placed into a different tracking level may provide direction behind teacher expectations for student success. In order to explore this inquiry, the teacher survey included questions on the survey about the method used for student placement into different tracking levels. The researcher also conducted interviews with teachers exploring this issue.

Research Question 2: *How do teachers' perceptions of student achievement, behavior, and future plans vary between low and high tracked classes?* To look into this query, the researcher conducted observations of teachers instructing in low-tracked classrooms. Observations focused on questioning techniques in class. Time spent on student-centered activities compared to time spent on teacher-centered activities. The researcher also logged the amount of time students worked on higher order thinking skills as compared to activities requiring lower ordered thinking skills. Semi-structured interviews were conducted, and transcriptions of the interview provided qualitative data for analysis.

Research Question 3: *How does a teacher's mindset affect instruction?* In order to address this question, participants completed a survey to determine the extent to which they exhibited fixed mindset characteristics. Interviews were also conducted in order to obtain qualitative data. The researcher observed the teachers instructing low tracked students and

focused on the rigor level of asked questions, the time spent on teacher-centered tasks compared to student-centered tasks, and the rigor level of the activities in class.

## **3.0 RESEARCH METHODOLOGY**

### **3.1 INTRODUCTION**

This study explored teachers at two schools and how their mindset affects their planning, instruction, assessing, and student learning in low tracked classes. In order to determine to what extent a teacher exhibits fixed mindset characteristics, they were given a survey. The teachers were observed and interviewed. To begin the research for this study a consent form with a description of the study was sent to the superintendents of two school districts in western Pennsylvania. Upon their consent, an application was submitted for IRB approval. Following approval from the IRB, the researcher reached out to the principals of the two high schools to secure times to complete the research. This research consisted of surveys, interviews, and observations.

Responses were gathered from a survey of high school English and math teachers from two high schools in Western Pennsylvania. The School in District A hosts a population of 1270 students. There are approximately 22\* high school math and English teachers in the district. The School in District B is made up of 590 students, with 14 math and English teachers in the high school.

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\* The exact faculty size has not been reported in order to protect confidentiality.

Following analysis of the survey, the researcher began scheduling observational visits in twelve classrooms. In order to get a full analysis, the researcher scheduled observations with six classroom teachers in District A and six classroom teachers in District B. Each class was observed twice, and six courses were chosen to move on to the next step.

The interview process consisted of six semi-structured interviews taking place in the teachers' classrooms. To cover all areas, three English courses and three math courses were represented, and three teachers were chosen from school A along with three teachers from school B. Following the interview, the transcripts were analyzed and coded. Table 2 presents the approach to answering each research question listing the method, analysis, and interpretation.

**Table 2: Research Matrix**

Research Question	Method	Analysis	Interpretation
How are students tracked in the 21st Century United States educational system?	Survey, Interviews	<ul style="list-style-type: none"> <li>• <b>Survey</b> Items: 13-18 – Frequency Distribution</li> <li>• 13-16 - Likert Scale 1=None, 2= A Few, 3=About half, 4= More than half but not all students, 5=All or almost all students</li> <li>• 17 – Likert Scale 1=Never, 2= Very Rarely, 3= Rarely, 4=Occasion-ally, 5=Very Frequently, 6= Always</li> <li>• 19 – Open Ended</li> <li>• <b>Interview</b> questions 8-10</li> </ul>	<ul style="list-style-type: none"> <li>• Survey Items – Often/AtT– determine how students are placed in tracking levels</li> <li>• Interview – themes and patterns will be used to determine coding</li> <li>• Questions 8-10 will determine how a specific school tracks students.</li> </ul>
How do teachers’ perceptions of student achievement, behavior, and future plans vary between low and high tracked classes?	Interviews, Observations	<ul style="list-style-type: none"> <li>• <b>Interview</b> questions 1-7</li> <li>• <b>Observations</b></li> <li>• Questioning Techniques in class – Webb’s DOK</li> <li>• Time on Task – Amount of Time teacher talks vs. amount of time student talks</li> <li>• Amount of time student is working on higher order thinking skills vs. lower order thinking skills –Webb’s DOK</li> </ul>	<ul style="list-style-type: none"> <li>• Interview – inductive coding looking for themes and patterns</li> <li>• Webb’s DOK – 1 or 2 – lower order thinking 3 or 4 – high order thinking skills</li> </ul>
How does a teacher’s mindset affect instruction?	Survey, Interviews, Observations	<ul style="list-style-type: none"> <li>• <b>Survey</b></li> <li>• Items 1-12 – fixed mindset – frequency distribution</li> <li>• Questions 1, 4, 8, and 11 – distractors</li> <li>• Likert Scale 1=Strongly Disagree to 6=Strongly Agree</li> <li>• <b>Interview</b> Questions 1-7</li> <li>• <b>Observations</b></li> <li>• Asked Questions – Webb’s DOK</li> <li>• Time on Task – Amount of Time teacher talks vs. amount of time student talks</li> <li>• Amount of time student is working on higher order thinking skills vs. lower order thinking skills –Webb’s DOK</li> </ul>	<ul style="list-style-type: none"> <li>• Survey Items 1-12 fixed mindset frequency distribution</li> <li>• Interview – themes and patterns will be used to determine coding</li> <li>• Teacher expectations based on the number of questions asked from each level 1-4</li> <li>• Webb’s DOK – 1 or 2 – lower order thinking skills 3 or 4 – high order thinking skills</li> <li>• Activities – Teacher expectations based on types of activities</li> </ul>

## **3.2 DATA COLLECTION AND ANALYSIS**

### **3.2.1 Participants**

The identified population included highly qualified teachers at the high school level from two school districts in western Pennsylvania. There are 125 teachers employed in the high schools of the two districts. This sample of convenience was chosen from two districts where the researcher had easy access to speak with and observe the teachers employed within the district. The identified sample included all math and English teachers within the two districts. Math and English teachers were targeted in response to findings that math teachers tend to favor structured ability grouping while English teachers tend to prefer mixed ability grouping (Hallam & Ireson, 2008). The survey was distributed to 37 teachers. Of the 37 teachers identified for the sample, there were 19 English teachers and 18 math teachers. Three of the English teachers and four of the math teachers also identified as special education teachers. The survey resulted in an 89% response rate consisting of responses from 15 English teachers and 18 math teachers. Selected participants were also observed and interviewed. Of the teachers who responded to the survey, six English teachers and six math teachers were selected to participate in observations. Of those teachers selected to be observed, four English teachers and three math teachers participated in the interview process.

### **3.2.2 Survey**

The researcher scheduled time with the principals of each building to meet with the English and math teachers to explain the survey. Each teacher received a participant letter about

the study and a copy of the survey. The teachers were given time to complete the survey, and some chose to complete it at that time while others chose to submit it at a later date. The researcher gave the teachers a week to complete the survey. Two days before collecting the remainder of the surveys, the researcher contacted the teachers a second time by e-mail. This e-mail contained a copy of the participant letter and a copy of the survey. This was intended to reach teachers that may have misplaced the survey or were unable to attend the first meeting. To evaluate the extent to which the teachers exhibited fixed mindset characteristics, a survey was used. This survey has its roots from Carol Dweck's *Mindset Assessment Profile Tool* (Dweck, 2006) as well as consultation from experts in the field. This short survey included 20 questions. The first section consisted of 12 questions and focused on determining the mindset of the teacher. In the survey, eight questions were adopted from Carol Dweck's studies, and four questions were used as distractors.

The second section of the survey asked the teachers to think about a specific class period. The class periods were intentionally chosen to be the lowest tracked class in each teacher's schedule. The questions focused on how students were placed in the focal class and how often students moved between academic levels. Teachers also used the survey to indicate their willingness to participate in an interview about lesson planning.

### **3.2.3 Independent Variables: Mindset Variables**

Each participant was given a Mindset profile and answered the questions according to their own opinion. The Mindset profile was derived from Dr. Carol Dweck's *Mindset Assessment Profile Tool* with consultation from experts in the field. This survey had originally been created to determine if a student/educator exhibits a growth mindset or a fixed mindset;

however, upon review of the original survey, it was noted that educators may have chosen answers that they felt were “correct,” in that, educators are becoming more aware of the idea of growth and fixed mindsets. Many educators may believe that a growth mindset is a more desirable trait, or people expect educators to have a growth mindset; therefore, when the participants answered the survey questions, the results may have been skewed. In order to account for social desirability bias in this research, the survey questions were revised to determine the level to which a person exhibits fixed mindset characteristics. Everyone exhibits some level of fixed mindset qualities, so the questions from the survey were chosen to determine if each participant showed more or less fixed mindset tendencies. Eight questions were chosen based Carol Dweck’s Mindset Survey, and four questions were chosen as distracters. These questions related to differentiation and grit; however, they were not directly related to mindset.

Upon completion of the Mindset survey, participants’ scores for the eight questions were averaged. Each score was then matched to a descriptor corresponding with Dr. Dweck’s Mindset survey. A person with a mindset score falling between five and 6 generally believes that intelligence is fixed—it does not change much. A person who strongly believes intelligence is fixed, believes that if one cannot perform perfectly, he would rather not do something. People scoring in this range tend to believe that smart people do not have to work hard. If a person’s score falls between 4 and 4.9, the person leans toward thinking that intelligence does not change much with outside influence. He prefers not to make mistakes if he can help it and believes that learning should be easy. A person with a score falling between 3 and 3.9 is unsure about whether a person can change her intelligence. This person cares about performance, but she may not believe one should have to work too hard for it. A person who has a score that falls between 2 and 2.9 believes that one’s intelligence is malleable. This person tends to believe that it is

more important to learn than to always perform well. Finally, if a score falls between 1 and 1.9, the person exhibits a growth mindset, believing that the best way to learn is to work hard, and that making mistakes leads to learning.

### **3.2.4 Independent Variables: Tracking Variables**

The aim of this study was to determine how teacher mindset affects students in low tracked courses. In order to study the effects of teacher mindset in these courses, it is important to determine how students are tracked in each school that was studied. As part of the survey, participants were asked to think about a specific class, the lowest level class on their schedule. The questions focused on how students are tracked into these classes. The survey collected teacher perceptions of how often students were tracked by standardized test scores, previous grades, teacher recommendations, and student choice. There were also questions concerning how often students moved up or down a level and how often students were discrepantly tracked.

### **3.2.5 Observations**

The researcher chose classroom observation participants based on the teacher's willingness to participate in an interview. Upon completion of the survey, it was determined that 18 teachers, made up of 9 English and 9 math teachers, were willing to participate in the interview process. The researcher chose six English teachers and six math teachers to participate. In addition to focusing on subject, the researcher also looked at teaching placement, in that, six teachers were chosen from each research site. Because this research is focused on teachers and students in low-tracked classrooms, the researcher chose to observe the lowest

academically tracked classes. Finally, the researcher looked at mindset score and chose the teachers teaching the lowest tracked classes and exhibiting the most fixed mindset characteristics based on their survey score. The classroom observations focused on time spent on various tasks, questions asked by the teacher, and questions answered by the students. Teachers and students were observed engaging in classroom activities, and the time spent on each activity was recorded. The type of activity (teacher centered vs. student centered) was noted, and the rigor of each activity was analyzed according to Webb's Depth of Knowledge. In addition, specific teacher and student questions were examined for rigor and coded according to Webb's Depth of Knowledge.

Dweck notes that great teachers set high standards for all students. One way to look at the standard of expectations set in a classroom is to determine the level of rigor presented in the classroom. This study uses Webb's Depth of Knowledge to analyze the rigor of activities and questions presented in each classroom. The Depth of Knowledge (DOK) of an item refers to the cognitive demands and complexity required by an item, and it describes the connections and level of reasoning that the item requires a student to make when providing a response to an assessment item (Webb, 1997). The DOK level does not refer to how easy or difficult an assessment item is for students. Though the assessment item may be difficult for students to answer, it may require a low level of cognitive processing. DOK levels do not change if the population changes; the fact that the item may be harder for students of differing abilities does not change the level of the item (Wyse and Viger, 2011). Webb's alignment of the DOK levels is separated into four distinct levels as seen in table 3.

**Table 3: Webb's Depth of Knowledge: Activities Sorted by Rigor**

Level One Activities	Level Two Activities	Level Three Activities	Level Four Activities
Recall elements and details of story structure, such as sequencing of events, character, plot and setting.	Identify and summarize the major events in a narrative.	Support ideas with details and examples.	Conduct a project that requires specifying a problem, designing and conducting an experiment, analyzing its data, and reporting results/solutions.
Conduct basic mathematical calculations.	Use context clues to identify the meaning of unfamiliar words.	Use voice appropriate to the purpose and audience.	Apply a mathematical model to illuminate a problem or situation.
Label locations on a map.	Solve routine multiple step problems.	Identify research questions and design investigations for a scientific problem.	Analyze and synthesize information from multiple sources.
Represent in words or diagrams a scientific concept in a relationship.	Describe the cause/effect of a particular event.	Develop a scientific model for a complex situation.	Describe and illustrate how common themes are found across texts from different cultures.
Perform routine procedures like measuring length or using punctuation marks correctly.	Identify patterns in events or behavior.	Determine the author's purpose and describe how it affects the interpretation of a reading selection.	Design a mathematical model to inform and solve a practical or abstract situation.
Describe the features of a place or people.	Formulate a routine problem given data and conditions. Organize, represent and interpret data.	Apply a concept in other contexts.	

Information reprinted from "Webb's Alignment Tool" by Webb, N, 2006

### 3.2.6 Interviews

The researcher conducted interviews in order to obtain information concerning how students are placed in different tracking levels and information about how each teacher planned for differently tracked levels. Interviews were completed with teachers that agreed to participate via the initial survey. Observations of twelve different classes were conducted, and the researcher interviewed the teachers of six of those classes. The interviews were made up of

teachers of three math classes and three English/language arts classes. One of the math classes was co-taught and one of the English/language arts classes was co-taught. The teachers of the co-taught classes were interviewed together. In analyzing the mindset scores of the interviewed teachers, five teachers scored between a 2 and 2.9, and 3 teachers scored between 3 and 3.9. A person with a score falling between 3 and 3.9 is unsure about whether a person can change her intelligence. This person cares about performance, but she may not believe one should have to work too hard for it. A person who has a score that falls between 2 and 2.9 believes that one's intelligence is malleable. This person tends to believe that it is more important to learn than to always perform well. The questions for the interview were established to coincide with the original research questions. The researcher used the Just Press Record App to record the interviews, and the app transcribed the interviews as well. The researcher also took notes during the interviews. Following the interview, the researcher listened to the interviews and updated the notes.

In the initial stage, the research read the interview notes. The next stage consisted of listening to the interviews again adding extra details to the notes. The third stage consisted of creating a chart with the research question, the interview question that corresponded to it, and a list of main points from each interviewee's answers. All transcripts were read and the notes were organized in a chart. The chart consisted of the original research questions along with the interview questions that coincided with them and the main points from each interview. The researcher then looked for commonalities among the answers.

The interviewer asked questions that focused on planning, assessment, and activities in the focal class that the teacher answered questions about in the survey. The interviewer also asked about the differences between high and lower level tracked students, lesson planning, and

the differences between planning and presenting for each tracked level. Worthy's (2010) study of ability grouping employed interviews of 25 sixth grade teachers of "regular" and "honors" language arts classes. According to the study, despite not asking any questions about ability grouping or differentiation, this became the subject of the interviews. Upon coding the interviews, the researcher found the following four categories to be significant: (a) differences in instruction and environment between honors and regular classrooms; (b) students' behavior, work habits, and interest in learning; (c) differential teacher expectations; and (d) causes for regular students' problems (Worthy, 2010). This study employed the use of the same categories in order to analyze the participant's answers.

## 4.0 FINDINGS

### 4.1 TEACHER REPORTS OF TRACKING POLICIES

**Table 4: Survey Questions Regarding Tracking Procedures**

Question	Mean	SD	Range	CV
In your focal class, about how many students are enrolled in this class, in part, due to their <i>standardized test scores</i> ?	2.06	1.48	1,5	0.72
In your focal class, about how many students are enrolled in this class, at least in part, because of their <i>grades from previous years</i> ?	3.53	1.63	1,5	0.46
In your focal class, about how many students are enrolled in this class, at least in part, because of <i>teacher recommendation</i> ?	3.07	1.78	1,5	0.58
In your focal class, about how many students are enrolled in this class, at least in part, because of <i>student choice</i> ?	1.97	1.27	1,5	0.64
How often do students ever change a tracking level once they are scheduled into it? I.e. A student is scheduled into a low level track as a 9th grader, but as a 10th grader, he is scheduled into a higher-level track.	3.19	1.14	1,5	0.36
Are any students discrepantly tracked? I.e. A student is scheduled into a high-level math class and a lower level English class.	1.17	0.38	1,2	0.32

Table 4 presents the mean, standard deviation, range and coefficient of variation for each of the survey questions. Teachers were asked to rate the number of students affected by each assignment policy using a scale of none, a few, about half, more than half but not all, and all or almost all. The coefficient of variation (CV) is used to describe the amount of variability relative to the mean in order to determine which variables/items exhibit more variation or consistency. In both districts the teachers perceive that most students are tracked according to their grades in the classes taken in prior years and that standardized test scores play the smallest role in the grouping of students. In fact, a majority of the teachers in both schools report that no students in their focal class were tracked based on standardized test scores. The districts policies on tracking differed slightly. In one district, the students were not tracked in English until their tenth grade year, while in the second district it started in their ninth grade year. Both schools began tracking math students as early as middle school. The information from the two districts were not separated out because there was not a large differentiation in the means.

Upon further review of the results, it can be seen that the teachers in each district are not providing consistent responses to each question. In District A, when asked if students were tracked according to grades from the previous year, the majority of them agreed that all or almost all students were tracked for that reason; however, in District B, there was no consistency in agreement on any one policy. When asked if students were enrolled in a class because of teacher recommendation, 32% of District A teachers indicated that all or almost all students were placed for that reason; however, in District B, only 8% noted that all or almost all students were placed for that reason. According to the teachers in District A, 77% agreed that no students are tracked in their classes based on student choice; however, in District B 42% of the teachers said that no students were placed due to student choice, and 58% indicated that a few students were placed

due to student choice. The data shows that teachers believe that relatively few students are placed according to student choice, but instead, placement is based on a variety of criteria including previous grades and teacher recommendations; however, respondents differed considerably in which criteria they believed were most salient.

According to the survey most teachers perceive that students are discrepantly tracked in both districts indicating that students can be tracked into different levels according to subject instead of one level for all classes. In District A, 68% of the teachers indicated that students can be discrepantly tracked, for example, students can be scheduled into a high-level math class and a low-level English class. In District B, 83% of teachers indicated that discrepant tracking takes place; therefore, there may be students in District B who are scheduled into an Advanced Placement English while being placed in the lowest science class.

## **4.2 MINDSET SURVEY**

Table 5 provides descriptive statistics for teacher responses to the mindset items.

**Table 5: Central Tendency and Dispersion in Fixed Mindset Measurements among 33 Teachers**

<b>Survey Question</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	<b>CV</b>
Only a few people will be truly good at academics - you have to be "born with it."	2.26	0.82	1,4	0.36
Your intelligence is something that you can't change very much.	2.38	0.91	1,4	0.38
You can learn new things, but you can't really change your basic intelligence.	2.84	0.99	1,5	0.35
Truly smart people do not need to try hard.	2.35	0.94	1,4	0.39
Students have a certain amount of intelligence, and teachers can't really do much to change it.	2.19	0.93	1,4	0.43
You can do things differently, but the important parts of who you are can't really be changed.	2.69	1.06	1,5	0.39
Students' talents in an area are something that you can't change very much as a teacher.	2.66	0.97	1,4	0.37
You can learn new things, but you can't really change your basic level of talent.	2.69	0.93	1,5	0.35
<b>Overall Mindset</b>	<b>2.50</b>	<b>0.55</b>	<b>1.1, 3.4</b>	<b>0.22</b>

Upon analyzing the mindset profile scores of the teachers participating in this research, it was found that most teachers believe that intelligence is malleable with 63% of the teachers in this study obtaining a score that falls between 2 and 2.9. None of the teachers scored over a 4; therefore, none of the teachers in this study portrays an extremely fixed mindset. Approximately, 13% of the teachers scored in the growth mindset range while 25% lean toward a fixed mindset. The largest percentage of teachers, 63%, scored between 2 and 2.9.

In disaggregating the data and comparing the mindset score of math and English teachers, it can be seen that the majority of teachers in both subject areas scored above a 2 and below a 3. Although more math teachers scored in the midrange, leaning toward a fixed mindset, 29% of

the English teachers scored in the lowest category (a lower score portrays a growth mindset), showing very limited aspects of a fixed mindset, while no math teachers scored in this category.

### **4.3 OBSERVATIONS**

The purpose of the observations was to look at the types of activities used during instruction. The researcher focused on the time teachers spent on student-centered tasks and activities compared to the time spent on teacher-centered tasks and activities while also focusing on degree of rigor. Participants were chosen based on their willingness to participate in an observation and an interview, their mindset score, and the academic level of class in which they teach. Observations took place in 12 classrooms and 14 teachers were observed. Each participant was observed twice for a total of 24 observations. Two of the courses were taught using a co-teaching method. The researcher used a standard form for each observation, which can be found in the appendix.

Table 6 presents a summary of the data of the observed teachers, their mindset score, the overall percentage of time spent on teacher-centered activities and student-centered activities during both observed class periods, and the mean level of rigor observed over two class periods. Upon analyzing the observational data, the researcher chose to list the level of rigor that each teacher used the most. Utilizing the mode provides a clearer picture of the number of times a certain level is used in each class.

**Table 6: Observation Data Summary**

<b>Teacher ID</b>	<b>Subject</b>	<b>Mindset Score</b>	<b>Total percentage of class time spent on TCA</b>	<b>Total percentage of class time spent on LCA</b>	<b>Total Average Level of Rigor</b>	<b>Overall Mode of Rigor Level</b>
AE32	English	1.37	57%	43%	2.2	3
AE1019	English	1.9	53%	47%	2.2	2
AM32	Math	2.0	78%	22%	1.55	2
AM325	Math	2.12	73%	27%	1.9	2
BM1920	Math	2.25	100%	0%	1.4	1
BM1111	Math	2.25	65%	35%	1.7	2
BE72	English	2.37	84%	16%	1	1
BM166	Math	2.37	0%	100%	3	3
BE1211	English	2.62	84%	16%	1	1
AM813	Math	2.75	78%	22%	1.55	2
AE108	English	3.0	53%	47%	1.9	1
BE102	English	3.12	78%	22%	1.5	1
BE202	English	3.25	67%	33%	1.3	1
BM2610	Math	3.37	13%	88%	3	3
SD		0.57	0.27	0.28	0.63	0.8
Mean		2.36	0.61	0.36	1.72	1.72
CV		0.24	0.45	0.75	0.36	0.47

According to the data, the average mindset score is a 2.36 (SD=.57) indicating that the average teacher believes that one's intelligence is malleable, and the research shows that most of the teachers surveyed fall within that range. The majority of teachers spent more than 50% of instructional time on teacher-centered activities with the average being 61% of class time spent on teacher-centered activities while only 36% of class time is spent on student-centered activities.

Many of the classrooms consisted of a teacher at the board while students sat in their seats answering questions. One example of this occurred in a math class. At the start of the class, students were asked to take out their homework assignments. The teachers walked around

to check the assignments while the students completed example questions. After ten minutes, the teachers went over the homework on the board. The teachers asked questions concerning the homework, and the students answered the questions. Approximately fifteen minutes later, the teachers read the homework questions out loud.

In another classroom, the students began by writing in their journals. They were given fifteen minutes to describe a memorable moment in their life. Following this student-centered activity, the teacher put facts about an author on the board as a review. The teacher then asked the students to look at four different poems. He read the poems to the students then asked them questions about the poems. The remainder of the class consisted of the teacher presenting information about poems from the Japanese culture. After thirty minutes, the class ended with the teacher putting a worksheet on the overhead and explaining multiple meaning words.

In another English classroom, for thirty minutes, students listened to a story being read to them. They stopped briefly to answer questions asked by the teacher. Other students were observed completing a diagnostic test on run-on sentences and fragments. They were given approximately twenty-five minutes. The teacher then showed a twenty-minute video on how to write correct sentences.

Two of the observed teachers spent more than 80% of instructional time on student-centered activities. In both classes, the students were working on the same project integrating art and math. They were given a set of directions to follow and interpret, and then they created the project. In an English classroom, the teacher placed students into groups to work on a vocabulary assignment. The students spent 40 minutes completing vocabulary charts analyzing the word and connecting words to concepts from the story. In another English classroom, the teacher played a game with the students. She asked them to create questions about the novel

they were reading. The students were asked to use the Webb's Depth of Knowledge chart to create questions from each rigor level. The students spent approximately twenty-five minutes on this student-centered activity.

Most observed activities and questions were of low rigor according to Webb's Depth of Knowledge. The mean level of rigor was 1.72 (SD=.63). Due to the small sample size and emphasis on understanding the local context of these districts, I do not report tests of statistical significance. However, preliminary investigation of statistical significance suggests that most of the group differences are not statistically significant by the conventional  $p < .05$  standard, but are significant at the  $p < .10$  level.

#### **4.4 INTERVIEW FINDINGS**

The teachers were asked questions about class dynamic, lesson planning, and differences between heterogeneously and homogeneously leveled classes. The teachers were also asked about the methods used to track students. The answers were coded according to (a) differences in instruction and environment between higher and lower leveled classrooms; (b) students' behavior, work habits, and interest in learning; (c) differential teacher expectations (Worthy, 2010).

##### **4.4.1 Differences in Instruction and Environment**

Upon looking at differences in instruction between high and low level classes, of the eight teachers interviewed, five specifically mentioned trying to do student-centered activities as

much as possible in the lower leveled classes. The five teachers included both English and math teachers and their mindset scores ranged from 2 to 3.25. Two of those teachers, an English teacher currently teaching homogenously tracked courses and a math teacher who moved from teaching homogeneously tracked courses to heterogeneously tracked courses within the last three years indicated that their lower class receives more student-centered instruction than their higher, or AP, levels. The math teacher, when referring to teaching her upper level classes, noted, “I’m in front of the classroom, and I’m lecturing, but it’s not really lecturing [it’s a] mix of the two. I’ll go through examples, and I’ll show them, and I’ll point out things that are going to be stumbling blocks.” The English teacher commented on the low-level English class having more movement involved. She also indicated that the class was more student-centered and project based. She went on to say that due to some extra time given in the AP classes, she was finally forced to move to student-centered activities in the AP classes.

Of the five teachers that discussed student-centered activities, two of the teachers that team teach a class indicated using more hands on activities with lower kids to get them more engaged. They explained that in their lowest level class, they incorporate more hands-on activities that are student interest based. One of the team teachers indicated that she likes to incorporate topics of interest to engage them including quad riding and tractor pulls.

Upon looking at the remaining three teachers, who were a mix of English and math teachers, two of the teachers co-teach a class, and they did not specifically mention student-centered activities, one of the co-teachers noted not giving very many “project things.” While these teachers’ mindset scores ranged from 2.62 to 3.4, it is important to note that the teacher with the highest mindset score (leaning toward a fixed mindset), noted using more teacher led instruction because “they don’t have the ability to learn independently.” These comments from

the remaining three teachers coincide with the information found in the literature review. Worthy (2010) found that teachers generally provide honors classes with creative instruction and sophisticated materials giving them freedom to work interactively, while regular classes focus on isolated and basic skills and use simple materials.

The teachers were asked about the types of activities planned at each level. The term “group work” was not specifically mentioned by the researcher; however, five of the eight teachers discussed the use of “group work,” one teacher spoke about students working together, stating two different times, “weaker kids will work with someone who is stronger that helps them out.” In looking at the statements made by the five teachers that mentioned the term “group work,” each of the five teachers that discussed group work remarked about the difficulty of giving group work in lower level classes. Comments were made regarding the productivity of smaller groups in the lower level classes, and three teachers indicated that smaller groups work best with lower levels. One teacher explained that he gives less group work in his lower period because of behavior issues which corresponds with Kelly and Carbonaro’s (2012) study noting that low track students are frequently inattentive and disruptive. One teacher noted that there is more group work for upper level kids; however, in the lower level, “working in groups of two is best.” She went on to explain, “After the content has been taught the students will work individually to gauge where each student is. Then we can more accurately group them. Groups are never the same. In the lower level, groups are chosen for them, but the higher level choose the groups themselves.”

When the teachers were asked how they planned and prepared for each class, four of the eight (two math teachers and two English teachers) noted that they plan the same types of activities for each class. One teacher stated that he incorporates AP strategies into the lower

level, noting, “I’ve found that they’ve actually worked very well.” Another teacher discussed challenging the students, “they’re rising to the challenge.” He went on to say, “I’m in front of the classroom and I’m lecturing, but it’s not really lecturing, it’s a mix of the two. I’ll go through examples and I’ll show them and I’ll point out things that are going to be stumbling blocks. I’ll go through an example, but I make them give me what to do next.” This teacher also noted that he plans the same for each level; however, the pacing is different as he gives basic examples to lead them into more difficult material expecting them to be able to do the same stuff as the upper levels. Two other teachers noted that they did more modeling with their lower level kids, and one explained that she uses ideas that her other periods come up with to help with her lower kids. Gutshall (2013) found that classroom teacher’ mindset views may remain the same in spite of learning disability, status, or gender. The teachers that plan the same regardless of tracked level support the findings of this research.

#### **4.4.2 Student Behavior, Work Habits, and Interest in Learning**

In focusing on student behavior and performance, three teachers discussed giving time in class to complete the homework. Two of the co-teachers noted built in class time for homework stating, “[We] try not to give them less homework, it’s already what they need.” A math teacher exhibiting a mindset score that closely relates to a fixed mindset stated that his grading and expectations are totally different for his AP class and low level class. He stated that he expects more outside work from his AP students, and that 90-95% of the work expected from his lower level students is done in class. This coincides with Rattan et al. (2012) who found that instructors holding an entity (fixed) theory of math intelligence more readily judged students to have low ability than those holding an incremental (malleable) theory. This study also revealed

that those exhibiting a fixed mindset were more likely to comfort students for low math ability and use “kind” strategies like assigning less homework.

#### **4.4.3 Differential Teacher Expectations**

Comments concerning the difference between heterogeneously tracked classes and homogeneously tracked levels were more general. In regard to heterogeneously tracked classes, one teacher stated, “I don’t think the top kids push themselves as much as they did before we tracked students. There is more down time for those kids. Kids at the lower end suffer because you can’t give them full attention.” Another teacher noted, “Writing was better when we broke them into groups.” One teacher suggested, “Mixed classes clearly penalize the top learners.” In discussing one homogeneously tracked low level class, the teacher stated, “Lack of motivation/negativity amongst the students provides a hurdle; it gives us obstacles to overcome.”

I found it interesting that when asked about the differences between heterogeneously tracked classes and homogeneously tracked classes, the three teachers that gave negative comments about the heterogeneously tracked classes achieved a mindset score above three (indicating a more fixed mindset). These teachers made comments concerning the top kids, kids not pushing themselves or being penalized, and the bottom kids suffering. It is also important to note that one of the teacher’s exhibiting the most fixed mindset score noted, “20% of their grade is on respectful behavior such as being prepared for class and not sleeping.” This relates to coddling students, which is a fixed mindset characteristic.

Overall, the teachers responded to the questions with similar answers. Of the eight teachers interviewed, four noted that they plan the same for all levels, and they assess the same. All eight of the teachers noted giving kids opportunities to fix mistakes and resubmit which is a

growth mindset characteristic. The teachers with the mindset scores that most closely leaned toward a growth mindset specifically noted activities geared toward deliberative planning such as putting answers on the board, walking the students through the answers, providing feedback, and encouraging the students to elaborate. Guidance for deliberative practice is one of the major characteristics of a teacher with a growth mindset (Conyers & Wilson, 2013). This also goes along with solving problems aloud in the classroom in order to help students learn to think at higher levels through effective modeling.

## 5.0 DISCUSSION AND CONCLUSION

### 5.1 SUMMARY

The primary objective of schools is to educate students. It is becoming increasingly important for all students to be educated at the highest of levels. Although detracking began in the 1990s, students are still sorted into different academic levels in schools across America. Most students who are placed in low-level tracks at the start of their high school career remain in those tracks until graduation. This is unsettling, and it poses an important question. Do students in lower level groups underperform because they do not have the ability? Or, do they underperform because they are expected to? According to Kelly and Carbonaro (2012), Track placements affect teacher expectations above and beyond student achievement and other characteristics” (p. 289). This invites the question: *How do teacher’s attitudes affect student success?*

If it is true that assuming a student has the ability to achieve will aid in achievement, how does this affect placement of students? If students are grouped by ability level, there is an assumption that the lower ability level is placed in that setting for a reason – their lack of ability. In the book *Mindset*, Carol Dweck (2006), states, “In a fixed mindset, people believe their basic qualities, like their intelligence or talent are simply fixed traits. They spend their time

documenting their intelligence or talent instead of developing them. They also believe that talent alone creates success – without effort.” Dweck further explains, “In a growth mindset, people believe that their most basic abilities can be developed through dedication and hard work – brains and talent are just the starting point. This view creates a love of learning and resilience that is essential for great accomplishment” (p. 63)

What is the effect of a belief in fixed intelligence on educators? Is it practical and unproductive to keep trying to educate students when they struggle? Instead of assuming that they will learn with extra time and effort, many educators teach a watered down curriculum to students who are assumed to be a lower ability level. Teachers who are unaware of the advances in neuroscience regarding malleability of intelligence often believe students’ intelligence is fixed, and they view struggles as failures instead of struggling as a critical part of learning. Other research shows that students can learn more with persistent effort from those who educate them (Dweck, 2006, p. 60). Upon considering these ideas, this study aimed to examine teacher mindset and its effect on student achievement in varying tracks. In order to do this, this study looked at the following three questions: How are students tracked in the 21<sup>st</sup> century United States educational system? How do teachers’ perceptions of student achievement, behavior, and future plans vary between low and high tracked classes? How does a teachers’ mindset affect student learning?

## **5.2 TRACKING**

Although detracking is becoming more commonplace, with many schools reporting the elimination of tracking, according to the literature most schools engage in some form of

curricular tracking. In Kelly and Price's (2011) study, they found that almost all schools in the study had some policies restricting enrollment in high track courses including test score or grade minimums or teacher recommendation. In looking at the two schools in this study, most teachers felt that students were tracked according to their grades in the classes taken in prior years, and standardized test scores played the smallest role in grouping students in the perceptions of teachers from both school districts.

According to the teachers who were interviewed, in one school the math teacher noted that students were tested at the end sixth grade in order to sort them into the tracked levels. In the other school, the math teachers noted that the students were sorted after their sixth grade year into either a pre-algebra class or a regular math class. This process allowed the students to remain on a certain path until they graduated either moving from pre-algebra to algebra followed by geometry then receiving a trigonometry course. Those students then had the opportunity to take pre-calculus and AP Calculus. The other grouping of students moved into an algebra or a supplemental algebra course in ninth grade. Those who completed algebra in ninth grade were then able to take Algebra II, geometry, and either trigonometry or statistics. The supplemental algebra course is paired with an Algebra I course, and those students may be directed to an Algebra III class before graduating or they may take a low level integrated math class. Teachers from both schools noted that the students who were tracked in a lower level in middle school would have to "double up," or take two math classes in one year of high school in order to change math levels. Because these schools follow a traditional tracking structure, mobility would be the exception. It is important to note, that in math, mobility would only occur if a student takes an extra math class in order to "catch up" to his peers.

According to the English teachers in those school districts, tracking is still commonplace in the school in District A; however, in the school in District B, in ninth grade there is only one English class offered to all students. In tenth grade, students are able to choose to take a Pre-AP course with instructor approval, and in eleventh and twelfth grade AP options are offered with instructor approval; however, each grade level only offers one other English class labeled as college preparatory. In District A, the English teachers noted that students were tracked in seventh grade, and remained in that track until 12<sup>th</sup> grade when English courses changed to open enrollment. One English teacher in that school district noted that the students are heterogeneously tracked in middle school, the top 50% are placed in honors and the bottom 50% are placed in a regular English class. These teachers noted there is a post assessment and teachers can recommend a level change; however, traditionally that does not happen. This coincides with the studies that have been done on tracking, in that, data shows about three-fourths of students attending tracked math classes over the past two decades while numbers have dropped in English/Language Arts tracking. Although both schools still set a path for student math classes, District B does very little tracking in English/Language arts, and although District A sorts students in English/language arts, they only do so until their senior year

### **5.3 SELF-REPORTED MINDSET SCORE**

Teachers have a tremendous influence in their classroom, and their views on malleable intelligence have significant implications for their students' academic performance, which can affect beliefs and motivation (Jones, Bryant, Snyder, &Malone, 2012). A teacher's mindset can affect the environment and even student outcomes. Dweck (2006) believes, "teachers with the

fixed mindset create an atmosphere of judging (p. 197). However, teachers who exhibit growth mindset tendencies tend to foster that mindset among their students leading to greater motivation and effort (Conyers & Wilson, 2013).

According to Conyers and Wilson (2013), teachers with a growth mindset exhibit seven major characteristics in their classrooms: high standards, a nurturing environment, guidance for deliberate practice, praise for effort, a focus on mastery goals, the use of formative assessments, and an emphasis on thinking skills (p. 89). In order to determine information about a teacher's mindset, I created a survey with roots from Carol Dweck's Mindset Assessment Profile Tool as well as consultation from experts in the field. Prior research has found that approximately 29% of study participants exhibit fixed mindset characteristics while approximately 70% show growth mindset characteristics (Gutshall, 2013). Approximately 63% of the teachers in my exploratory study achieved a score on the profile that noted a belief in the possibility of one's intelligence being malleable, while 13% received a score that suggested a growth mindset, believing that the best way to learn is to work hard, and that making mistakes leads to learning. This indicates that a majority of teachers believe that intelligence can grow; however, they did not score in the category that matched every indicator of a growth mindset. This finding is similar to the previous research in that almost three-fourths of the participants exhibited growth mindset characteristics. An exciting aspect about these findings is that none of the participants in my research received a score noting a belief that intelligence cannot be changed; however, 25 % were unsure whether a person could change his intelligence. This is important when understanding that teachers with a growth mindset tend to be more effective in the classroom. It's also relevant that none of the math teachers surveyed achieved a score of less than two (a score of 1-1.9 indicates a high growth mindset score) while 29% of English teachers achieved a

score of less than two indicating that more English teachers held an incremental theory of intelligence exhibiting growth mindset characteristics.

#### **5.4 THEORIES OF INTELLIGENCE AND TEACHER INSTRUCTION**

After visiting twelve classrooms on two different occasions, I was able to see variations in teacher instruction within the classroom. Following the observations, I spoke with the teachers of six of the courses to further discuss their perceptions of classroom instruction. Upon observing the classrooms, I found that most teachers, regardless of mindset score, relied on teacher-centered instruction. Throughout the observations of low tracked classrooms, I saw teachers lead questions and answer sessions, teachers reading to students, and teachers spending the majority of the time in front of the classroom. In contrast, in the interviews, the majority of the teachers suggested that they spend more time on student-centered activities. One limitation to this study relates to the amount of time spent observing classrooms, the researcher was only able to see a snapshot of the activities done in a classroom over two observations. Nevertheless, recall from Table 6 that 25% of instructional time was allocated to student-centered activities in several of the classrooms observed; it seems there is a disconnect between what teachers report about instruction and what actually occurs in some low track classrooms.

Another interesting result from the data that was collected relates to the level of rigor used in the classroom. Upon recording the activities and questions presented in each classroom, I labeled each activity according to Webb's Depth of Knowledge indicators. While very few teachers presented activities with the highest level of rigor, I found that teachers whose results on the mindset self assessment fell between 1 and 2.9 (indicating more of a growth mindset) used

more rigorous activities than those who received a score of three or higher. This relates to Dweck's (2006) description of effective characteristics associate with growth mindset educators (p. 187).

There was one exception to this finding. The teacher who scored the highest on the self assessment, falling into the category that indicated an uncertainty about changing ones intelligence, offered students activities with an average level three rigor according to Webb's DOK. The students were working on this rigorous student-centered activity during both of my observational experiences. However, while I was observing the class, the teacher indicated that this was not a usual activity in this type of course (low tracked level). The teacher explained that this was an activity developed by another teacher that taught the same level, and the students were trying it. I would have liked the opportunity to spend more time in this classroom to determine an average level of rigor.

## 5.5 LIMITATIONS

This study of teacher mindset and its effect on low tracked classes included various limitations. In using self-reported surveys and interviews, participant's responses can be limited by social desirability bias. Because the survey questions focused on how the teachers perceived intelligence, teachers may answer questions in a way they perceive to be favorable. Due to the popularity of Carol Dweck's (2006) book, *Mindset: The New Psychology of Success*, many people may have read it and want to answer questions in a way that corresponds to the book instead of answering with their true beliefs. Social desirability bias may also affect the interview

process in that teachers may over report information about strategies that they feel are desirable to use in the classroom.

Another concern associated with this study is the sampling process. Both districts studied were in the same geographical region. Although one was bigger than the other was, the demographics were fairly similar. Many studies point out that teacher expectations can be influenced by demographics; however, due to the landscape of the study, a wide range of demographics was not covered. Therefore, the study cannot be broadly generalized beyond western Pennsylvania. The exploratory nature of the study limits its usefulness as well. There is limited prior research on teacher mindset and its effect on student learning; therefore, some of the analysis may be subjective.

## **5.6 IMPLICATIONS FOR RESEARCH AND FUTURE PRACTICE**

Prior studies show the benefits of instilling growth mindset characteristics in students. Believing that intelligence is malleable and can be developed has significant impacts on learning. The literature reveals that exhibiting growth mindset traits is a quality that an effective teacher portrays. Teachers with growth mindsets set higher standards in the classroom and help all students achieve those standards (Dweck, 2006).

The study results show that a majority of teachers portrays growth mindset traits. Working with these qualities and promoting them in students could lead to higher student achievement and motivation. An implication for practice is related to the professional development offered to teachers. Training teachers to promote growth mindsets in students could benefit successes of both the students and the schools. This could also lead to a future

study involving teaching incremental theories of intelligence in school, and its benefit on student achievement.

Although a majority of the teachers portrayed growth mindsets, through observations, it was noted that all teachers, regardless of mindset score spent more time using teacher-centered activities than student-centered activities. A further study may need to be done focusing on the use of teacher-centered instruction and exhibiting growth or fixed mindset characteristics.

A further implication of this study relies on professional development of teachers. If exhibiting and promoting growth mindset characteristics is beneficial to the learning environment and aids in the advancement of student successes, is it beneficial and cost effective to provide professional development to help shape teacher mindsets. In order to understand this better, further research needs to be completed on the ability of professional development to shape teacher mindsets effectively. Is it enough to just understand what a growth mindset is and how to display the traits or is more extensive development required?

Prior to completing this study, my interest rested in teacher mindsets and their effect on student learning. I am still interested in further exploration of this topic. A future longitudinal study may focus on teacher mindsets and student results on standardized tests. Studies of this nature could result in changing hiring practices in school districts in order to focus on growth mindset traits in the interview process. There could also be implications for pre-service teachers and teacher education programs.

## 5.7 CONCLUSION

Teachers matter more to student achievement than any other aspect of schooling (Teachers Matter, 2012). In understanding how important a teacher is to a classroom and a school, it is important to make sure all teachers are effective. According to Carol Dweck (2006), “The great teachers believe in the growth of intellect and talent, and they are fascinated with the process of learning” (p. 188). She notes that great teachers set high standards for all students (p. 190) and teach students how to reach high standards (p. 192). Fixed minded teachers often think of their role as simply to impart their knowledge (p. 195).

In reflecting upon this it is so important to make sure all schools are encouraging growth mindsets in teachers. According to the literature and the information found in this study, although many schools are touting the idea of detracking, tracking is still thriving in America’s schools. As discussed in the review of literature, expectations that lower track students are unlikely to achieve academically could potentially set these students up for failure from the start. Supporters of this viewpoint argue that teachers generally hold limiting expectations for students in lower educational tracks (Wheelock, 1992). This study aimed to look at teachers with differing mindset scores and their approach to and perception of teaching students in low academic tracks.

This study looked at a group of 37 teachers and found that 76% of them leaned toward a growth mindset, scoring between 1 and 2.9 on the mindset survey. According to Dweck, this could mean that the majority of teachers in this study exhibit effective teaching characteristics. This is encouraging as it is so important that teachers model the mindset in the classroom and foster the growth mindset in students. Fostering this mindset can lead to greater student motivation and effort, which could greatly change the path of students in low tracked classes.

However, it must also be noted that this study found that most of the teachers, regardless of mindset score, focused more on teacher-centered activities as opposed to learner, or student-centered activities. This indicates that mindset did not show a pronounced difference in instruction. Through observations, it was noted that most of the teachers who scored lower on the mindset survey (exhibiting growth mindset characteristics) used activities with higher levels of rigor more often indicating that incremental theorists (those exhibiting a growth mindset) may plan more rigorous activities or ask more rigorous questions. However, more research needs to be completed to determine the significance of this idea.

## APPENDIX A

### TEACHER SURVEY

Teacher ID \_\_\_\_\_

#### **Differentiation of Instruction Survey for Teachers**

My study is trying to understand how teachers differentiate instruction for diverse learners. Read each question and then note your level of agreement with the following statements. Please remember there are no “right” or “wrong” answers in that I am most interested in your own professional understanding of this topic gained from years working with students in a variety of settings.

*Thank you for your time.*

1. I have had many opportunities to learn about strategies to successful differentiate instruction.

- Strongly Disagree (1)
- Disagree (2)
- Mostly Disagree (3)
- Mostly Agree (4)
- Agree (5)
- Strongly Agree (6)

2. Only a few people will be truly good at academics – you have to be “born with it.”

Strongly Disagree (1)

Disagree (2)

Mostly Disagree (3)

Mostly Agree (4)

Agree (5)

Strongly Agree (6)

3. Your intelligence is something that you can't change very much.

Strongly Disagree (1)

Disagree (2)

Mostly Disagree (3)

Mostly Agree (4)

Agree (5)

Strongly Agree (6)

4. Differentiating instruction is a very stressful part of teaching.

Strongly Disagree (1)

Disagree (2)

Mostly Disagree (3)

Mostly Agree (4)

Agree (5)

Strongly Agree (6)

5. You can learn new things, but you can't really change your basic intelligence.

Strongly Disagree (1)

Disagree (2)

Mostly Disagree (3)

Mostly Agree (4)

Agree (5)

Strongly Agree (6)

6. Truly smart people do not need to try hard.

Strongly Disagree (1)

Disagree (2)

Mostly Disagree (3)

Mostly Agree (4)

Agree (5)

Strongly Agree (6)

7. Students have a certain amount of intelligence, and teachers can't really do much to change it.

- Strongly Disagree (1)
- Disagree (2)
- Mostly Disagree (3)
- Mostly Agree (4)
- Agree (5)
- Strongly Agree (6)

8. You are better at solving problems if you are creative.

- Strongly Disagree (1)
- Disagree (2)
- Mostly Disagree (3)
- Mostly Agree (4)
- Agree (5)
- Strongly Agree (6)

9. You can do things differently, but the important parts of who you are can't really be changed.

- Strongly Disagree (1)
- Disagree (2)
- Mostly Disagree (3)
- Mostly Agree (4)
- Agree (5)
- Strongly Agree (6)

10. Students' talent in an area is something that you can't change very much as a teacher.

- Strongly Disagree (1)
- Disagree (2)
- Mostly Disagree (3)
- Mostly Agree (4)
- Agree (5)
- Strongly Agree (6)

11. You are made stronger when faced with difficult situations.

- Strongly Disagree (1)
- Disagree (2)
- Mostly Disagree (3)
- Mostly Agree (4)
- Agree (5)
- Strongly Agree (6)

12. You can learn new things, but you can't really change your basic level of talent.

Strongly Disagree (1)

Disagree (2)

Mostly Disagree (3)

Mostly Agree (4)

Agree (5)

Strongly Agree (6)

The following questions focus on how students were assigned into your focal class and about your role in course taking decisions. I am interested in your \_\_\_\_\_ period class.

Grade Level: \_\_\_\_\_ Subject Matter: \_\_\_\_\_ Ability Level of Students: \_\_\_\_\_

13. In your focal class, about how many students are enrolled in this class, in part, due to their *standardized test scores*.

None (1)

A few (2)

About half (3)

More than half but not all students (4)

All or almost all students (5)

14. In your focal class, about how many students are enrolled in this class, in part, because of their *grades from previous years*.

None (1)

A few (2)

About half (3)

More than half but not all students (4)

All or almost all students (5)

15. In your focal class, about how many students are enrolled in this class, in part, because of *teacher recommendation*?

None (1)

A few (2)

About half (3)

More than half but not all students (4)

All or almost all students (5)

16. In your focal class, about how many students are enrolled in this class, in part, because of *student choice*?

None (1)

A few (2)

About half (3)

More than half but not all students (4)

All or almost all students (5)

*The following questions are about the students that you have had in the last few years in your focal class. If this is a new class, please answer each question as best you can about the class:*

17. Do students ever change a tracking level once they are scheduled into it? Ie. A student is scheduled into a low level track as a 9th grader, but as a 10th grader, he is scheduled into a higher level track.

Never (1)

Very Rarely (2)

Rarely (3)

Occasionally (4)

Very Frequently (5)

Always (6)

18. Are any students discrepantly tracked? Ie. - A student is scheduled into a high level math class and a lower level English class.

Yes (1)

No (2)

19. Please use this space to explain any other factors used when tracking students?

20. Are you willing to answer questions in an interview format about your lesson planning process?

Yes (1)

No (2)

**APPENDIX B**

**CLASSROOM OBSERVATION TOOL**

Classroom Observations

Classroom observations will focus on time spent on various tasks and questions asked by the teacher. I will observe teachers and students engaged in classroom activities. I will examine the level of questions asked and answered in low tracked classes. Those levels will be coded according to Webb’s Depth of Knowledge. Types of activities will be document; time spent on teacher-centered and student-centered activities will be noted.

Activity/Question (Procedure)	Type (TC or SC)	Start	Finish	DOK	Notes

## APPENDIX C

### OBSERVATION LOOK-FOR TOOL

#### Look Fors

- Teacher centered vs. student centered activities (time on task)
- Wait time (less? More?)
- Rigor of activities /Questions
- Feedback type (comfort oriented?)
- Homework assigned (less? More?)

<p style="text-align: center;">Level 1 (Recall)</p> <p><b>Verbs:</b> Arrange, calculate, define, draw, identify, list, label, illustrate, match, memorize, recognize, tell</p> <p><b>Focus:</b></p> <ul style="list-style-type: none"> <li>• specific facts</li> <li>• definitions</li> <li>• details,</li> <li>• procedures</li> </ul> <p>*one correct answer</p> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Can you recall?</li> <li>• How can you find the meaning of?</li> <li>• What is the formula for?</li> <li>• Who was?</li> <li>• Solve a one-step word problem</li> <li>• Evaluate an expression</li> <li>• Apply a formula</li> <li>• Determine the area or perimeter in a drawing with labels</li> <li>• Solve linear equations</li> </ul>	<p style="text-align: center;">Level 2 (Skill/Concept)</p> <p><b>Verbs:</b> categorize, cause/effect, classify, compare, distinguish, estimate, graph, interpret, modify, predict, relate, show, summarize</p> <p><b>Focus:</b></p> <ul style="list-style-type: none"> <li>• applying skills and concepts</li> <li>• explaining how or why</li> </ul> <p>*still one correct answer</p> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Can you explain how ___ affected ___?</li> <li>• How would you classify?</li> <li>• What steps are needed to edit?</li> <li>• How would you summarize?</li> <li>• How would you apply what you learned to develop ___?</li> <li>• Select a procedure according to criteria and perform it</li> <li>• Specify and explain relationships between facts, terms, properties, or operations</li> <li>• Compare, classify, organize, estimate, data</li> </ul>
<p style="text-align: center;">Level 3 (Strategic Thinking)</p> <p><b>Verbs:</b> assess, cite evidence, conclude, construct, critique, develop a logical argument, differentiate, formulate, hypothesize, investigate, revise</p> <p><b>Focus:</b></p> <ul style="list-style-type: none"> <li>• reasoning and planning in order to respond</li> <li>• complex and abstract thinking required</li> <li>• defending reasoning or conclusions</li> </ul> <p>*multiple answers or approaches</p> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• What facts would you select to support?</li> </ul>	<p style="text-align: center;">Level 4 (Extended Thinking)</p> <p><b>Verbs:</b> apply concepts, analyze, connect, create, critique, design, prove</p> <p><b>Focus:</b></p> <ul style="list-style-type: none"> <li>• complex reasoning</li> <li>• planning and thinking</li> <li>• make real world applications in new situations</li> </ul> <p>*multiple answers or approaches, often requires extended periods of time with multiple steps</p> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• Write a thesis drawing conclusions from multiple</li> </ul>

<ul style="list-style-type: none"> <li>• How could you test?</li> <li>• Can you elaborate on the reason?</li> <li>• Can you predict the outcome?</li> <li>• Best answer? Why?</li> <li>• What conclusion can be drawn?</li> <li>• Support your rationale?</li> <li>• Solve multiple step problem and provide support with a mathematical explanation</li> <li>• Formulate an original problem</li> </ul>	<p>sources</p> <ul style="list-style-type: none"> <li>• Design and conduct an experiment</li> <li>• Apply one approach among many to solve problems</li> <li>• Design a mathematical model to inform/solve a practical or abstract situation</li> <li>• Relate math concepts to real-world applications in new situations</li> </ul>
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## **APPENDIX D**

### **INTERVIEW QUESTIONS**

- Tell me about your educational background.
- Can you describe your class dynamic? Tell me about the behavior, attitude, and work ethic of students?
- How do you plan/prepare for each class level?
- Tell me how you formatively assess (check for understanding) for each level?
- What types of activities do you plan for each level?
- Do you plan more student- centered activities for higher levels or lower levels? Please explain.
- Is there a difference between what you plan for each level and how it is carried out in each class?
- Do you see any differences between heterogeneously tracked classes and homogeneously tracked classes in regards to student performance? Teacher preparation? Assessment?
- When are students tracked (sorted into levels) in your school?
- How many students change levels? Do students ever begin in one track and move to a different track? Low to high?
- What grade levels or subjects are heterogeneously tracked?

**APPENDIX E**

**SUPERINTENDENT CONSENT FORM**

Study of Tracking and Instruction

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Superintendent of \_\_\_\_\_ School District:

As part of my doctoral studies at the University of Pittsburgh, I am conducting a research study of the effect of teacher mindset on instruction and achievement. I will be conducting my research in two (2) district(s). In your district, \_\_\_\_\_ High School has been selected to participate. The data provided will help to understand the effect of teacher mindset on instruction, specifically in low-tracked classrooms.

With your district’s permission, I will be asking English/language arts and math teachers at the selected school to complete a teacher mindset and instructional practice survey. Following the survey, I will ask to meet with teachers to participate in interviews, and I will ask teachers to allow me to conduct two (2) observations of instruction during normal classroom time. In addition, students in each teacher’s classroom, contingent on student and parent consent, will be asked to complete a survey.

Your district’s participation in this study is entirely voluntary. Individual teachers and students will be free to decline participation at any time, and their responses will be kept strictly confidential. The data will only be used to generate statistical results. In order to protect the confidentiality of teacher and student responses, I will not report individual data from students or teachers.

I hope you will agree to participate and return this letter signed below to indicate permission to conduct this study in your district. If you have any questions about the study please contact Tawnia St.Amant at 724 875 2942. If you have further questions or want to talk with someone about the rights of research participants in your district, please contact the University of Pittsburgh IRB office at 412-383-1480, or by email at askirb@pitt.edu.

I sincerely hope that you decide to be part of this research project.

If you agree to participate in this study, please sign below:

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Superintendent’s Signature

\_\_\_\_\_  
Date

## APPENDIX F

### STUDY INFORMATION LETTER FOR TEACHER/PARTICIPANTS

# Study of Tracking and Instruction

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You are being asked to participate in a research study concerning tracking and instruction. This research is being carried out by Tawnia StAmant, who is pursuing her doctoral degree at the University of Pittsburgh.

This study will examine best practices for instruction and learning in low-tracked classrooms. The study will take place during normal classroom time. If you agree, you will be asked to complete a 20-minute teacher background and instructional practice survey. Following the survey, you may be asked to participate in an interview and to allow researchers to observe your class two (2) times throughout the school year. The interviews will be audio-recorded for data compilation purposes.

This study has been reviewed by the School District superintendent who has given permission to study several English/ language arts classrooms and math classrooms this year. As one of only 32 teachers selected to participate, the data collected in your classroom will help make the conclusions of this study representative of instructional practices and outcomes in your school district.

To protect your confidentiality, when the data is analyzed and reported, you will only be identified by a number, never by your name. No sensitive information is being collected and therefore, the risk to you from a confidentiality breach is minimal. Your participation is voluntary. If you choose to participate, you can stop at any time. You will also receive no compensation or extra benefits for your participation. I hope that we can use this study to see improvements in teaching and learning.

If you have any questions about the study, please contact Tawnia St.Amant, at 724 875 2942. If you have more questions, or want to talk with someone about your rights as a research participant, please contact the University of Pittsburgh IRB office at 412-383-1480, or by email at askirb@pitt.edu.

I sincerely hope that you decide to be part of this research project.

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