

*A Preliminary Study on the Effect of Math Tracking on Learning:  
Students' and Parents' Thoughts*

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**Abstract**

Math tracking, or ability grouping, is a practice used in mostly secondary education to place students into different math classes according to their mathematical abilities. However, the placement of students in various levels of math classrooms typically relies exclusively on adult perceptions, and the students, rarely get the chance to let the world hear their voices. In this study, we surveyed (n=40) and interviewed (n=9) students and parents to gather their thoughts on math tracking. The survey results were mixed. While more than 50% of the students reported that math tracking is stressful and preferred detracking, more than 60% of the students believed that math tracking has a positive impact on learning and motivates them to work toward more difficult courses. However, interview results revealed that the negative effect of math tracking can have significant adverse impacts on some students. One parent shared her story of transferring her child to another school due to the strain of math tracking. Overall, our interim conclusion is that schools that implement math tracking must offer additional academic and emotional support to students who might not benefit from the practice. We suggest future research on students' stress levels across different math courses to gain more insights into how math tracking impacts students' mental health.

Keywords: Math Tracking, Ability Grouping, Gifted Students, Accelerated Math, Educational Equity

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## **Introduction**

In many parts of the world, math tracking is used in students' education. Math tracking is to place students into different math classes according to their mathematical abilities. Ability grouping is not unique to mathematics, but there are also different forms of group teaching in other subjects (see, for example, Eccles & Roeser, 2011; Li & Kam, 2011). However, the placement of students in various levels of math classrooms typically relies exclusively on adult perceptions, and the students, rarely get the chance to let the world hear their voices. There have been discussions on the topic, but a conclusion is yet to be formed. Some people, mostly students, think that math tracking has a negative effect on students' learning as it creates stress and pressure to not be left behind. At the same time, some people, mostly parents, think that it allows students to learn at their own pace and level which will cause their mathematical skills to advance sooner. This research paper will discuss the controversy of whether math tracking has a positive or negative effect on students' learning and is necessary or not.

## **Literature Review**

Math-tracking is a common practice in American middle schools. About 75 percent of U. S. students are tracked in math (Loveless, 2013). As it is spreading to more schools, there are people that stand for it and there are people that stand against it.

When it comes to learning, two factors are most important, and they are pace and the understanding of the material. Pace is something we cannot ignore in learning. Every unique student has a different pace of learning and in the field of math, the pace of learning is crucial. By placing students in different courses, both polymath students and students who aren't gifted can learn and advance at their own pace. It will help them "engag[e] and [train with different] learning experiences" (Petrosillo, 2022). Eventually, all students will be developing a deep understanding of the content and reach their highest potential. As an example, students can "choose to take anywhere from one to five math classes in high school with varying degrees of rigor – all while meeting their graduation requirements" (Kelmon, 2019). Math tracking enables students to not only grow effectively but take as many classes as they want in school while meeting all the graduation requirements because they are able to learn at their own pace.

To add on, if math tracking isn't in action, and students with different learning paces and wide skill ranges are mixed, there will be struggles because it will slow down the class. For example, Colangelo & Kelly (1983) revealed that gifted students are eager to participate in gifted programs because they are willing to work together with other talented students rather than regular students. Doucet (2012) claimed that an accelerated course is the best arrangement for gifted students given the necessary financial support. Manuel (2017) pointed out that there are some talented students in math lose their interest when they complete middle school because they are not intellectually stimulated by the everyday tasks during mathematics lessons.

The understanding of the material is essential for learning, as there are cases when students move on without gaining the knowledge. In mixed classes, students who aren't gifted in the field of math won't be able to fully understand the material because they will be constantly asked to understand something not at their level, something they are unable to perceive. They will be scared to ask questions because they don't want to embarrass themselves in front of

other students. Their final grades will then reflect these insecurities and lack of motivation to learn and advance. Students who don't acquire the knowledge will have to retake the course and will fall far behind.

At the same time, there are schools that "eliminated math tracking, recognizing that the practice can create inequities between students, with significant ramifications as they progress through school" (Berwick, 2019). While there are students that take different courses as motivation, there are also students that lose passion in math because of math tracking and give up. To add on, there are cases around the world when math tracking has divided students. As an example, in Cambridge Public Schools, high-level courses are filled with white and Asian children, and lower-level math courses are filled with black and Latino children. It has created a negative influence on students, "students internalize it – they believe the smart kids are the white kids" (Berwick, 2019). Students lose confidence and discourage themselves to keep learning when in different leveled math courses. Correspondingly, mixed classes prevent competition and stressful atmospheres between students. They ensure that no student is left out. To learn more about the effect of math tracking might bring to students and parents, this study was conducted with the guidance of these research questions:

1. Does different math-level courses bring stress to students?
2. How do students think about the difficulty of different math-level courses?
3. Would students like it better if all students took the same math courses?
4. Do students learn mathematics effectively from courses at different levels?
5. Would students still be able to have the same performance when combined into one math course?

## **Methodology**

The present study used surveying and interviewing as its primary research methods. In order to obtain a preliminary understanding of the effect of math tracking on students' learning, a convenience sampling method was employed, with the majority of respondents being students and parents associated with an international middle school in Shanghai. To enhance the representativeness of the sample, the authors also extended invitations to students and parents from other schools. The parent respondents exhibited diverse occupational backgrounds and nationalities, and were residing in various countries. The survey and interview participants included students enrolled in both advanced and regular mathematics classes. Data collection was carried out in-person by the first author during November and December of 2022.

## **Findings**

### ***Survey With Students***

Quantitative data was collected by surveying ten seventh-grade students and ten eighth-grade students taking the advanced math course. The following questions were posed to them for response:

1. Do you find different math-level courses stressful or not stressful?
2. On a scale of 0~10, 0 being easy and 10 being too hard, how would you rate your math classes?
3. Would you like it better if everyone took the same math class?

Fourteen students responded that they find it stressful, which amounts to 70% of all students. The main reason was that they had to keep worrying about whether they will drop out from their current courses or not. Out of twenty responses, sixteen students rated their math classes an 8, which translates to 80% of the total and it was because the material was sometimes harder than their ability. Also, twelve students responded that they would like it better if everyone took the same class, which translates to 60% of the total. The primary reason for these responses was that they didn't want minor competitions and conflicts between their classmates to get into the higher math course. Though math tracking might be effective, with these responses, it is foreseeable that over 50% of the students might have a negative view of math tracking. These responses show that its short term might be effective, but the long-term effect is unpredictable because of the drawbacks it brings along.

Another set of qualitative data was conducted by surveying twenty eighth-grade students, 13 students from the advanced math course and 7 from the regular math course. They were asked whether they believed that math tracking has a positive effect on students' learning or not. The data shows that 60% of the students surveyed believed that math tracking has a positive effect on students' learning. Simultaneously, there were individuals who vehemently disagreed with its positive effect on students' learning. One student from the advanced math course and six students from the regular math course believed that math tracking has a negative impact on students' learning. A student from the regular math course who believes it has a positive effect said, "Even though I'm in the normal math course, I put the advanced math course as my goal and work hard every day. Math tracking helps me get motivated by students that are in higher-level courses and work towards the day to learn with them." Accordingly, most students believe that math tracking affects them positively.

### ***Interviews With Students and Parents***

Another set of qualitative data was conducted by interviewing 9 different interviewees, 5 students who each go to different schools, 3 parents that educate their children in different countries, and 2 math teachers in China and Korea. The interviewees were asked to answer the following questions: Do you think different leveled math courses are effective in students' learning? Why or why not? Would students still be able to have the same performance when combined into one math course? Kristy, a student from School A stated,

I think it's effective because students can teach and learn from each other because they have similar math levels. Also, I don't think students would have the same performance when combined because there will be students that will slow them down, which causes them to improve slowly and be unable to focus in a class entirely.

Two other students agreed with this point of view, and add to Kristy, saying that it would be more comfortable because not everyone has the same pace in learning. Meanwhile, two other students disagreed and believed that different leveled math courses are not effective in students' learning. Coco, a student from School B, stated,

I don't think it's effective because people have pretty much the same math levels. Some may be born with talent, but if people put effort towards it, they will improve so no one needs to be low-rated. Also, I think students would be able to have the same performance because the student doesn't change. If the student continues to take any course with persistence and hard work, anything would be possible.

Another student adds on to Coco and said,

Math tracking also causes stress. To add, I can't relate to my friends because some of us take different courses. Besides, another reason why students would be able to keep their performance whether good or bad because they won't be learning a different subject. It will just be the same material being easier or harder.

Parents in different regions responded with different points of view. Mrs. Johnson, a parent of two middle school students in the U.S. commented that math tracking is unnecessary and isn't effective in students' learning. She explained,

When I lived in China, my kids experienced math tracking in school. It wasn't an enjoyable experience for them. My first child started to give up on math because he was sick of the level system. And it became a lot better when we transferred him to a school without math tracking.

Parents of middle school students in Korea and China responded to the opposite of Mrs. Johnson, they both believed that it is effective in students' learning. Mrs. Ahn, a parent of a middle school student in Korea, said,

Math tracking is what motivates my son to try harder to improve faster in math. Although he indeed has that he has some stress on him, he said it himself that when he moves up, all that stress just goes away.

Mrs. Liu educating two middle school students in China added,

Yes, it is effective because students can reflect on their abilities and make plans to get better.

Interviews with teachers also showed a whole different story. In an interview with Ms. Jung, a math teacher in Korea, she said,

Whether math tracking is effective or not effective depends on the student. Throughout my years of teaching, I've met various students. To most students, math tracking works effectively, because then they desire to get better as their abilities are shown with the class they take. However, there are always some students in a class that seems careless and if math tracking is used in their learning, they will just give up. For parents with those students, I recommend first building their passion for math and progress into math tracking later.

An interview with Mr. Xi, a math teacher in China stated similarly. He said,

There is no answer in whether it is effective or not. Every student is different and so will the effect on the student. Nobody can conclude that math tracking will be effective or ineffective on students' learning.

## **Conclusion**

To many people, mathematics is one of the most important subjects a student has to study for. As parents' zeal for education increases over generations, younger students are learning and

solving problems designated for older students to solve (Lee & Mao, 2021). Math tracking is quickly spreading to parts around the world and high schools and universities are more likely to accept a student that has better marks in math and took high-level courses than a student who took low-level courses. Math tracking allows students to learn at their own pace and learn more deeply. However, it indeed also has a negative side, because everything comes with a price. It causes the students to be pressured and to be stressed out. It may also cause students to be bullied because of the level of the course they take. The data collected shows that this is a very interesting topic to discuss for both sides as both sides have reliable evidence to prove their points. Overall, our interim conclusion is that schools that implement math tracking must offer additional academic and emotional support to students who might not benefit from the practice.

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