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How American Grouping Systems Perpetuate Low Achievement

Whether or not to group students by prior attainment (often called ability) is one of the most controversial topics in education. Many parents support ability grouping because they want their high-attaining, motivated children to be working with similar children. This is completely understandable and makes perfect sense. But we know from several international studies that countries that reject ability grouping—nations as varied as Japan and Finland—are among the most successful in the world, whereas countries that employ ability grouping, such as America, are among the least successful. Is ability grouping part of the problem of America’s low achievement? And if it is, how can it be the case, when the idea seems to makes so much sense?

In 1999, the Third International Mathematics and Science Study (TIMSS) researchers collected a wide range of data on eighth grade students in thirty-eight countries. The achievement results, with the U.S. coming in nineteenth place, received a huge amount of attention and prompted widespread concern. But analysts of the TIMSS database also uncovered some interesting facts about ability grouping. For example, in a study of achievement variability the U.S. was found to have the greatest amount of variability between classes—that is, the U.S. had the most tracking. The highest-achieving country in the group, Korea, was the country with the least tracking and the most equal grouping. The U.S. also had the strongest links between achievement and socioeconomic status (SES), a fact that has been attributed to the widespread use of tracking in American schools. The high achievement of countries that do not use ability grouping and the low achievement of those that do was also a finding of the Second International Mathematics and Science Study (SIMSS) conducted from 1982 to 1984. This caused leading analysts to conclude that countries that leave grouping to the latest possible moment or who use the least amount of grouping by ability are those with the highest achievement.

Some have argued that the high degree of tracking in America is a reflection of our desire to sort students at an early stage in order to find and focus upon the high-achieving students. But such an approach has some serious flaws, including the difficulty of identifying students correctly when children develop at different rates, and the creation of highly unequal schooling, which is one of the results identified by the international studies. In Japan, by contrast, the main priority is to promote high achievement for all and teachers refrain from prejudging achievement, instead providing all students with complex problems that they can take to high levels. Japanese educators are bemused by the Western goal of sorting students into high and low “abilities,” as George Bracey, a professor at George Mason University noted:
In Japan there is strong consensus that children should not be subjected to measuring of capabilities or aptitudes and subsequent remediation or acceleration during the nine years of compulsory education. In addition to seeing the practice as inherently unequal, Japanese parents and teachers worried that ability grouping would have a strong negative impact on children's self-image, socialization patterns, and academic competition.³

Lisa Yiu, a student of mine at Stanford, was interested in the very different ways Japan and the U.S. treat the grouping of students. She visited Japan and interviewed some of the mathematics teachers she observed, who explained to her why they do not use ability grouping. "In Japan what is important is balance. Everyone can do everything; we think that is a good thing. . . . So we can't divide by ability."

Japanese education emphasizes group education, not individual education. Because we want everyone to improve, promote and achieve goals together, rather than individually. That's why we want students to help each other, to learn from each other . . . , to get along and grow together—mentally, physically and intellectually.⁴

The Japanese approach of teaching students "to help each other, to learn from each other, to get along and grow together—mentally, physically and intellectually" is part of the reason for their high achievement. Research tells us that approaches that keep students as equal as possible and that do not group by "ability" help not only those who would otherwise be placed in low tracks, which seems obvious, but also those who would be placed in high tracks too.

In neither of my two longitudinal studies of students work-
students may be in something called "math 7" while their peers are in pre-algebra, a higher class. Or eighth graders may be placed in "math 8" or in pre-algebra, while their peers are in algebra. The critical information that schools rarely provide is that in most American high schools, students cannot take calculus unless they have already passed algebra in middle school. If, like in most high schools, classes are a year long, then students who take algebra in ninth grade will take four years of courses without ever reaching calculus (algebra, geometry, advanced algebra, and precalculus). Thus the tracking decisions made by middle school teachers impact the classes reached in high school and, from there, students' chances of being admitted to colleges of their choice. Middle school students should hear a strange sound when they are placed into lower-level math classes. It is the sound of doors closing.

As educators become more aware of the disadvantages of tracking, more schools are trying different approaches. Carol Burris, from South Side High School in New York, with Columbia University professors Jay Heubert and Hank Levin, conducted a study of a detracking innovation in mathematics. They compared the performance of students who were in tracked classes with those who were in mixed-ability classes. The researchers compared six annual cohorts of students in a middle school in the district of New York. The students attending the school in 1995, 1996, and 1997 were taught in tracked classes with only high-track students being taught the advanced curriculum. But in 1998, 1999, and 2000 all students in grades 6 through 8 were taught the advanced curriculum in mixed-ability classes and all of the eighth graders were taught an accelerated algebra course. The researchers looked at the impact of these different middle school experiences upon the students' completion of high school courses and their achievement, using four achievement measures, including scores on the Advanced Placement calculus examinations. They found that the students from detracked classes took more advanced classes, pass rates were significantly higher, and students passed exams a year earlier than the average in New York State. Their scores were also significantly higher on various achievement tests. The increased success from detracking applied to students across the achievement range—from the lowest to the highest achievers.

In my own work in the U.S. and England, I have studied high schools that have shown a commitment to more equal schooling by placing all incoming students into mixed-ability classes. Railside School in California started all students in a class called algebra regardless of prior achievement. This was a challenging class for all students, even those who had taken algebra in middle school, because it involved working on complex, multidimensional, multilevel problems. The school also taught classes that were ninety minutes long but that only took half a year. This meant that all students could reach calculus as they had eight opportunities to take a math class during their four years of high school. The results were outstanding, including 47 percent of the seniors taking calculus and precalculus advanced classes, compared to 28 percent of students in the more typical tracked high schools. Interestingly, the students who were most advantaged by the mixed-ability grouping were the highest-achieving students, who achieved at higher levels than students who were placed into high tracks in the other schools, and who improved their achievement more than any other students in their school.

Many parents fear mixed-ability grouping and cannot see the logic of grouping students with very different needs and limited teacher resources into one class. So why is it that mixed-ability grouping is repeatedly found to be associated with higher achievement? The four most important reasons are explained below:
Opportunity to Learn

Researchers consistently find that the most important factor in school success is what they call “opportunity to learn.” If students are not given opportunities to learn challenging and high-level work, then they do not achieve at high levels. We know that when students are in lower groups, they receive low-level work and this, in itself, is damaging. In addition, teachers inevitably have lower expectations for students. In the 1960s Robert Rosenthal and Leonore Jacobson, two sociologists, conducted an experiment to look at the impact of teacher expectations. Students in a San Francisco elementary school were assigned to two groups. Both groups were taught the same work, but teachers were told that one group included all of the students identified as especially talented. In reality, the students had been randomly assigned to the two groups. After the experimental period, the students in the group identified as talented showed better results and scored at higher levels on IQ tests. The authors concluded that this effect was entirely due to the different expectations the teachers held for the students. In a study of six schools in England, a team of researchers and I were saddened to find that teachers routinely underestimated children in low groups. One student reported to us: “Sir treats us like we’re babies, puts us down, makes us copy stuff off the board, puts up all the answers like we don’t know anything. And we’re not going to learn from that, cause we’ve got to think for ourselves.”

The students talked openly to us about the low expectations teachers held for them and the way their achievement was being held back, and observations of the classes confirmed this to be true. The students simply wanted to be given opportunities to learn: “Obviously we’re not the cleverest, we’re group 5, but still—it’s still maths, we’re still in year 9, we’ve still got to learn.”

When teachers have lower expectations for students and they teach them low-level work, the children’s achievement is suppressed. This is the reason that ability grouping is illegal in many countries in the world, including Finland, the country that topped the world in the latest international achievement tests.

Student Differences

When students are placed into a tracked group, high or low, assumptions are made about their potential achievement. Teachers tend to pitch their teaching to students in the middle of the group, and they teach a particular level of content, assuming that all students are more or less the same. In such a system, the work inevitably is at the wrong pace or the wrong level for many students within a group. The lower students struggle to catch up, while others are held back. While a teacher of any class, including a mixed-ability class, can wrongly assume that the students all have the same needs, tracking is based upon this erroneous assumption, and when teachers have a tracked group, they often feel license to treat all students the same. This is true even when students clearly have different needs and would benefit from working at different paces.

In a mixed-ability group the teacher has to open the work, making it suitable for students working at different levels and different speeds. Instead of prejudging the attainment of students and delivering work at a particular level, the teacher has to provide work that is multileveled and that enables students to work at the highest levels they can reach. This means that work can be at the right level and pace for all students.

Borderline Casualties

When teachers assign students to different groups, they make decisions that affect their long-term achievement and their life
chances. Despite the importance of such decisions, they are often made on the basis of insufficient evidence. In many cases, students are assigned to groups on the basis of a single test score with some students missing the high groups because of one point. That one missed point, which students may have scored on another day, ends up limiting their achievement for the rest of their lives.

Researchers in Israel and the UK found that students on the borders of different groups had essentially the same understandings, but the ones entering higher groups ended up scoring at significantly higher levels at the end of school because of the group they were placed into. Indeed, the group that students were put into was more important for their eventual achievement than the school they attended.\(^\text{10}\) Borderline casualties are those students who just miss the high groups and become casualties of the grouping system from that day on. There are many of these students in schools and for them the almost arbitrary assignment to a lower group effectively ends their chances of success.

\[\text{Student Resources}\]

In a tracked class the main sources of help are the teacher and the textbook. Students are presumed to have the same needs and to work in the same way so the teacher feels comfortable lecturing to the class for longer periods of time and requiring the class to work in silence or in very quiet conditions, denying them the many advantages of talking through problems, as set out in Chapter 2.

In mixed-ability classes the students are organized to work with each other and help each other. Instead of one person serving as the resource to thirty or more students, there are many. The students who do not understand as readily have access to many helpers. The students who do understand serve as helpers to classmates. This may seem like it is wasting the time of high achievers, but the reason these students end up achieving at higher levels in such classrooms is because the act of explaining work to others deepens understanding. As students explain to others, they uncover their own areas of weakness and are able to remedy them and they strengthen what they know. In the two longitudinal studies I conducted, the high-achieving students told me that they learned more and more deeply from having to explain work to others. Some of the high achievers from Railside School talked about their experiences in mixed-ability groups in the United States. Zane said, “Everybody in there is at a different level. But what makes the class good is that everybody’s at different levels so everybody’s constantly teaching each other and helping each other out.”

Some of the higher achievers entered Railside thinking it unfair that they had to explain work to others, but they changed their minds within the first year as they realized that the act of explaining was helping them. Imelda reflected: “So maybe in ninth grade it’s like ‘Oh, my God. I don’t feel like helping them. I just wanna get my work done. Why do we have to take a
group test? But once you get to AP Calc, you're like 'Ooh, I need a group test before I take a test.' So like the more math you take and the more you learn, you grow to appreciate, like 'Oh, thank God I'm in a group!'

The high achievers also learned that different students could add more than they thought to discussions. Said Ana, "It's good working in groups because everybody else in the group can learn with you, so if someone doesn't understand—like if I don't understand but the other person does understand—they can explain it to me, or vice versa, and I think it's cool."

Students who work together, supporting each other's learning, provide a tremendous resource for each other, maximizing learning opportunities at the same time as learning important principles of communication and support.

**Student Respect**

When we consider the role of ability grouping and the difference it makes in students' lives, there is another dimension besides achievement that it is critical to consider. For ability grouping not only limits opportunities, it influences the sorts of people our children will become. As students spend thousands of hours in their mathematics classrooms, they do not only learn about mathematics, they learn about ways of acting and ways of being.

Mathematics classrooms influence, to a high and regrettable degree, the confidence students have in their own intelligence. This is unfortunate both because math classrooms often treat children harshly, but also because we know that there are many forms of intelligence and ways to be "smart" and math classrooms tend to value only one. In addition to the power that math classrooms have to build or crush children's confidence, they also influence to a large extent the ideas students develop about other people.

Through my own research I have found that students in tracked classes in American high schools not only developed ideas about their own potential, but they began to categorize others in unfortunate ways—as smart or dumb, quick or slow. Comments such as this came from students in tracked classes:

"I don't want to feel like a retard. Like if someone asks me the most basic question and I can't do it, I don't want to feel dumb. And I can't stand stupid people either. Because that's one of the things that annoy me. Like stupid people. And I don't want to be a stupid person."

The students who had worked in mixed-ability classes at Railside School did not talk in these ways and they developed impressive levels of respect for each other. Any observer to the classrooms could not fail to notice the respectful ways students interacted with each other, seeming not to notice the usual dividing lines of social class, ethnicity, gender, or "ability." The ethnic cliques that often form in multicultural schools did not form at Railside and students talked about the ways their math classes had taught them to be respectful of different people and ideas. In learning to consider different approaches to math problems, students also learned to respect different ways of thinking more generally and the people making such contributions. Many of the students talked about the ways they had opened their minds and their ideas—for example:

Tanita: You got everyone's perspective, 'cause like when you're debating a rule or a method, you get someone else's perspective of what they think instead of just going off your own thoughts. That's why it was good with like a lot of people.

Carol: I liked it too. Most people opened up their ideas.
most interesting problems in mathematics so they carry the additional advantage of being more engaging. I have seen such problems used to great effect in a number of classrooms. These sorts of multilevel problems are used in Japanese classrooms in order to promote high achievement for all, as Steve Olson, author of the best-selling book *Countdown*, reflects:

In Japanese classrooms ... teachers want their students to struggle with problems because they believe that's how students come to really understand mathematical concepts. Schools do not group students into different ability levels, because the differences between students are seen as a resource that can broaden the discussion of how to solve a problem. Not all students will learn the same thing from a lesson; those who are interested in and talented at math will achieve a different level of proficiency from their classmates. But each student will learn more by having to struggle with the problem than by being force-fed a simple, predigested procedure."

Japanese students are not all expected to learn the same from each lesson, which is the unrealistic expectation for many American classes; instead they are given challenging problems and each student gets the most from them that he or she can.

In addition to open, multilevel problems, the second critical condition for mixed-ability classes to work is that students are taught to work respectfully with each other. I have observed many math classrooms where students are working in groups, but the students do not listen to each other. The teachers of such classrooms have given students good problems to work on together, and they have asked students to discuss the problems, but the students have not learned to work well together. This can result in chaotic classrooms with groups where only some of the students do the work, or, even worse, groups in
which some students are ignored or ridiculed by other students because they are deemed to be low status. Teaching students to work respectfully requires careful and consistent building of good group behavior. Some teachers do this by highlighting the need for respect and hard work in groups, some teachers employ additional strategies such as “complex instruction” (an approach designed for use with mixed-ability groups), which is aimed at reducing status differences between students. Whatever the approach, when students learn to work well and respectfully together and their different strengths are seen as a resource rather than a point to ridicule, then children are helped by being able to achieve at high levels and society is helped through the development of respectful, caring young people.

**Psychological Prisons**

In my study of Amber Hill and Phoenix Park schools in England, I was able to follow students through a school that used ability grouping (Amber Hill) and one that did not (Phoenix Park). At Amber Hill the teachers also taught traditionally, whereas at Phoenix Park the teachers used complex, open problems. As I described in Chapter 3, I was fortunate in being able to catch up with the students eight years after my initial study and talk to them about the impact of their school experiences on their jobs and lives. During that study I found that one of the most important differences between the students, perhaps not surprisingly, was the grouping approaches they experienced. At Amber Hill, where they used ability grouping, the adults talked about how the grouping had shaped their whole school experience and many of those from set 2 downward talked not only about the ways their achievement had been constrained by the grouping but also the ways they had been set up for low achievement in life. In a statistical comparison of the jobs that the ex-students were working in, I found that those who had experienced mixed ability grouping, despite growing up in one of the poorest areas in the country, were now in more professional jobs than those who had experienced tracking. 14

Interviews with some of the young adults gave meaning to these interesting differences. The students from Phoenix Park talked about the ways the school had excelled at finding and promoting the potential of different students; they said that teachers had regarded everyone as a high achiever. The young adults communicated a positive approach to work and life, describing the ways they used the problem-solving approaches they had been taught in school to get on in life. The young adults who had attended Amber Hill, which had put them into sets, told me that their ambitions were broken at school and their expectations lowered. One young man, Nikos, spoke passionately about the ability grouping experience:

You’re putting this psychological prison around them ... People don’t know what they can do, or where the boundaries are, unless they’re told at that kind of age.

It kind of just breaks all their ambition ... It’s quite sad that there’s kids there that could potentially be very, very smart and benefit us in so many ways, but it’s just kind of broken down from a young age. So that’s why I dislike the set system so much—because I think it almost formally labels kids as stupid.

The impact that ability grouping has upon students’ lives—in and beyond school—is profound. Researchers in England revealed that 88 percent of children placed into ability groups at age four remain in the same groupings until they leave school. 15 This is one of the most chilling statistics I have ever read. The fact that children’s futures are decided for them by the time they are placed into groups, at an early age, derides...
the work of schools and contravenes basic knowledge about child development and learning. Children develop at different rates, and they reveal different interests, strengths, and dispositions at various stages of their development. In the U.S. such decisions are usually made during middle school, but they still prejudge children's potential before they have had a chance to develop. One of the most important goals of schools is to provide stimulating environments for all children—environments in which children's interest can be piqued and nurtured, with teachers who are ready to recognize, cultivate, and develop the potential that students show at different times and in different areas. This can only be done through a flexible system of grouping that does not prejudge a child's achievement and that uses multileveled mathematics materials that individual students take to their own highest level. Only such an approach will enable America to become a fairer society in which all children are given the chance to be successful.

6 / Paying the Price for Sugar and Spice
How Girls and Women Are Kept Out of Math and Science

When I started my research at Amber Hill, Caroline was fourteen years old, eager to learn, and very accomplished. When the students had entered the school some three years earlier, they had all been given a math test. Caroline had earned the highest score in her year, but three years after coming to the school she was the lowest-achieving student in her group. How could it all have gone so badly wrong? When I met Caroline, she had just been placed into the top set—a group that was taught by Tim, the friendly and well-qualified math department chair. But Tim was a traditional teacher and he, like most math teachers, demonstrated methods on the board and then expected students to work through exercises practicing the techniques. Caroline sat at a