ABILITY GROUPING IN MATHEMATICS CLASSROOMS: A BOURDIEUIAN ANALYSIS

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Why are some students more likely to succeed in or fail school mathematics than their peers, in spite of similar learning opportunities? Frequently such differences have been framed within liberal or even conservative discourses that identify purportedly innate dispositions, such as ability or intelligence, as the root of differential success. However, a significant body of sociological research challenges such fundamental assumptions by demonstrating that success or failure is not random, but rather, closely linked to the background (gender, social class, language, or culture) of the student (Boaler, 1997c; Cooper and Dunne, 1999; Lubienski, 2000; Zevenbergen and Lerman, 2001).

As a number of critical educators have noted, middle-class students often occupy upper sets or streams, and working-class and other marginialised groups, the lower sets or streams. Ability grouping, therefore, reflects social rather than innate categories However, conservative and to a lesser extent liberal, views of education maintain that ability grouping reflects categories such as intelligence and ability. An ethos is created whereby the dominance of the ability mythology in school mathematics pervades the practices of mathematics education creating a particular (and pervasive) style of learning opportunities and classroom organisational strategies

This article poses a challenge to the opportunities offered by practices that group students according to perceived ability. Using the theoretical constructs of French sociologist Pierre Bourdieu, I argue that inserting students into particular ability groups creates learning environments that influence how students come to see themselves as learners of mathematics, i.e the construction of a mathematics identity, which can have implications for future learning. Bourdieu's work seeks to theorise the relationship between the individual and the social whereby he explores how the:

> *dialectical* relations between the objective structures [...] and the structured dispositions within those structures are actualised and which tend to reproduce them. (Bourdieu, 1992, p. 3)

In contrast to liberal views of schooling and mathematics education, where success (or failure) is generally attributed to some innate construct of ability, Bourdieu's constructs allow a theorising of how success and failure is realised through the practices of mathematics education.

Bourdieu's theoretical project was concerned with understanding the ways in which practice constituted, and was constituted by, particular groupings of people. His work has been instrumental in theorising the class structuring practices of many cultural groups While Bourdieu's work focused on the construction of social class, his theoretical constructs are most useful in theorising the construction of differential outcomes of schooling in mathematics education Within a Bourdieuian framework, a novel interpretation is made possible for understanding how students come to be seen as, for example, able, talented or successful. Rather than interpreting the outcomes of some structuring practice, such as a test or similar, within this framework, the student is described as having a range of experiences that have become embodied into a habitus. This habitus is rewarded differentially within the field of mathematics education. Individual students, whose pre-school experiences have provided them with a rich language of shape and number, have a very different habitus from the students who have had a rich experience in fishing or exploring. Yet the practices of school mathematics (the field) value one set of cultural experiences over another, and those whose culture positions them more in line with the practices of school mathematics have a greater chance of being described as successful. As such, the student's cultural background becomes a form of capital within the classroom that can be exchanged for other goods, for example, rewards, grades, marks and praise.

This exchange economy is what Bourdieu (1991) calls "cultural capital". His definition of cultural capital can be seen as analogous to the "trumps in a game of cards [where] powers [...] define the chances of profit in a given field" (p 230) and that ultimately "social positioning is influenced by the overall volume of the capital and the composition of that capital" (p. 231). As such, this framework challenges taken-for-granted constructs of ability by suggesting that the field differentially conveys power to those whose habitus is aligned with the structuring practices of that field. Rather than see ability as being a natural and innate characteristic, a Bourdieuian analysis allows for the theorising of ability as cultural capital, where there is an inter-relationship between the individual whose habitus is legitimated and valued through the objectified structuring practices of the field (see Figure 1 for a visual illustration of this relationship).

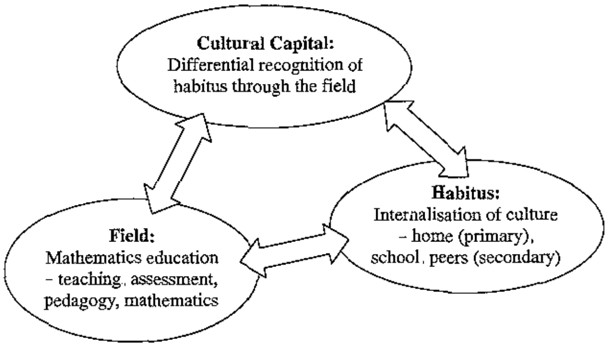

Figure 1: Relating cultural capital, habitus and field

The practice of ability grouping is commonplace for teaching mathematics in schools It is held in place through the practices of the field, whereby ideologies of ability, hierarchies of mathematical knowledge (Ruthven, 1987), objectivity of mathematics as a discipline (Ernest, 1991) and assessment are relatively entrenched. For example, in a large study in the UK, it was found that teachers supported the use of ability grouping in mathematics, but not in other curriculum areas In spite of considerable research that is critical of ability grouping as a social and academic practice (see for example, Boaler's extensive work 1997a, 1997b; with Wiliam and Brown, 2000), the practice continues

Reappropriating Bourdieu's theoretical constructs, it is proposed that the practices of ability grouping in school mathematics (where students of similar 'ability' levels are grouped together and exposed to different learning experiences and curriculum) create differential learning environments. Such environments create different opportunities to construct a mathematics habitus, which, in turn, will predispose students towards thinking and working mathematically. The different habitus, in turn, become forms of capital that can be exchanged for rewards, such as grades in assessment, and hence position students differentially Such differential outcomes are in the objective outcomes of grades, but also in the subjective dispositions students develop towards mathematics as a field of study.

It is not my intention to show empirically the constitution of habitus, but rather to draw on comments offered by students to argue that the particular learning environments of mathematics classrooms where students are grouped by ability offer different learning experiences. These learning experiences offer considerably different potentials for construction of a mathematics habitus Those students whose habitus is aligned with the dominant practices of mathematics (the field) are more likely to be constructed as effective learners. Thus, the structuring practices of such classrooms can offer very different potentials for the construction of a mathematical habitus, which, in turn, will convey different status on students and their subsequent positioning within the field. This will have a considerable impact on their subsequent choices in studying mathematics.

The study

A total of 96 students, from six Australian schools, were interviewed using a semi-structured interview schedule The students were in years 9 and 10 in secondary school, so were generally in the age range of 14–16 years Year 10 is the final year of what is generally seen to be the compulsory years of schooling Although students can leave at 15 years of age, most employers see year 10 as the minimal educational standard for (semi-skilled) employment The students attended a range of schools, public and private, co-educational and single-sex, which served a range of clientele including socially divergent groups. A relatively equal number of boys and girls were interviewed, where each co-educational school provided equal numbers of boys and girls, but the overall sample was off-set by one all-boys school. The interviews were tape-recorded and later transcribed. The students were selected by staff at the school so as to represent high through to low achieving students, and to include high through to low motivated students. Students self-reported their levels of 'ability' determining their location in particular class groupings. All schools had practices whereby students were grouped according to ability. The issue of such grouping was not an initial consideration in the selection of students but rather, using a grounded theory approach to the analysis of the data, it emerged from the data, where the comments offered by students clearly fell into categories according to their level of grouping (made possible through using *NVivo*, a qualitiative software package used for analysing data through a grounded theory model).

Part of the study asked students to describe a typical mathematics lesson Further questions centred on their experiences in their classrooms Overall, the results indicated two key practices that form the basis of the students' experiences in secondary school mathematics teaching. The first practice, that of the practice of teaching, was unanimously of a particular form The second practice, that of ability grouping, was evident in all schools. The experiences of the students fell clearly into distinct categories, whereby the students in higher groups felt that they were blessed with high-quality experiences, while the students in lower groups reported that their experiences were quite negative. In terms of the central analysis of this paper, the experiences of the

	High group students		Low group students
Sarah:	I think we're lucky in this class because we get the best teachers. I can see the others in the lower classes and the teachers they get can't even control them so they get no work done. (Beechwood, year 10)	Jodie:	It's just boring and stuff, the things we do. How he's just talking the whole time and we're not doing anything interesting and involved He's just telling us the same things over and over again and it's boring. (Pine Bark, year 9)
Annie:	Well, I am just so glad to be in this class We have got the head of department so he is really good. I know there's a lot of mathematics teachers that sort of say, "Oh yeah that's nice", but he sort of comes over and says, "Well, how did you do this one? It is exactly the same as this one, except that there's two more steps" and he'll go over it and after it, if you're not right with it, he'll go "Do you want me to do another one with you?" (Huon Pine, year 10)	Robert:	Like, well, like we get the crap teachers. They don't know how to teach maths. You know that they don't like being in our class. They think we are the dummies and treat us like that They might be clever but they just don't know how to teach Like the one I have now is so boring and he just talks all the time and then says, "Now do it". When you ask for help, he just says "do it and if you can't, leave it" It doesn't help me to understand (Beechwood, year 9)

Figure 2: Table comparing students' comments on teacher quality in high groups and low groups

	High group students		Low group students
Mike:	It is good that in this class everyone moves along quite quickly so you're not slowing down. (Pine Bark, year 10)	Luke:	Well, in this class you get lots of help from the teacher He goes really slow so that we can understand it [maths], I mean, I would not be able to go as fast as the smart guys, you know. Um, the kids in this class need the extra help and he is really good. I mean we are not the really dumb kids, they go to special classes. We just kinda have trouble understanding stuff. It is a bit of a problem when it comes to exams as we don't cover all the stuff that they do in the other classes, so we are lucky to get a pass, but the others have already passed and just are working on getting higher marks where we have to work to pass. (St Michaels, year 10)
Vicki:	I like my teacher. She explains it really, really well I like being in the top maths class because we move through the work fast enough so that we can do revision and cover all the work that's necessary for Year 11 and 12 maths. (Beechwood, year 10)		
Keiko:	It is good in this class coz we don't have to slow down for the dumb kids We are all smart so we can go through the work quickly Sometimes someone might have a problem and she [the teacher] will go over it again but most of the time we move through the book really quickly. (Melalucca, year 10)	Sophia:	I get a bit angry sometimes because the teacher thinks we are really dumb and goes really slow We don't cover everything that we are supposed to so when it comes to the exam, we don't know much of the stuff that's on it (Huon Pine, year 10)

Figure 3: Table comparing students' comments on pacing of content in high groups and low groups

students could be seen to effect their relationship with mathematics profoundly and, hence, their subsequent choices as to whether or not to participate in the practices of the classroom and further study in the discipline.

In theoretical terms, the structuring practices of the field of mathematics, whereby practices of ability grouping create differential experiences that can be embodied in a mathematics habitus, in turn differentially reward students on their embodiment of the culture of school mathematics, thereby reifying differences in outcomes - both objective and subjective. From a theoretical standpoint, students enter the mathematics classroom with a primary habitus that predisposes them to a greater or lesser extent for success depending on the demands operationalised by the field. These demands could be evident in the forms of assessment being used such as problem solving, language-rich tasks, rule-governed strategies and so on. Where students are able to perform well on these tasks, they are seen to have greater 'ability' and hence are conferred with greater status and power. The role of the mathematics teacher is to add knowledge (or capital) to students, involving a (re)constitution of the habitus of the students Depending on the background of the students, the primary habitus will facilitate, to greater or lesser extents, their capacity to be constituted as successes or failures within the field

Ability grouping as a structuring practice

Grouping students according to perceived ability created very different learning environments for the students in this study. Using Bourdieu's language of description, ability grouping becomes a structuring practice in that it produces different outcomes. In terms of this study, these outcomes are both objective, in terms of the scores that are possible on examinations, and subjective, in terms of the dispositions students held towards mathematics.

Analysing the students' responses to more specific questions relating to their feelings and aspirations; relationships with teachers and peers; and impressions associated with mathematics, a difference emerged falling largely along the divisions of the types of classes in which students were located. The general trend was that there were significant differences in the qualitative experiences in the classrooms based on the practice of ability grouping. Overall, students in the higher groups were far more positive about their learning environments and their attitudes towards mathematics, whereas the converse was true for students in the lower groups. Gender differences did not emerge in this data set. In the following sub-sections of the paper I draw on comparative responses made by the students in terms of the issues under discussion

Objective structuring practices

There were a number of issues identified by the students in their remarks that indicate particular practices within the ability grouping of students that contribute to differential outcomes Whether these are perceived differences or real differences is difficult to say, but for the students, the outcomes in terms of construction of a mathematics habitus are the same

Teacher quality: As the comments in Figure 2 show, students reported their perceptions of their teachers as being very different in quality. The higher group students said that they felt they had the best teachers in the school, and would frequently pass comments (such as those of Sarah's) whereby they compared their experiences with their peers in the other groups. In contrast, there was a strong sense among the lower group students that they were not given the best teachers. However, in some lower classes, students did recognise that their schools had placed high-quality teachers with them. The students were then pleased to have this experience.

In comparing the statements of Annie and Robert, students were able to offer specific comments on how the pedagogical approaches used by teachers influenced how they taught Annie indicates that quality is closely aligned with the level of support offered when she is working through examples. Robert is also concerned with the level of support with a different approach being offered by his teacher.

Pacing of content: Students commented on the pacing of lessons in terms of content delivery (see Figure 3). Here they recognise that the content is differentially paced so that the students in the higher groups are confronted with more content, and that at a higher level, than their peers in the lower groups. While some of the students in the lower groups recognised that they needed a slower delivery of content in order to understand, they simultaneously acknowledged that such pacing restricted their learning of the overall content expected within any year level.

While the support for pacing was strong in the higher groups, it was problematic for some students who felt that at times the pacing was too fast In contrast, students in the lower groups recognised a similar problem with pacing that, for them, resulted in lower levels of content being covered. This ultimately restricted their potential to address many of the questions on the examinations The pacing of mathematics becomes an objective structuring practice in that it determines the content that is covered in any lesson or extended period. Restricting or enhancing the amount of content inhibits or extends what can be learned and, in so doing, creates different opportunities when it comes to assessment. In all schools in this study, a common test was set for any year level, regardless of the content covered This meant that all students sat the same test, even though they had covered very different amounts and types of content due to pacing

Examinations: Perhaps the most overt structuring practice noted by most of the students (see Figure 4) was that of examinations. For the range of issues identified so far, the practices to which the classes were exposed created very different learning environments that ultimately impacted on students' capacity to perform on examinations. The examinations in the schools were standard ones delivered to a whole year cohort The examinations were criterion marked, with three types of questions posed. Students were graded against their performance on these three items Students in both groupings recognised their relative advantages and disadvantages when it came time for examinations. Students in the higher groups entered the examination already sitting on a pass, having completed the standard for easier process questions already so they did not have to complete the process questions in the examination. For them, the examination was a chance to improve their grade. Conversely, the students in the lower groups had not covered the higher order content and were restricted to the lowest level of process questions. For them, the examination was a means of gaining a pass grade only, with no scope of gaining a higher grade

It is clear that students in both groups were overtly aware of the problematic nature of assessment in terms of recognising work undertaken. Both the higher group students and those in the lower groups recognised that the former were able to improve their standing, while the latter had to fight to pass the subject and were unable to gain anything higher. The position is summed up in the comment by Rachel:

> I get so annoyed with maths coz I want to get out of this class. The teacher doesn't really care about us, the boys all muck around and we get no work done I have worked really hard and even got a home tutor to help me. But we aren't doing the hard stuff so I don't know the work on the exam. I want to get into a better class but I just can't. (Beechwood, year 9)

Rachel's voice provided a recognition of how the objective practices are structured so as to lock her out of the higher groups

Objective structuring of outcomes

As I have attempted to show, some of the practices associated with ability grouping create very different learning outcomes for students Here I have drawn on three main themes in the responses offered by the students; teachers, pacing and assessment The students' comments indicate that some of the practices in mathematics classrooms with ability grouping create different potential outcomes for students, and of this the students themselves are quite aware. In terms of a Bourdieuian analysis, the practices of the field, in this case teaching, pacing and assessment, create different potentials for capital building. In the cases of the higher groups, the practices have greater potential to add capital to the students who, in turn, are legitimated by the objective practices of assessment as having greater capital than their

	High group students		Low group students
Randolf:	What is good about this class is that I already know I have passed the exam I just have to work on the harder questions to get an HA or VHA [higher marks]. The kids in the dumb class don't even cover the hard stuff so they can only pass the exam (Melalucca, year 10)	Simon:	In our revision for the test we only cover the easy questions as the really hard questions are for the smart kids They don't even have to do the process [easiest] questions on the exam as they already have got an SA [pass] for maths, so they can go straight to the hard ones. We don't even get taught that stuff so can't even do it on the exam The most I can get is an SA (Pine Bark, year 10)
Thomas:	Some of my friends, who are in different classes, have said that they do really easy work and they don't do hard work, so when the hard work is on the test they just can't do it because they haven't learnt it (Huon Pine, year 10)	Mel:	I like doing the easy work, but it is not fair when it comes to the exam coz we don't even know half the stuff that is on it We haven't even covered it so we are lucky just to pass. (Huon Pine, year 10)

Figure 4: Table comparing students' comments on examinations in high groups and low groups

peers in the lower groups As such, power is being conveyed differentially through practices and legitimated through assessment Thus, the field becomes somewhat self-regulatory by ensuring that those with the cultural capital are differentially rewarded through institutionalised capital, such as grades on assessment items. Thus, the dispositions and qualities that are valued within the field of mathematics education become legitimated as if they are 'natural' qualities through such processes.

Construction of a mathematics habitus

Coming back to the original problem posed at the beginning of this article, why do some students do better at school mathematics than others?, it is now possible to offer another explanation other than ability. From the comments offered by students in this study, the practice of ability grouping creates substantially different learning environments for them The structuring practices of the field, mathematics education, differentially legitimate social and cultural attributes The students in these classes have been exposed to particular practices within their mathematics classrooms, where such practices induct them into a culture of mathematics and what it is to be a mathematics student. For the students in the higher groups, the practices would appear to be conducive to creating an environment supportive of the continuation of mathematics In contrast, the students in the lower groups have been exposed to practices that are conducive to the rejection of the discipline. One way to theorise this using Bourdieuian constructs is to consider how the practices become constituted, or internalised, by the students and how, in turn, this can impact on their relationship with mathematics. In theoretical terms, the structuring practices of school mathematics create differential learning opportunities for students These practices then become embodied in a quite different mathematics habitus As a consequence, this habitus predisposes students to think and act in different ways, some that are more aligned to the preferred and valued practices of school mathematics, others that are not Students whose habitus are aligned with school mathematics are more likely to be constructed as successful students than their peers, whose habitus are incongruent with the preferred practices of the field. Thus, the cultural dispositions created by the structuring practices of the field, in this case classes grouped by ability, create different opportunities for the students to create a mathematics habitus - a habitus which predisposes them to think and act in particular ways towards mathematics (see Figure 5)

Inherent in these comments, and the ones cited in previous sections, is the internalisation process of the structuring practices Terms such as "brightest" and "smart" are used to describe the students in the upper groups, whereas the lower group students are described with terms such as; "lazy"; "just muck around"; "dumb"; "idiots"; and "bad". This labeling of self and peers suggests that the structuring practices have been internalised so as to constitute particular mathematics habitus For the students in the higher groups, there is a greater sense of achievement and belonging to the field, whereas the converse is true for students in the lower groups For the students in higher groups, it is a habitus that is in line with the legitimating practices of the field, such

	High group students		Low group students
Mel:	I am so glad to be in this class rather than with the dumb kids They don't know anything and just muck around all the time Here our teachers know that they can teach us important things and we will learn because we are smart. I feel sorry for the teachers in the other classes, as the kids are so bad (Beechwood, year 9)	Tyler:	I don't like being in this class coz it is the only one I feel dumb in. I mean in English or workshop, I am doing OK, but in maths, I feel like a retard. The teacher treats us as if we know nothing. (St Michaels, year 9)

Figure 5: Table comparing students' internalisation of mathematical culture (habitus) in high groups and low groups

as high grades, strong work ethic and a respect for teachers, and is therefore more likely to position them in favourable circumstances While there are different perceptions about their teachers, there is recognition that the structuring practices, such as teachers, pacing, examinations or peers, impact on their potential to gain better grades. The comments indicate how the internalisation of practice differentially positions the students, so as to enhance or hinder their chance of success in school mathematics Furthermore, the internalisation of the structuring practices, so as to form a particular mathematics habitus, impacts on how they will come to see themselves in relation to mathematics Consider this comment from Steven:

> Maths is my worst subject It is useless and the teachers teach you nothing. They think you are dumb. In woodwork, the teachers treat you like you are good and I want to go to those classes. In maths, we just have to sit there and write out sums I don't think I will be doing that when I get a job. (Beechmont, year 10)

There is a sense that the practices of mathematics in the lower groups have facilitated the construction of a particularised habitus - one where the student is constructed as marginal to the desired features of a learner of mathematics. Here, Steven articulates his position in relation to school mathematics. He sees mathematics as "useless"; "teaches nothing"; where students are "dumb" He compares this with a woodwork subject where a very different subject position is made possible.

As a result of their experiences in mathematics, students construct and are constructed by the practices of the classroom. Some of the values and dispositions towards mathematics (that are part of a mathematical habitus) are valued more than others, so that some students are predisposed to greater or lesser success in mathematics as a result of their habitus. The task of the teacher is to reconstitute students' habitus so that they are more in line with the valued practices of the field in order that they have improved chances of success. In other words, the notion of adding capital is central. In the lower groups, this process was questionable in terms of its potential for success, whereas the students' comments in the upper groups suggest that this was occurring for them.

Conclusion

Bourdieu's theory offers a useful tool for analysing classroom practice and the construction of difference within mathematics classrooms. The practices described by the students form part of the field of mathematics, where notions of ability are reified through practices such as examinations. Yet, as the students in this study indicate, the practices that they experience as students reify them and their perceived notions of ability, since the tests that they undertake at the end of the school term help to validate their location in the ability grouping. Questions are raised as to the validity of notions of ability, since the students in these classrooms may be locked into or out of mathematics as a consequence of their ability groupings.

While the theory is useful in developing an understanding of how the practices of mathematics constitute a particular mathematics habitus, ultimately conveying power and status as a consequence of its relationship with the field, the theory does not adequately allow for a sense of agency. Other than where students participate in the reconstruction of the primary habitus in order that it is more synonymous with that of the school or mathematics classroom culture, there is little sense of agency. Where agency was expressed, it was more in the form of resistance to the imposition of particular structuring practices. It is as if the practices to which students are exposed facilitate the production of particular forms of habitus, some of which will be more empowering than others. In the case of this study, the students in the lower groups are being constituted and marginalised by the practices of the field. They are being exposed to practices that exclude them from adding capital to their habitus and are thereby restricted in their future successes and participation in mathematics. There is a sense that they are being shaped by the field as if they have little control of their destinies. While the data collected in this study did not allow for addressing this aspect of ability grouping, it would be worthwhile to investigate this idea further since there should be scope in classrooms for students to move into different groups.

This theoretical model offers a way to understanding the exodus of students from mathematics in the post-compulsory years – from a systems perspective as well as a subjective perspective. It allows for a deeper understanding of how the practices may be biased and how such practices influence subjective accounts of learning mathematics. For students in the classes cited in this study, the differences in practices of the upper and low groups offer very different subjective and systemic realities for the students, some of which will be more empowering than others. It can be seen from the comments raised by students that the students in the upper groups are being exposed to practices that may enhance their experiences of and towards mathematics, with the converse being true for the students in the lower groups. These very different experiences can give rise to very different internalisations of mathematics as a mathematical habitus that can result in very different school and life trajectories for students.

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