

‘Going it alone’ within further mathematics?

Cathy Smith

Institute of Education, London University

In this paper I examine the idea of choosing further mathematics as positioning oneself/being positioned as belonging to an imagined collective (Anderson 1991). My previous research has analysed students’ accounts as practices of neoliberal self-entrepreneurism that construct them as individually successful (or not). Here I consider the roles of belonging and not belonging as practices of the self that are produced/reproduced by the collectives to which students belong. I use the examples of two students to show how they negotiate different senses of belonging within their accounts and manage to produce simultaneous discourses of inclusion and going it alone.

Keywords: Further mathematics, identity, affect, belonging

Introduction

Further mathematics is one of the A-level subjects that 16-18 year olds can choose to study in England and Wales. Around 1 in 7 of the 75000 students who complete mathematics A-level also complete the extended, ‘broader and deeper’ (Smith 2011) further mathematics A-level course. In larger schools it may be possible to teach these double-mathematics students as a single class with an integrated curriculum but in many schools it is necessarily a small subset of a mathematics class who attend extra lessons. Where the school’s tuition is being provided by the Further Mathematics Support Programme (FMSP), these lessons may be twilight lessons, on or off the school site, and involve students from other schools. In this context it is interesting to examine how FMSP students feel that they belong to further mathematics, or not, and what kind of collectives are constructed in their mathematics learning practices.

This paper draws from my wider study of 24 16-18 year olds who chose to study further mathematics with the FMSP (then FMNetwork). My approach draws on post-structural theory to examine choosing as a discursive practice of the self (Foucault 1984), through which students position themselves, and are positioned, as self-entrepreneurs, working at their education and their happiness in order to become intelligible neoliberal adolescents (Smith 2010). Overall I found that students describe belonging in mathematics and further mathematics as a practice of individual choice, even if the choices are to accept exclusions and give up. Here I look at examples of two students whose accounts of continuing in further mathematics showed a particular discursive strategy of ‘going it alone’ from *within* a further mathematics collective. I argue that further mathematics allowed them to position themselves as neoliberal agents, aligned with a discourse of aspiration against the odds.

Theoretical Framework

There is a rich body of research into how students are encultured into mathematics through social practice. The classroom can be seen as a site of initiation and joint enterprise in (school-)mathematical discourses and communities and/or of resistance

to them. Different mathematics classrooms may be characterised by different systems of practice, so that students need to “cross boundaries” as they move into more advanced mathematics (Hernandez-Martinez, Williams and Farnsworth 2011). Another view starts with sense-making practices, and how these construct learners, classrooms and mathematics (Cobb and Hodge 2002). There is more scope here to include the wider practices through which students make themselves: those of family, adolescence, of self-determination in work. Rose (1999) describes collectives as a “fulcrum of personal identity” resting on the neoliberal model of individual freedom: knowing and choosing the collectives we belong with shows that we can discover and mould our own selves.

This fits better my post-structural focus on practices of the self. In studying the FMSP I am particularly interested in the multiplicities and intersectionality of local meanings and practices that have effects but are subsumed into familiar patterns of inclusion and exclusion in mathematics (Mendick 2008). The FMSP operates both remotely and intimately: online, across schools and inside schools. Here, more than in most studies, I need a concept of collective that starts from experiences of belonging across varied practices that gather, albeit loosely, around the concepts of further mathematics and/or the FMSP.

I therefore propose to think of further mathematics as an imagined collective in the sense of Anderson’s “imagined communities”. Anderson argues that all collectives larger than the face-to-face are cultural artefacts which are “distinguished not by their falsity/genuineness, but by the style in which they are imagined” (1991, p6). His examples are nations or the readership of newspapers. Similarly, you do not meet most further mathematics students but you can imagine community with them.

Imagined communities need to be boundary-oriented because membership does not flow out from a physical or dynastic centre. They need homogenising practices that mark who is included and excluded. These are practices that articulate sameness among difference, such as using a common language or recognised cultural trajectories, and they are permitted by space-compressing technologies such as travel and communication. The online resources of the FMSP are an example of these technologies: they provide help in different sites, to individuals, schools and groups, possibly at the same time. Further mathematics membership is produced by the cultural ‘case histories’ presented on the FMSP website and in its schools, by practices such as registration and receiving your password, by a shared specialist vocabulary and by teaching that aims to foster a ‘gang mentality’ of ‘we’re all in it together’. Anderson argues that our perspective on time is another such technology: things that happen at the same time ‘go together’. Sitting further mathematics module exams, being given textbooks, attending joint revision days all make sameness happen in time and across sites.

These are examples of what Solomon (2009) calls ‘institutional’ identifications, samenesses that are produced by your relationship with school technologies. She distinguishes them from “nature” samenesses that appear to be essential because they derive from your personal history, or “affinity” sameness that are made new in you. I have found these useful categories for identifying where students make claims about where they belong and how they are different. My data suggests that they are mutually reinforcing and constitutive rather than distinct practices of selfhood: for example, students make claims that those who “really, really enjoy” mathematics (affinity sameness) are those who have arguments/debates in lessons (institutional).

The data is drawn from interviews and subsequent e-mail questionnaires with twenty four students in three FMSP sites in which students gave accounts of their choices and experiences in mathematics and further mathematics. Details are given in Smith (2010). I coded text where students explicitly or implicitly described a collective in mathematics or further mathematics, for example where they described samenesses, habitual practices, homogenising technologies, feelings of inclusion or exclusion. I also coded when students positioned themselves strongly as an individual, emphasising differences, unusual situations, self-determination or rejection. From this coding I identified a sense-making strategy in which students' claims to autonomy were closely connected with their descriptions of mathematics and further mathematics collectives and their decisions to continue. I describe the discourse as 'going it alone' *within* further mathematics, and I illustrate it with the accounts of two students, Bob and Jodie.

Bob

Bob is one of the students who positioned himself as unquestionably belonging to further mathematics, although he takes a particular view of what that means. In describing the FMSP collective Bob articulates a discourse of neoliberalism in which he overcomes the disadvantages he inherits from school and regains an aspirational trajectory.

Bob is taking Mathematics, Physics and Accounting A-levels at Island Park, an 11-to-18 comprehensive school in a socioeconomically deprived area, plus Further Maths AS-level with FMSP. Bob frames his ambition within the expectations of his British Asian family. He is exhorted to succeed by his pharmacist brother, who tells him that success is down to individual hard work: "I didn't need my teachers, I did it all myself". In contrast Bob organises his story around his developing understanding that he is failing and his hope that this may be temporary: although his school setting does not equip him to 'do it all himself', further mathematics may.

Bob has struggled in A-level mathematics, and has weak module results. He feels a sense of belonging but in a low status position: "obviously there are the good higher students and there's lower students, and because everyone's a strong good Maths student then I am part of the lower students, which I'm not used to". Sometimes he reconstructs this essentialist institutional positioning for himself: "there was a down-point as well, I just thought I don't think I can do any better". But often he challenges this self-exclusion by associating it with solely with the school's (faulty) mathematics: "I just don't enjoy it. I just can't understand it. The way they put it to you is just the basics. They don't show you the applied version or anything like that, they just tell you what you have to know and you've gotta learn it, it's up to you." He contrasts this depersonalised non-negotiable approach with FMSP lessons where his effort is valued despite his grades: "I called [teacher] up and said if it's ok if I can come back and continue and retake the mechanics paper, and she said it was fine, she didn't have no doubt in me". In school mathematics Bob belongs but is fixed in position by a discourse of ability backed by grades; in further mathematics he belongs through choice and - we'll see - has more power to negotiate success.

Bob describes further mathematics students as a collective of individuals who are enabled to express themselves and 'go somewhere' – qualities that are read back on them as confirming aspiration, effort and autonomy. He characterises them discursively as responsible for their own progress and constructed through affinity samenesses revealed within FMSP classes. It is not just choice but the kind of

teaching that provides a discursive construction of independent individuality: “the teaching is tailored to you specifically”. For Bob, further mathematics students are both more supported and more autonomous: they are ideal pupils. It is from his self-positioning within the collective that Bob’s account draws an authority to resist the exclusions experienced in school and reconnect with his family’s ambitions:

I was able to make that comparison and notice that it wasn’t just my ability or I’m lacking in my maths abilities. It’s that the teaching isn’t necessarily 100% or ... not even close to 100% to be honest with you, and I knew that from Further Maths, it gave me so much more confidence that, you know if I actually put my... more effort in I may be able to do some of these things.

I understand Bob’s account as ‘finding himself’ through further mathematics, articulating a sense that he has a continued affinity for challenging subjects despite the initial failures that make fixed ability discourses precarious for him. His description of further mathematics invests in its risks and hardness rather than its dependability: “It’s not like if you don’t understand it then you’d never understand it, or you can’t do it. It’s like you try and try and you get better”. Further mathematics thus positions him in a discourse of resilience that justifies continuing with risky but ambitious choices. Together, the negotiation of risk, balanced with the FMSP collective’s expert practice and better pupilhood all bring neoliberalism within reach.

Jodie

Jodie is a White, working-class student in a market-town school, taking A-levels in Mathematics, Further Maths, Business Studies and Psychology. In both interviews Jodie structured her account of choosing further mathematics as a success story. She succeeds in resisting school-based exclusions and finding the further mathematics collective, all without having to change in herself. Jodie recounts a long history of exclusions and re-inclusions in mathematics, from being in the lower groups in primary school, to getting an A at early-entry GCSE, to failing her next mathematics exam and being advised not to try A-level. Her belonging in school mathematics is thus contested and contestable, and although she has excellent module results at A-level she distances herself from the “cleverest”, male students. She positions this cleverness as speed, enthusiasm, competition and natural talent, while she describes herself as slow, quiet and “just do[ing] what I need to do”. In particular she “doesn’t do class discussions” although she knows that this refusal positions her as unconfident and marks a practice of rejection:

I’d rather not say what I think or what I know because I... in case it’s wrong. [My maths teacher] seemed to think that that meant I wasn’t good at maths and he just seemed to be convinced that I was going to fail basically and he gave me 3’s for my effort on my report.

She describes this silence as self-imposed, her own preference, but also as required by the “popular” students who “just [...] believe they’re better than us. They don’t mix with people like us”. These peer-group powers to produce or deny audience (Currie, Kelly and Pomerantz 2007) limit the ways in which Jodie can position herself as successful to her teachers and herself. Other students and teachers also commented on the power of certain middle-class students to influence classroom talk, though giving this less importance than Jodie does. As with Bob, the issue is not that Jodie is excluded from her school mathematics collective but that she belongs in a subordinate way that does not allow her to express (even voice) herself. This happens *to* Jodie and she also reconstructs it in her practice and in her account (below) of experiencing a

different practice in further mathematics. This recalls Foucault's notion (1984) that power is not solely repressive but also productive. When she is positioned as able to express herself, then in acknowledging and re-telling these exclusions, Jodie makes claims about reflexivity and self-management that position her as a neoliberal subject.

Jodie contrasts this with further mathematics. She initially joins to be with her best friend, and the further mathematics group takes on some qualities of a friendship group for her:

I guess if I'm with my friends, well a group that I feel close to, like in Further Maths I guess. I still won't answer many answers but I'm more likely to because I know all the people and it's a very small group, there's only like seven of us in it. So I'm not like as wary of people. And I understand what we're doing. It's like totally new to all of us. That doesn't mean we're all rubbish.

In further mathematics Jodie includes herself in the "we", and is supported not just by the students' sameness of sharing the "totally new" experience but by the fact that FMSP is outside school so that her relationship with the teacher is "new" as well. Overall, my data suggests that the content of further mathematics is not unfamiliar for mathematics students but the learning practices required to deal with its abstraction and complexity are. Highlighting the differences adds to the status of doing further mathematics. For Jodie these boundaries make it intelligible for her to continue a resistance to school which does not value her as a mathematician (or even as an engaged educational subject) while aligning herself strongly with the future benefits that mathematics can give:

It just seems to actually have a point and a purpose and a use, which makes me more interested. I guess that's... I can see it helping me get somewhere. I can do well in that, if I can do well in Maths and Further Maths it could totally change my future.

During her two-year sixth-form Jodie changed her career choice: she had intended to follow her parents into social care, but instead took a degree in mathematics and business studies. Her experience and her choices can thus be read as transformative in the way she suggests, echoing not just the cultural trajectories of the FMSP discourse but the ways in which neoliberalism takes white working-class women as its ideal subjects (Walkerdine 2003). As Walkerdine suggests, Jodie's trajectory positions her as accessing economic advantage and employability but without challenging the ways in which she has been positioned by class.

Discussion

Jodie and Bob weave together many different forms of belonging in their accounts of choosing further mathematics. They illustrate how gender, ethnicity, class and school cultures do not add or overlap but create new discourses and positionings at their intersections (Valentine 2007). Bob uses the ways he is positioned in his family, in his earlier mathematics successes but present low status, and within further mathematics to tell a story of coming back to himself, re-finding his aspiration and (new forms of) independence through an educational experience that *is* "100%". The imagined practices of the FMSP collective promote this sense of expertise and conformity, as does the teaching. Jodie uses the ways she is positioned in her peer group, her schooling, and in further mathematics to tell a story of finding a place in which she is valued as an individual, sidestepping the school's challenges to her classed and 'classroomed' identity but still accessing a high status future. The further mathematics

collective gives her a promise of career success and security in which she can engage with difficulty.

Both students align their sense of belonging in further mathematics with a neoliberal project. Firstly, they use the contrast between school and FMSP to position themselves as autonomous, as making choices for their own future based on self-knowledge and resistance. Secondly they use the practices of further mathematics teaching to challenge exclusions they have felt in mathematics: Bob's based on discourses of fixed, measurable ability, Jodie's based on discourses of speed and active competition. They draw on the institutional authority of the collective to circulate new mathematics practices that allow for their future inclusion. Thirdly, they use belonging to share the responsibility of engaging with difficulty, thus controlling the risks of self-entrepreneurism. This alignment suggests some reasons why FMSP has had successes in widening participation but it is worth noting two points. First, it is neither the face-to-face teaching nor the online network alone that supported these students in continuing with further mathematics but a combination of both. Second, both students position further mathematics as practical and directly linked to employability. The historical middle-class routes to success though mathematics have valued the theoretical and require longer periods of education.

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