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Surprising everyone but herself with her good results: the twin dynamic of invisibility and failure to see

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In this paper we explore the co-construction of identity in a Norwegian lower secondary school mathematics classroom. Focusing on one high-performing girl, Sarah, we analyse the role of male-dominated performance of “smartness” in her positionality in the figured world of Class A. While Sarah can be simply understood as making herself “invisible” in this dynamic, her teacher’s account draws our attention to the impact of gender performance on what she sees and values in her students. We argue that Sarah’s positionality is the result of a twin dynamic between girls’ cultural invisibility and her teacher’s failure to see, indicating a need for greater awareness of girls’ situation in mathematics classrooms, particularly where - as in Norway - gender is seen as “no longer an issue”.

Keywords: Classroom dynamics, gender performance, invisibility, equity.

Background and literature

Although Scandinavian countries are often seen as a “beacon” of gender equity, women’s participation in science, technology, engineering and mathematics (STEM) lags behind other countries (Talks et al., 2018), particularly in Norway: only 1 in 3 STEM graduates are women (Confederation of Norwegian Enterprise NHO, 2018). Talks et al. (2018) suggest that part of the problem is the common perception that Scandinavian countries have “fixed” the problem of gender inequity. In this paper, we explore girls’ experiences of mathematics in the crucial years before they choose their final educational pathway, in a setting where gender equity in the sense of a level playing field is assumed to follow from an emphasis on equal opportunities. We find that, on the contrary, being a successful student is marked by a highly gendered performance within a classroom dynamic that goes unquestioned by all participants, including the teacher. Focusing on the case of Sarah, a consistently successful girl, we argue that the gendered performance of “smartness” in the classroom renders her invisible, and contributes to her teacher’s failure to see her achievement: everyone is surprised by her marks except Sarah herself.

The link between classroom culture and students’ mathematical identities is well established. Black (2004a, 2004b) notes the role of interaction between teacher and students in the construction of mathematics knowledge in a British primary school, with particular implications for girls. Rather than engaging with the girls about mathematics, the teacher “somehow negotiated with these girls a coping mechanism where they stayed silent on the periphery of the classroom in whole-class discussions, but were praised for neatness and presentation elsewhere” (Black, 2004a, p.49). Girls who laid claim to a higher profile were “positioned out” as in the case of Sian, a girl whose ability was publicly acknowledged, but was exploited by the teacher to work as a “pace-maker”, contributing minimal responses which enabled the boys to continue in more productive dialogue with the teacher: “it is because of Sian’s compliance with the teacher’s agenda ... that the [high

performing] boys ... were able to engage in more dialogic talk ... it involves using the right kind of input (or response from the teacher) to signal and be recognised as ‘high ability’” (Black & Radovic, 2018, pp. 280-281).

Similarly, Foyn (2021) investigates how being good at mathematics is performed in a Norwegian lower secondary school. She argues that gender is refracted through a cultural model of “smartness” signified by “effortless” work, interrupting the teacher or challenging her mathematical competence, leading to a collectively held claim that there are no gender differences, but that the best students are boys (since they act in this way). Hence the gendered nature of high achieving girls’ self-censorship away from activities that are connected to the performance of smartness goes unchallenged. In an earlier study, Foyn et al. (2018) focused on “clever’ girls” positionality in an upper secondary school classroom in Norway, finding that they subtly positioned themselves as clever without performing in the same way as the boys in the classroom. However, their performance was restricted by a gendered discourse in which they both “policed” each other and “self-policed” in order to (re)enforce particular rules for combining being female and being good at mathematics: performing in terms of visible “natural ability”, flair and competitiveness was unacceptable as “feminine” behavior, and indicators of ability (e.g. ability group membership, marks) were expected to be noticed but not commented on. The case of girls’ visibility in mathematics is also elaborated on by Walls (2009), who identifies gender differences in the way students express their response to mathematics. She argues that, in order to survive, girls and women in mathematics “are required to don a cloak of invisibility that affords them temporary status as honorary males in a male domain” (Walls, 2009, p.47).

The teacher’s role in how students develop their positionality is illuminated by Jaremus et al. (2020). They found that teachers assumed three main categories of students: the gifted, characterized by their perceived natural ability, speed and achievement; the “dedicated”, characterized as hard working; and the utilitarian, having specific career goals (mostly “masculine”) which required mathematics. These subject positions “were not equally available to girls and boys” (p. 226): the utilitarian and gifted groups were predominantly male, while the dedicated group was mostly female. Jaremus et al. argue that the “naturalization” of mathematics as masculine excludes girls from the “gifted” subject position, whereas the normalization of effort makes the dedicated position available to them; the utilitarian position is available only if they can subscribe to the normalized aspirations to male-dominated careers. Both Walls’ and Jaremus’ research took place in Australia, while Black worked in Britain. As noted above, Scandinavian countries, Norway included, lay a strong claim to gender equity, yet Foyn’s earlier work questions this. In this paper we explore the twin dynamics of girls’ (self-) imposed invisibility and teachers’ assumptions about their capability in the Norwegian context further. Hence our research question is: What are the dynamics of gender (in)visibility in a Norwegian classroom?

Theoretical framework – positionality in a figured world

In this paper we draw on Holland et al.’s (1998) theoretical framework to see the mathematics classrooms as a figured world, a “socially and culturally constructed realm of interpretation in which particular characters and actors are recognized, significance is assigned to certain acts, and particular outcomes are valued over others” (Holland et al., 1998, p. 52). A figured world is “a

social reality that lives within dispositions mediated by relations of power”, where actors see themselves as having “more or less influence, more or less privilege, and more or less power” (p. 60). Importantly, though, figured worlds are not independent of other worlds, and the structuring effects of major discursive forces such as class, gender and ethnicity which underpin power and privilege in surrounding worlds impact on local worlds too. Thus,

social categories also can have meaning across many figured worlds. [...They] separate those who are routinely privileged from those who are not. Cross-cutting markers tend to become stereotypically associated with these social categories, if not actually demanded (p. 130).

In the Western world at least, gender as a positional force may lead some female students to see themselves as not having access to significant acts in the classroom such as participating in discussion about mathematics: “gendered dispositions to participate, or not, in given activities, develop in places where gender participation in activities is treated as a claim of gender specificity” (Holland et al., 1998, p. 143). Actors in a figured world get to know “their” position in relation to others as they participate in its everyday practices; in a mathematics class, students (and the teacher) learn to live out the figured world in terms of what they are “allowed” to say or do, what is expected of them, and what is valued. To understand girls’ positionality in a mathematics classroom, we need to notice the mundane activities of the classroom, its norms, rules and habitual acts:

They come to have relational identities in their most rudimentary form: a set of dispositions toward themselves in relation to where they can enter, what they can say, what emotions they can have, and what they can do in a given situation (Holland et al., 1998, p.142–143).

Thus students’ acts in the classroom are based on a blend of figurative identity - “signs that evoke storylines or plots among generic characters” - and positional identity - “acts that constitute relations of hierarchy, distance, or perhaps affiliation” (Holland et al., 1998, p. 128). Hence being a female “clever student” or a male “clever student” is “normally” played out differently in the same figured world, and position becomes disposition, ways of being that are frequently unconscious and “out of awareness” (p. 139). Habitual acts may thus lead towards situations of exclusion and inclusion of which actors in the figured world are unaware. As Holland et al. point out,

even in situations where all students are admitted to the arena of learning, learning is likely to become unevenly distributed Teachers will take some students’ groping claims to knowledge seriously. ... Others, whom they regard as unlikely or even improper students of a particular subject ... are less likely to receive their serious response (p. 135).

The mundanity and ordinariness of acts of exclusion or inclusion mean that noticing, resisting and countering these norms is unlikely or difficult, because “the everyday aspects of lived identities . . . may be relatively unremarked, unfigured, out of awareness” (p. 140). In this paper, we focus on the ordinariness of acts of inclusion/exclusion in the mathematics classroom on the basis of gender, and how this mundanity appears to prevent such acts from becoming visible.

Methodology

The data for this paper derive from a larger ethnographic study tracking a Norwegian lower secondary school mathematics class (“Class A”) from grade 8 to grade 10 (Foyen, 2021). Just outside Oslo, the school is in a high socio-economic status area with a fairly homogenous population mostly comprising native Norwegians and native Norwegian speakers. The school prides itself on its high grades. Students are assessed in the national system with grades from 1-6, where grade 6 is the best. Grades 5 and 6 are considered to be at a “high level”. Grades awarded correspond with the goals set for each grade, so achieving grade 5 in two consecutive years requires making the improvement required to meet the higher goals of the later year. All students follow the same curriculum. We draw on a variety of data collected by the first author in this ethnographic study: fieldnotes from participant observation; focus group interviews with the students in 8th and 9th grade; individual narrative interviews at the end of 10th grade; interviews with the teacher, Miss A, at the end of 8th and 9th grade; and copies of the teacher’s assessment record and students’ diary notes.

In this paper, we focus on one case study student, Sarah, whose 10th grade interview about her grades and performance, work effort and experience of mathematics is of particular interest because of her comments on her marks. However, the ontological implication of taking a figured world approach means that it is not possible to investigate any act, event, or statement in isolation, because it occurs between people in a context over time. Thus analysis focuses on story structure, collective storying and their connection with collectively spoken and enacted norms and values.

Sarah’s and the other students’ stories were analyzed in terms of narrative structure. Operationalisation of important concepts are exemplified in Table 1.

Table 1: Operationalization of narrative concepts

Concept	Definition	About	Operationalization
Positional utterances	About relations to groups or actors	Positionality	Describing/explaining oneself in relation to subgroups/persons
Flow	Narrative structure, choice of incidents, combination of ideas	Style of authorship	Sequencing of events, connections
Contradictions	Conflicting/contradictory issues in the talk	Ruptures	Contradictory claims/voices

Interviews with Miss A and the students take place within the figured world of Class A. Table 2 illustrates the operationalization of the central concepts of norms/rules and values in the figured world.

Table 2: Operationalization of central concepts of figured worlds

Concept	Definition	About	Operationalization
Norms/Rules	Expected actions or moves	Habitual events	<p>Observations - what is repeatedly observed? Expected actions based on previous experiences in observations</p> <p>Narratives - descriptions of characteristic actions in the class</p> <p>Co-constructions in focus group interviews</p>

Values	Perceived importance of actions or objects	How artefacts are employed, positional acts	Observations –acts that seem to give credit to the actor Narratives – description of what is important to do in order to claim status Co-constructions in focus group interviews
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In addition, the analysis draws on fieldnotes and observations of student movement within the classroom to gain a broad access to the figured world of Class A. Interviews were transcribed in Norwegian and translated into English. In our translations we have aimed to keep as close as possible to our understanding of intended meaning in the original Norwegian. This study followed the research ethics practices of the Norwegian Centre for Research Data, and all names are pseudonyms.

Analysis: Sarah in Class A

*SARAH: Is seen as mediocre by the teacher. She keeps on working. Enjoyed maths in primary school. **I think she is overlooked by the teacher**, because when I talk to Sarah in the classroom, I get the feeling that she is getting the concepts and does understand the connections. Easygoing, natural way of acting. Is improving her grades, got a rock solid 5 in the final test this year.*

(Fieldnotes, end 9th grade)

This summary impression of Sarah remained unchanged through 10th grade, with reference to both the way she acted in the classroom and her assessment record: she performed steadily at grade 5 throughout the year. Not being noticed seemed to be her “destiny” in this mathematics classroom, and her interview at the end of 10th grade revealed that Sarah was aware that this was the case.

Sarah’s story – everyone is surprised by her good results, except herself

A typical feature of Sarah’s story is her straightforward attitude when she describes her work in mathematics. Even though she is ambivalent about the way they work with mathematics, she just gets on with it: “*In 10th grade we kind of had to learn it quickly and then it wasn't as much fun because I didn't quite get it, but I learned it*”. It seems that Sarah tends not to like the fast pace, but she accepts the situation and goes along with it. However, this doesn’t affect her performance, because her marks indicate improvement in Miss A’s assessment protocol and Sarah says that this will continue: “*I think it might go upwards if I'm working to make it go up*”. Despite this confidence, she hesitates to position herself among the students who are doing well in mathematics, instead positioning herself as ordinary: “*I guess I've always been somewhere in the middle in maths, really. I find something difficult while something is very easy, surely like most of the other students, so like many or most of them, actually*”. Furthermore, she declines to query her marks: “*I don't often dare to say that I deserve a higher or lower grade, I'm more that what she gives me is what I get*”.

Given this apparent acceptance of the situation, the most striking moment in Sarah’s story is her account of her teacher’s excited response to her final test score. Mid-sentence, she suddenly mimics Miss A: [Excited voice, imitating the teacher’s bright tone] “*Wow! This is really good, aren't you surprised?* [Continues in her own tone, with indignant emphasis] *I was just like, 'no thanks!' I wasn't surprised*”. Her rejection of Miss A’s storying of her results as a surprise returns when she is

asked how she thinks the others in the class, including the teacher, see her: *"I think she [the teacher] is a bit like the others in the class, who think I'm a bit dumber or not as good as I am"*. She continues; *"people might think I'm going to get slightly worse grades than I get, or they go like [parodying puzzlement] 'are you smart?'"* Clearly aware of her positioning by others, Sarah's resistance goes no further than parody. To understand further, we turn to an analysis of the figured world of Class A.

The figured world of Class A - Sarah's position within the performance of smartness

Although the students describe Class A as a unit storied with a 'we' in which everybody does their best and works together despite differences, this image cracks the moment achievement is mentioned. Eva admits that *"There are some who get 6s in every single test, also there are quite a few who are average, and also some who can't do it, the special group"*, while Elias says *"There's a group that is quite a lot better than the others, at a higher level than the others ... They do more difficult tasks, help others a bit more, give explanations and discuss a bit more with Miss A"*. Sarah is aware of this group as well. Asked who is very good at mathematics in Class A, she replies, *"I feel boys or people think that. At least in our class, the guys are the smart ones good at maths, but I think that it differs from class to class"* She adds: *"We have a lot of very extraordinarily smart boys, at least, who are doing maths for upper secondary school and things like that, so I think a lot of people think they're smart"*. She describes the boys as smart, but it is notable that she doesn't accept this argument unreservedly - twice she says this is "what people think". She goes on, perhaps reflecting her own experience: *"But I think the girls are keen to do well, maybe, more than the boys too"*.

Miss A's account adds to this complex picture of how things are seen in Class A. In her interview at the end of 8th grade she is asked if there is any subject the students connect to status. She replies: *"In this class we have a whole bunch of special boys ..., who are very interested in mathematics and science. And getting good grades in mathematics is high status"*. As for the girls, she says: *"I have the impression that they like to do well, but I haven't picked up any indication that mathematics is particularly significant. She goes on: I think maybe they are thinking a bit more in the direction of language, for those who like to write"*. She repeats this account of the boys in her 9th grade story of Class A: *"I have to mention this group of boys, "the smart boys"; they are a driving-force, academically. They easily affect others in a positive way"*. Miss A's comments on the girls' assumed favoring of language over mathematics are by her own admission speculative, and appear to be based on the fact that the girls do not *act like* the boys. Both teacher and students described how this group of boys performed smartness through acts which have particular significance in Class A: acting as "assistant teachers", engaging in discussion with Miss A and so on. Miss A stories the girls very differently. Only two high performing girls are presented as high achievers in mathematics alongside the "smart boys" in Miss A's narrative of the class, but they have a less prominent position than the boys, being mentioned in either the 8th or the 9th grade, but not both. Neither are described as particularly interested in or focused on mathematics, and they appear in Miss A's narrative as stereotypical girls in mathematics While the "smart boys" are presented as enjoying discussion of a subject they are interested in - *"Erik and Ross, they are the same, they think that the subject is interesting and like to enjoy it and discuss"*, Emilia is presented

as hard working - *"I have to say Emilia works extremely hard and tackles challenges head on and wants to stretch herself"*. Equally successful, Kine is portrayed as lacking in confidence: *"Kine can feel a bit of performance pressure ... when she really trusts herself and comes up with something it's really great"*.

Although Sarah is also a consistent high performer, she is not mentioned alongside the "smart boys". In 8th grade Miss A describes her as being in the group of students who are in the middle, both in terms of achievement and how they work in mathematics. She comments that some of the girls, including Sarah, are doing better in other subjects: *"I think I can say that Sophie, Maya, Kine, Josephine and Sarah are all typically better in social science and religion"*. At the end of 9th grade, Sarah is still not mentioned among the best students, even though we know that her achievement has improved. Instead, repeating her emphasis on hard working girls, Miss A places her among a group of girls she labels "the sporty hard-working girls", characterized as *"just chatting girls, laughing [...] they spend a lot of time together in their spare time. Also, they are sporty girls"*. Sarah, whose results in mathematics are improving all the time, is barely mentioned in Miss A's storying of Class A, even though achievement is clearly important in this classroom culture. It seems that good marks are not enough for Sarah to be recognized as a good student in mathematics, since she is positioned outside of the highly gendered performance of "smartness".

Discussion: the twin dynamics of invisibility and failure to see

In this paper we have focused on just one girl, who interested us because of her critical parody of her teacher's surprise at how well she had performed on a test. Our analysis is not intended as a basis for generalization about girls' experiences – other girls in Class A have different experiences. However, Holland et al.'s (1998) framework emphasizes that Sarah's positionality cannot be understood in isolation from her context; it takes place within the dynamics of the classroom as a figured world, hence our research question: "What are the dynamics of gender (in)visibility in a Norwegian classroom?". We have seen how Miss A fails to see her achievement as worthy of the label "good at mathematics", but Sarah herself doesn't resist her positioning as a mediocre student beyond a private parodying of the teacher and the other students, even though she is aware and resents the fact that her competence in mathematics is not recognized. For us, Sarah's positionality is a double bind: she is caught between others' failure to see - students and teacher are blinded by the "smart boys" performance of smartness - and her invisibility in that she is unable or unwilling to perform smartness.

Holland et al.'s (1998) theory provides tools which enable us to understand the dynamics behind this double bind. We argue that Sarah's positionality and the fact that her mathematical competence goes unrecognized in Class A are two sides of the same coin. Miss A and Sarah both act within the norms and values of the figured world of Class A, caught by the same dynamics of power and privilege in connection to the smart boys' performance of smartness. It is as though this performance is a significant marker of being good at mathematics which goes beyond results. As Holland et al. (1998) point out, actors in a figured world get to know "their" position in relation to others as they participate in its everyday practices; they learn to know what they are "allowed" to say or do, what is expected of them, and what is valued. These relations take place within the mundanity of the classroom, its rules, norms and habitual acts. In Class A, the performance of

smartness is inextricably linked to gender – we see that not just from Sarah’s account but from the other students and Miss A herself. Its habitual nature means that exclusion is hidden in plain sight, since Sarah can only make herself visible by her good results, and these go unnoticed, remarked on only with surprise as though this was an unusual event. Without access to those acts which signify smartness - interest, discussion, helping the teacher, Sarah is invisible, and described at best as “hard working”, echoing Jaremus et al.’s (2020) finding that female students are excluded from the position of “good at mathematics”. We argue that in fact she has no means for countering these norms in Class A - Foyn et al. (2018) drew attention to how difficult and even risky it can be to break out of gender dynamics, or challenge gendered norms in the classrooms, since “discourse border guards” ensure that gender lines are not permeable.

As Holland et al. (1998) emphasize, the mundanity of everyday lived identities makes them difficult to challenge. It might be argued that Sarah could change her behavior in order to publicly resist her positionality, but Sarah’s double bind means that this isn’t easy. This is not to say that change is impossible, but making Sarah’s situation visible goes beyond Sarah’s and Miss A’s acts alone - it requires a collective recognition and action. The implications of Sarah’s story in the figured world of Class A are that gender dynamics in mathematics classrooms need to be discussed in classrooms, school departments, and teacher education; arguably this is particularly so in a country such as Norway where gender inequity is assumed to be in the past, and mundane classroom practices go questioned.

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