Surprising everyone but herself: the twin dynamic of invisibility and failure to see

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In this paper we explore the co-construction of (available) identities in a Norwegian lower secondary school classroom. Focusing on a case study of one high-performing girl, Sara, we analyse the role of male-dominated performance of 'smartness' in her positionality in the figured world of Class A. While Sara can be simply understood as making herself an 'invisible girl' in this dynamic, close inspection of her teacher's account of the classroom draws our attention to the impact of gender performance on what Miss A sees and values in her students. We argue that understanding Sara's positionality as a result of a twin dynamic between her cultural invisibility and the teacher's failure to see indicates 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, in fact female participation in science, technology, engineering and mathematics (STEM) lags behind other countries (Talks, Edvinsson & Birchall, 2018), particularly in Norway: women make up the majority university population but comprise only 1 in 3 STEM graduates (Confederation of Norwegian Enterprise NHO, 2018). Talks et al (2018) suggest that part of the problem of gender equity in STEM in Scandinavia is the common perception that these countries have already 'fixed' the problem of gender inequality. 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 equality is both assumed and taken for granted. We argue that being a successful student is nevertheless marked by a highly gendered performance within a classroom dynamic that goes unquestioned by all participants, including the teacher. Focusing on the case of Sara, a consistently successful girl, analysis reveals that the gendered performance of 'smartness' in the classroom not only renders her invisible, but also contributes to her teacher's failure to see her achievement: everyone is surprised by Sara's marks except Sara 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 classroom. She argues that gender is refracted through a cultural model of 'smartness' signified by 'effortless' work and interrupting the teacher or challenging her mathematical competence, leading to a collectively held claim that there are no gender differences in mathematics but that the best students in the class are boys (since they act in this way). Foyn (2021) notes how two high achieving girls self-censor away from activities that are connected to the performance of smartness, and that no one challenges the gendered nature of their positionality, not themselves, not the teacher or any of the other students.She argues that the cycle of identifications-in-practice is both emergent and powerful, and that gender in mathematics is characterised by a lack of awareness among the actors in the classroom; it is embedded in the mundanity of the mathematics classroom.

Foyn et al (2018) focused on 'clever' girls' positionality in an upper secondary school classroom in Norway, finding that girls who were doing well in mathematics 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 of mathematics learning, 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' behaviour, and indicators of ability (eg ability group membership, marks) were expected to be noticed but not commented on.

While Foyn et al (2018) unpack the role of girls themselves in policing their own behaviour, the teacher's role in how students develop their positionality is illuminated by Jaremus et al (2020). Echoing Walkerdine (1998), they claim that high-achieving female students seem to be 'counted out' by their teachers, and that teachers categorised their students according to gender, with potential for excluding female students from the highest levels in mathematics. Jaremus et al (2020) note gender constraints in 'what seems to be taken for granted', leading to a narrow range of possibilities for girls to be "legitimate participants within the senior secondary mathematics classroom" (2020, p. 223). They found that teachers assumed three main categories of students: the gifted, characterised by their perceived natural ability, speed and achievement; the 'dedicated', characterised as hard working; and the utilitarian, having specific career goals (mostly 'masculine') which required mathematics. Importantly these subject positions "were not equally available to girls and boys" (p. 226), with the utilitarians and gifted groups being predominantly connected to male students, while the dedicated group was mostly associated with female students. Jaremus et al argue that the 'naturalisation' of mathematics as masculine (and requiring a 'male brain') excludes girls from the 'gifted' subject position, whereas the normalisation of effort makes the dedicated position available to them and the utilitarian position is available as long as they can subscribe to the normalised aspirations to male-dominated careers. Jaremus' research took place in Australia. As noted above, Scandinavian countries, Norway included, lay a strong claim to gender equity. In this paper we explore the twin dynamics of girls' (self-) imposed invisibility and teachers' assumptions about their capability in the context of an assumed emphasis on gender equality. Hence our research question is: Why is it difficult to render this positional 'blind spot' visible, and consequently break out of it?

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. These categories [...] 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 of their members in practice" (Holland et al., 1998, 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. Understanding girls' positionality and their access to status, power and privileges in a mathematics classroom we have to paying close attention to 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 in its specifics. Teachers will take some students' groping claims to knowledge seriously on the basis of certain signs of identity. … 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. As Holland et al say, "the everyday aspects of lived identities . . . may be relatively unremarked, unfigured, out of awareness, and so unavailable as a tool for affecting one's own behaviour" (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 (Foyn, 2021). Following Geertz' (1973) emphasis on the importance of 'thick descriptions' of a culture, we draw on a variety of data in this study collected by the first author: fieldnotes from participant observation; focus group interviews with the students in 8th and 9th grade; individual narrative interviews with the students in the end of 10th grade; interviews with the teacher, Miss A, at the very end of 8th and 9th grade; and documents such as copies of the teacher's assessment record and students' diary notes.

We focus here on one case study student, Sara, whose interview in the second semester of 10th grade is of special interest. It was conducted around three main topics in order to gain an insight into her relationship with mathematics: grades and performance, work effort and her experience of mathematics. The interviews with Miss A are also of particular interest. She played a significant role in Class A as the bridge between the students' life as mathematics students in terms of performance and their general well-being, and the national and local guidelines for education. Interviews with Miss A focused on the students' performance and way of working with mathematics, relations among the students, and the challenges and affordances of teaching mathematics in this class. The interview analysis process began with transcription (Jenks, 2011), and we noticed and reflected on particular key themes which emerged, employing the lens of Figured Worlds to capture the values, norms and figures of 'Class A'. We also focused on the overall impression of the talk in terms of genre, flow, contradictions and attitudes. Interviews were transcribed in Norwegian and translated into English by the first author. In our translations we have aimed to keep as close as possible to our understanding of intended meaning in the original Norwegian. The data for this paper also include copies of Miss A's assessment record. In order to gain a comprehensive understanding of Sara's positionality in Class A, other students' narratives of Class A are also used to understand this figured world; these were conducted and analysed as described for Sara above.

The school in which this study took place was located just outside Oslo, in a high socio-economic status area, based on economy and education levels. The area that the students are recruited from is fairly homogenous, with few people speaking a language other than Norwegian, and there are few who are not native Norwegians. The school has a reputation for being a school where the students achieve high grades, and this is underlined by statistics presented on its webpage. Students are assessed by grades from 1-6, where grade 6 is the best. Grade 5 and 6 are commonly termed a 'high level of achievement'. Grades awarded correspond with the goals set for each grade, so a student might achieve grade 5 in two consecutive years, indicating the improvement required to meet the higher goals of the later year. All students follow the same curriculum, and they have no choices in mathematics before 11th grade, the first year of upper secondary school. This study followed the research ethics practices of the Norwegian Centre for Research Data for the collection, storage and processing of personal data, including active consent, the right to withdrawal and anonymity. All names are pseudonyms.

Analysis: Sara in Class A

> *SARA: 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 Sara 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 Sara at the end of 9th grade stayed 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 Sara was aware that this was the case.

Sara's story – everyone is surprised by her good results, except her

Sara's story shows a straightforward attitude to her work in mathematics. She is ambivalent because she tends not to like the fast pace, but 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

Sara 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 Sara says that this will continue: *"I think it might go upwards if I'm working to make it go up".* Despite this confidence in her capacity to do mathematics, 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"*[1]*).*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*"[2].

Given this apparent acceptance of the situation, the most striking moment in Sara'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 with her own tone of voice, with indignant emphasis] *I was just like, 'no thanks!' **I** wasn't surprised"*[3]. Her rejection of the suggestion that her good results should be storied as a surprise returns when she is asked how she thinks the others in the class, including the teacher, see her as a mathematics student: *"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".*[4]This indicates that Sara has a sense of being seen as less capable than she actually is. 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?'"*[5] Although Sara is clearly aware of how she is positioned by the other students and the teacher in Class A, and that her ability is not noticed, her resistance goes no further than parodying the teacher and the other students. To begin to understand why everybody except Sara herself is surprised by her good results, we turn to an analysis of the figured world Sara is a part of, Class A.

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

Although the students describe Class A as a whole class 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".* Sara is aware of this group as well. When she is asked who is very good at mathematics in Class A, she replies; "*I don't know. 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 a gendered situation where boys are seen as smart, but it is notable that she doesn't buy this argument unreservedly - twice she says

[1] Jeg har vel egentlig alltid vært litt midt på treet i matte, egentlig. Jeg synes noe er vanskelig mens noe er veldig lett, så sikkert som ca alle sammen, så som mange eller flesteparten er egentlig

[2] for jeg tør ikke så ofte snakke om at jeg kunne fortjent høyere eller lavere karakter, jeg er mer sånn at det hun gir meg er det jeg får.

[3] Wow! Dette er veldig bra, er du ikke overrasket! Jeg bare sånn, nei takk! **Jeg** ble ikke så overrasket.

[4] Jeg tror hun [læreren] er litt som de andre i klassen, som tenker at jeg er litt dummere eller ikke så flink som jeg er

[5] folk kanskje tror at jeg skal få litt dårligere karakterer enn jeg får, eller sånn [endrer stemmen for å imitere] er du smart?

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".*[6]

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 with Ross, Erik, Alexander, Albert and Isak and so on, who are very interested in mathematics and science. And getting good grades in mathematics is high status".* When she is asked how the situation is for 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. (...) I think maybe they are thinking a bit more in the direction of language, for those who like to write."* This picture returns in her 9th grade story of Class A, when she is asked if there is anyone who influences the class in a particular direction. She replies: "*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."* It seems that power and privilege are unevenly distributed among the students in Class A and that this is gendered. Miss A's comments on the girls' assumed favouring 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; her impression that they like to do well is dismissed because they do not act out a link between mathematics and status as the boys do. 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 differently, particularly with respect to their achievement in mathematics. 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 then the boys, being mentioned in either the 8th or the 9th grade, but not both . Neither are described as particularly interested in or focussed 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", while the 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 Sara 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 Sara, are doing better in other subjects: "I think I can say that Sophie, Maya, Kine, Josephine and Sara are all typically better in social science and religion."[7] At the end of 9th grade, Sara 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, maybe they're not that keen on boys and stuff like that yet. No partying and stuff yet, they spend a lot of time together in their spare time. Also, they are sporty girls.[8] Sara, whose results in mathematics

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[6] Vi har jo veldig mange sånn ekstraordinært smarte gutter, i hvertfall, som er med på videregående prøver og sånne ting, så da tenker jeg at mange tenker at de er hvertfall , så da tenker jeg at mange tenker at de er de smarte (…). Men jeg tror at jentene er opptatt av å gjøre det bra, kanskje, mer enn guttene også.

[7] Jeg tror jeg kan si at både Sophie, Maya, Kine , Josephine, and Sara er sånn typisk bedre i samfunnsfag og KRLE

[8] De bare sånn skravlete jenter, ler, de er kanskje ikke så opptatt av gutter og sånn enda. Ikke noe festing og sånn enda, de er mye sammen på fritiden. Også er de idrettsjenter.

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 Sara to be recognised 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

Following Holland et al's (1998) framework, it is not possible to understand Sara's positionality as an isolated case in Class A; it has to be understood within the dynamics of the classroom as a figured world. We have seen how Sara is not noticed by Miss A, who fails to see her achievement as worthy of the label 'good at mathematics'. Sara 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 recognised. For us, Sara's positionality is a double bind: she is caught between others' failure to see - both students and teacher are blinded by the 'smart boys' performance of smartness - and her consequente invisibility; unable to perform smartness, she goes under the radar. Sara's double bind returns us to our research question; Why is it difficult to render this positional 'blind spot' visible, and consequently break out of it?

Holland et al's (1998) theory provides tools which enable us to understand the dynamics behind this double bind. We argue that Sara's positionality and the fact that her mathematical competence goes unrecognised in Class A are two sides of the same coin. Miss A and Sara 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 the performance of smartness 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. Its habitual nature means that exclusion is hidden in plain sight, since Sara 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, Sara is invisible, and described at best as 'hard working', echoing Jaremus et al's (2020) finding that the naturalisation of mathematics as masculine excludes female students from taking up 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 noted above, Holland et al emphasise how mundanity means that "the everyday aspects of lived identities . . . may be relatively unremarked, unfigured, out of awareness, and so unavailable as a tool for affecting one's own behaviour" (1998, p. 140). It might be argued that Sara could change her behaviour. She clearly notices her positionality, but she barely resists. Sara's double bind means that the blind spot can't be made visible. There are possibilities for change in Holland et al's framework, but making Sara's situation visible goes beyond Sara's and Miss A's acts alone - it requires a collective recognition and action. The implications of Sara's story 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 inequality is assumed to be in the past, and mundane classroom practices go questioned.

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