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Storylines in public news media about mathematics education and minoritized students

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Abstract
Public media both reflects and shapes societal perceptions and attitudes. Teachers and others around students in mathematics classrooms have expectations for the students, projected with what appears in these media. We are most concerned about the expectations placed on students who are identified with minoritized groups—particularly students who are Indigenous or migrated to Norway. We investigate how minoritized group contexts and mathematics education appear together in Norwegian news media texts. Our analysis uses the notion of storylines to describe the expectations about minoritized groups that news media project. We found seven entangled storylines: "the majority language and culture are keys to learning and knowing mathematics," "mathematics is language- and culture-neutral," "minoritized groups' mathematics achievements are linked to culture and gender," "extraordinary measures are needed to teach students from minoritized groups mathematics," "students from minoritized groups underachieve," "students from minoritized groups put in extraordinary effort and time to learn mathematics," and "minoritized mathematics students are motivated by gratitude."

Keywords Immigrant · Indigenous · Mathematics education · Minority/minoritized groups · Norway · Norwegian media · Positioning · Sami · Storyline

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1 Introduction

News media has the potential to raise public awareness and to distribute powerful storylines which concurrently represent and influence public opinion and perception on mathematics and mathematics education (e.g., Abtahi & Barwell, 2020; Rodney et al., 2016). Storylines are broad, culturally shared common-sense narratives that function as frameworks for participants to make sense of any communication, including, for instance, news media articles (Herbel-Eisenmann et al., 2016). Storylines in media affect individual students' and groups of students' identities (Mendick, 2005; Wagner, 2019), students' relations with and expectations of mathematics education and thereby their opportunities for mathematics learning and ultimately their future prospects.

One goal that underpins our analysis of Norwegian news media is to identify and consider the relationships between/among storylines that are pervasive in society and relevant to minoritized learners of mathematics in Norway. Storylines are the grand narratives people draw from in interaction and are important for mathematics education to consider because they relate to the range of positionings that are available to people in their interactions. Although positioning theory has been used in mathematics education since about 2009, very little of this work focuses on storylines; there is much more attention paid to positionings. Thus, a secondary contribution of this article is our detailed articulation of methods for identifying storylines.

We are motivated by the fact that the opportunities that students from minoritized groups have for learning mathematics are often diminished as compared to their majority group peers due to systemic and institutional issues (Källberg, 2018; le Roux, 2016; Meaney et al., 2011; Valoyes-Chávez & Martin, 2016). Languages may be the most obvious challenge in diverse mathematics classrooms, but they connect to cultural differences and conventional characteristics of the discipline. Indigenous communities have experienced linguistic and other discriminatory and genocidal practices for decades as a result of colonization. Such tensions are now appearing in "ordinary" Norwegian classrooms because tensions in education are intensified by language and cultural differences in times of large migration (Cenoz & Gorter, 2010). Additionally, deficit discourses about multilingual students and teachers may further stigmatize or cause harm (Andersson & le Roux, 2017).

Public news media both reflect and form classroom tensions; hence, the storylines become part of individuals' and groups' positionings in different contexts. With this media study, we sensitize ourselves to storylines already potentially available by identifying some of them and considering how they may relate to each other. This is important because it relates to how available storylines may shape positionings for minoritized students and may need to be considered in the development of asset-based pedagogies (Adiredja & Louie, 2020). We searched a database of public media articles; found 1896 articles that included references to mathematics, education, and either Indigenous or migrant identifiers; and identified seven prominent storylines.

We note here that we are not comfortable with any wording that points to the youth whose storylines we are most interested in. The possibilities—*nondominant*, *minority*, *othered*, *non-Norwegian*, *multicultural*, etc.—all rest on attributions that are not always consensual and imply problematic power relationships. We use the word *minoritized* because it recognizes discriminatory and dehumanizing practices and policies influencing people's lives rather than indicating there is a problem with the people themselves. We recognize, however, that this word, too, is problematic.

2 Storylines

2.1 How storylines work

The theorization of storylines and positioning come from efforts to understand how people are drawn into certain forms of action and interaction. There are other constructs with similar goals, but we choose storylines because the theory underpinning the concept radically focuses on the experience of and available choices for individuals in particular contexts. We see this focus as an opportunity to overcome widespread, dominant storylines and their associated positionings.

Davies and Harré (1990) used the term *story line* to describe the stories that people draw upon to make sense of and structure their interactions. For example, someone might see an interaction as a story of physical training and thus position themselves as a veteran, emerging athlete, or a coach, which has implications on how they see others in the interaction. Later theorization from Harré and others used the term *storyline* (e.g., Harré, 2012). Storylines make positions available, which could be either accepted or resisted (Wagner et al., 2019). Parents could position themselves as a teacher in a learning storyline when trying to help their child with homework. The child could resist, rejecting being positioned as a student, and interact in a way that suggests a different storyline. Storylines are negotiable. Interlocutors may interact with different views on what story is playing out, so the storylines and positioning are contingent on perspective. Storylines are also reciprocal in that one's choice for storyline and positioning has implications on the choices of others in the interaction (Wagner & Herbel-Eisenmann, 2009). The theory directs us to focus on human interactions.

Storylines about minoritized groups in news media often inform intergroup positioning because individuals or groups position themselves and others based on group membership. Significant to our interest in minoritized groups, Tan and Moghaddam (1999) noted that "[o]ne of the most important aspects of intergroup relations concerns power inequalities between groups" (p. 182). Some groups which control, for instance, mass media or an educational system have more power to influence societal storylines compared to groups that are distant from the socialization mechanisms of the dominant society. This influences what positionings could be made available for students from minoritized groups. For example, it is a human right to emigrate from a country, but each nation sovereignly decides whom to grant entrance (Oberman, 2016). This positions immigrants with the duty to demonstrate they are worthy of entering and remaining in the country. People in the host country are positioned with the right to judge their worthiness. Also, people who identify with majority society in the host nation often position the country as a caregiver who benevolently educates immigrants in the language and culture. Relevant laws are reflections of societal values. Further, social judgments are not limited to the legalities. The two storylines about *worthiness* and *caregiving* are examples of what Harré (2012) calls a broader set of conventions or meta-positioning. With intergroup positioning like this, people may be positioned in advance of an interaction. Teachers and others form expectations about the capabilities and responsibilities of minoritized mathematics students, which impact their opportunities.

In our focus context, Eriksen (2020) investigated how middle school students perceived the majority society's Norwegianness as a matter of enacting majority Norwegian culture and being fair skinned, blond, and blue eyed as characteristics of appearance. Groups of people who differ from this majority society myth about who is or is not "Norwegian,"

particularly because of appearance, are positioned as highly visible in the public realm. This means that students from some minoritized groups cannot choose to make membership in particular groups explicit—they are pre-positioned on the basis of their appearance and thereby ascribed attributes about moral character or competences. Students from minoritized groups whose appearance aligns with this majority's social construct of "Norwegianness" may hide membership in a minoritized group because they are aware that the pre-positioning that would follow from that ascribes stigmatizing attributes (Kommunal- og moderniseringsdepartementet, 2015) or due to longstanding assimilation policies that are alienated from their own origin (Huru, Räisänen & Simensen, 2018). The preference for "hiding" within the Norwegianness is a symptom of a more or less conscious presumed benefit, or even superiority, attributed to the Norwegianness, likely to align with an ideology of whiteness and white supremacy. Even if some white Europeans might be excluded due to ethnicity, national identity, immigration status, or other distinctions people use to implicitly and explicitly marginalize "others," the social constructs of race and racism and of white supremacy are global concerns (e.g., Martin, 2009; Valoyes-Chávez & Martin, 2016).

Herbel-Eisenmann et al. (2015) noted how multiple storylines may concurrently shape positioning. This means that actors (e.g., newspaper authors) (un)consciously navigate several storylines (Andersson & Wagner, 2019) as they write their stories. The interaction among storylines is complex. Barthes' (1972) work on myths is informative. He identified "inoculation" as a rhetorical device for myths: a storyline can be supported by small doses of a contradictory storyline similar to the way human bodies produce antibodies from vaccines or inoculation. For example, when a media article presents a novel situation as newsworthy it is a reminder that this situation breaks the norms that are tacitly understood by the majority: a celebration of one person's success is a reminder that society does not expect success from such a person.

2.2 Public media storylines about mathematics and mathematics education and minoritized groups

Recent scholarship in mathematics education has begun to identify some of the storylines present in news media. Here, we outline some of the storylines identified in this literature, along with other literature that describes pervasive stories and images of mathematics. It should be noted that although we limit ourselves to literature on storylines, related issues are described with different theories: e.g., many have related economic growth and prosperity to mathematics education, but not necessarily referring to this as a storyline. For the Norwegian context, we also included other sources for storylines that are not explored in research literature. What people say about a country and its inhabitants are storylines, and for minoritized groups in Norway there are (historically shifting) storylines, some held in common among several of the groups.

One storyline identified in the literature suggests that mathematics equips society in pursuit of economic growth and national prosperity (Chorney et al., 2016; Herbel-Eisenmann et al., 2016; Rodney et al., 2016; Wagner, 2019). This storyline positions students and their mathematical achievements as national commodities valued by means of global ranking systems such as PISA and TIMMS (Lange & Meaney, 2018). The exchange value of this commodity is a high-rated STEM workforce. News media often report nations' positions when new global rankings have been released. Global ranking reports often specify the achievements of students from minoritized groups such as students with immigrant backgrounds, usually reporting that these students achieve lower than students from majority

groups (e.g., OECD, 2018). Hence, the storyline *mathematics equips society for prosperity* positions students as serving the needs of the majority society and may thus position immigrated students as jeopardizing the majority society's fortune. To assure national pride and prosperity, or in other words to increase minoritized students' mathematical achievements, the majority society positions these students as needing integration and/or inclusion.

Another storyline with strong moral implications in the media, identified by Schwöbel-Patel and Ozkaramanli (2017) and Ryan et al. (2021), describes a "grateful immigrant." This storyline imposes certain societal behaviors, expectations, and obligations such as a willingness to "work hard," learning the language and culture of the majority society, gratitude to the host nation, and an unwillingness to be a burden to state resources. In this storyline, the model student who has immigrated is expected to take up positions that involve excelling in education, contributing to labor, displaying vulnerability and weakness, and ultimately accept the benevolence and superiority of the host country's culture (Thiruselvam, 2019). The Norwegian context and history that relates to such storylines is that from the 1970s, when a noticeable number of migrants arrived for work. These people and their descendants got their own categories in Norwegian population statistics (Søbye, 2014). More recently, the reasons for immigrating to Norway as well as the countries of origin have diversified (Reisel et al., 2019).

In contrast to the earlier-mentioned storyline which positions countries as competitors in mathematics achievement on a national basis, the storyline *mathematics equips the individual* positions individuals as combatants in pursuit of social and economic advancement (Chorney et al., 2016; Wagner, 2019). This storyline appears in a wide range of development and research projects to support the mathematics learning of students from minoritized groups. The projects demonstrate how students from minoritized groups can equip themselves with mathematics when their languages and cultures are appreciated as resources for mathematics learning (Huru et al., 2018; Planas & Setati-Phakeng, 2014). Language and culture are often viewed as deficits (Gutiérrez, 2008; Källberg, 2018).

In the same vein as the storyline(s) of benevolence of the host country for immigrants, the dominant settler/imperialist culture in many places expects Indigenous peoples to undertake the colonizers' culture (Tuck, 2009). When Indigenous peoples resist these storylines, the colonizers' prevailing culture becomes visible. For instance, Indigenous peoples' revitalization of their own languages for the sake of mathematics education in Norway (Fyhn et al., 2018; Huru et al., 2018) and elsewhere (Meaney et al., 2011) are decolonizing acts. National language and culture policies are tied to the inception of the modern idea of a nation–state and thus decolonizing acts can resist those storylines. For constructing a nation–state, national languages are essential for building a shared national identity and to mark territory (Blommaert & Rampton, 2011). The Norwegian educational system, and rural schooling in the North in particular, has a history of assimilation and Norwegianization (e.g., Minde, 2005). The politics formed from approximately 1800 and onwards had an aim to remove unwanted cultures and languages from the Norwegian territories. This policy targeted Forest Finns, Kvens, Sami, Rom, Romani, and Jewish peoples. For Kven and Sami people, schools generally did not permit the use of their mother tongue, even outside the classroom (Engen, 2010; Minde, 2005). For the Romani people, these policies also had harsh expressions through measures like forced sterilization and the denial of traditional livelihood, as making horse-ownership illegal (NOU, 2015: 7). Jewish people were denied access to Norwegian territory through a paragraph in the Norwegian constitution in 1814, later repealed. Storylines such as the "grateful immigrant," however, also impact these peoples. In statistics from the era of Norwegianization, the Kven and Sami were considered non-Norwegian and Rom and Romani were not registered. It is noteworthy that at that time

immigrants, except if belonging to one of these peoples, were considered Norwegian in Norwegian statistics (Søbye, 2014).

In the context of students from minoritized groups and education, Eriksen (2020) highlighted how perspectives such as race, racism, and Whiteness are concealed or even tabooed in Norwegian public debate and in education. She argued that "[t]he avoidance of race reflects a Norwegian national imaginary invested in Whiteness, obscured by an ideology of colour-blindness and 'equality as sameness' to avoid [white individuals] discomfort" (Eriksen, 2020, p. 1). The color-blind *equity is sameness* storyline claims to ignore the differences in physical appearance that make some students highly visible (Puwar, 2004), since this difference is situated in observable differences about their bodies and what the dominant culture perceived "Norwegian" people should look like.[1] Hence, the color-blind *equity is sameness* storyline makes it impossible to acknowledge existing othering and/or racism, which conflicts with the storyline *education should strive for equity* (Rodney et al., 2016). This means that minoritized students have to deal with being positioned as different, without recognition of the emotional labor involved in such a positioning (Eriksen, 2020). We want to add that in addition to news media, global popular culture, including movies, television, and music, is also influential on public opinions and perceptions on mathematics and mathematics education (Epstein et al., 2010; Mendick, 2005). Storylines operate in these cultural works too—with the media reflecting and driving public perceptions. Therefore, it is interesting to note how different storylines in popular culture can contradict the above-mentioned ones. For instance, in popular culture mathematics is traditionally exercised successfully only by an exclusive group of white, eccentric men who are distanced from the social world (Epstein et al., 2010) and from any kind of civic participation. In popular culture, mathematics does not appear to be relevant in the social realm nor anywhere else outside of the mathematicians' studies (Mendick, 2005). These storylines about mathematics are often exclusive and gendered, and any non-visible minority backgrounds (e.g., because of skin color) are not stated and hence distanced from the society.

In this section, we have discussed storylines on mathematics education that scholars have identified in public media and connected these to other studies that examine pervasive stories in the Norwegian context. We illuminated some storylines about minoritized groups. We emphasize that storylines do not have to be "true" to be powerful. For instance, a fact that is often ignored is that migrant students achieve higher in mathematics than their peers when adjusted for socioeconomic conditions (Meld. St. 6 (2012–2013), p. 50). Similarly, the competition storyline reminds us that newspaper reports are not neutral; they distribute moral values (Abtahi & Barwell, 2020) which may materialize as national pride or shame due to a nation's present ranking position (Yasukawa, 2019).

We note that apart from the work of Samuel et al. (2014), who discussed how the Chinese minority in Malaysia through media was able to negotiate a stance on Malayan language policy for mathematics education, we have not found other media analyses that address storylines about minoritized groups and mathematics education. We find it important to highlight how minoritized groups appear in public news media because, as noted by Lange and Meaney (2018), news media influence public opinion and ultimately policy making, and reflect the realities students experience in schools. Further, storylines that

[1] Racism and anti-blackness are part of the global experience (Martin, 2009), and it manifests in different forms throughout the world (Nicolson et al., 2016). Drawing on Barajas and Ronnkvist (2007), Martin (2008) stated that "whiteness is a mechanism of power that allows dominant group ideologies surrounding race to be imposed on other groups, often in subtle ways (p. 1520)" (p. 390).

appear in the public media realm affect students' identities and foregrounds (Epstein et al., 2010; Mendick, 2005). In other words, there is a connection between news media reports and students' mathematics learning. The connections are perhaps not always straightforward, but nevertheless news media can shape minoritized students' opportunities to learn mathematics.

3 Methodology

Before describing our methodology, we find it important to recognize that identifying news media storylines means risking reproduction of harmful storylines. Tuck (2009) explained that much research that relates to minoritized groups focuses on "damage and repair" rather than on assets, hopes, and desires. To be able to (re)imagine storylines that position minoritized youth in asset-based ways that recognize their hopes and desires, it is important for us to tease out and scrutinize storylines and the positionings made available in news media. To (re)imagine asset-based storylines, already existing storylines may have to be renegotiated, especially if they are deficit-based and do not match the hopes and desires of the community. If they already are asset-based, they may need to be amplified. Additionally, since multiple storylines are present in any one interaction (Andersson & Wagner, 2019), we investigate how storylines are interconnected and how interconnected storylines make positionings available.

3.1 Phase 1—identifying search strategies and generating the data set

We drew on text-based news media sources that report current events and which acknowledge Redaktørplakaten, an ethical codex for publishers in Norway because they are accessible in the Norwegian mass media database Atekst (https://www.retriever.no/). In addition to mainstream daily newspapers, weekly and monthly journals, tabloids, etc., small-scale publications were included because they may influence storylines in local areas and hence make positionings available for minoritized students located in those areas. Some minoritized groups are highly visible in the public realm and hence in the media because of their appearance. Other minoritized groups are invisible in the hegemonic society (Eriksen, 2020) and consequently, in mainstream media (Tan & Moghaddam, 1999). Storylines that make positionings available for them may be captured in small-scale local news media. We identified articles published from January 2003 to September 2020 to include the time of a new national syllabus launch in 2004 and the related intensified public discussions about (mathematics) education. Using positioning theory we ask: What storylines about minoritized youth and their relationship with mathematics education are portrayed in these news media articles?

To generate the data set, we identified three groups of words that would represent: (A) Indigenous and migrational contexts, (B) education, and (C) mathematics (see Table 1). If an article addressed each of these three groups, the author was knitting together a storyline that related to these words. Often there would be no explicit connection made among these words, but the fact that they coexisted in the same article signified a relationship.

The search words in Table 1 generated 26,610 hits in the database Atekst. We read the first 100 articles and noted that two search words, *economy* and *statistics*, generated

Table 1 General groupings of search words applied to media sources

Group	Norwegian search words	English translations
Indigenous and migrational contexts	urfolk	Indigenous people
	minoriteter	Minorities
	migrasjon	Migration
	innvandring	Immigration
	Samer	Sami people
	Kvener	Kvener
	Skogfinner	Skogfinner
	Tater/romani	Tater/Romani
	Rom	Rom
	Jøder	Jews
	flerspråklighet	Multilingual
	flerkulturell	Multicultural
	mangfold	Diversity
Education	utdanning	Education
	skole (ungdomskole og videregående, setter grensen ved 5 trinn og oppover)	School (upper elementary school and high school, from 5th grade)
	opplæring	Teaching
	pedagogikk	Pedagogy
	didaktikk	Didactics
	klasse	Class
	klasserom	Classroom
	lærer	Teacher
	lærerstudent	Teacher student
	vurdering	Assessment
	karakterer	Grades
Mathematics	matematikk (matte)	Mathematics (math)
	matematikkdidaktikk	Mathematics didactics
	realfag	Science
	naturfag	Natural science
	økonomi	Economy/economics
	statistikk	Statistics
	programmering	Coding
	geometri	Geometry
	algebra	Algebra

irrelevant hits in particular. Therefore, we excluded those words. Thereby we identified 1896 articles which were narrowed to 501 after removing articles deemed irrelevant because:

- the article was a duplicate.
- the search identified a full media page with the search words in different articles.
- the context was not in Norway.

- a search word had an irrelevant meaning:

  ○ *mathematics* was an arbitrary school subject (e.g., "They had finished a mathematics lesson").
  ○ *diversity* not relating to Indigenous or migrational contexts (e.g., biological diversity).
  ○ *geometry* referred to the architecture of buildings.

When we read the 501 articles, positioning theory focused our attention on how mathematics and minoritized students were or were not portrayed and positioned. Since few of the articles straightforwardly mentioned mathematics education and minorities, the storylines that we were interested in were often scattered across an article. Nevertheless, we saw significance in the fact that an author put words from all three groups (see Table 1) together in the same article—for example, it is significant if they choose to write about someone's mathematics and their immigration status in the same article, even if they do not explicitly say these are connected. Therefore, we included such articles in the data set.

3.2 Phase 2—finalizing the storylines

AntConc, a software for multi-purpose corpus analyses, was used to generate concordances for the search words in the 501 articles. A concordance is a list of target words in a corpus showing the context in which each word is used. This analysis enabled us to read the contexts in which the search words appeared, and to generate rough ideas of storyline core terms (Table 2). In line with our theoretical assumptions, we recognize that our readings of the contexts may interact with different views on what story is playing out. The contexts of the target words influenced what storyline core terms we identified, because storylines and positioning are contingent on our perspectives (Wagner & Herbel-Eisenmann, 2009). By means of the storyline core terms, we generated new search words (Table 2) which we used to identify excerpts where these search words appeared.

This process resulted in 319 excerpts which were examined carefully and repeatedly in their Norwegian wording with special focus on how minoritized people were positioned. Identifying this positioning required us to look at how majority individuals were positioned too, due to the reciprocity of positioning. The examination of the 319 excerpts was conducted both jointly and individually among us, which allowed us to compare and refine our coding of the excerpts. Finally, we grouped the excerpts according to the coding displayed in Table 3, by storylines organized from largest to smallest context (culture, mathematics, Norwegian society, the school system, students).

We then read the excerpts again with the purpose of formulating propositions that articulated the storylines which underpinned each group of coded excerpts.

Table 2 Core terms identified by concordance analysis

Storyline core terms identified by concordance analysis	Search words	Number of excerpts
Mathematics	*matematik*, matte**	103
Language	*snakk*, kommuniser*, språk*, morsmål**	98
Gender	*jente*, gutt*, mann, menn, kvinne**	56
Culture	*livsstil*, levesett*, religion*, religiøs*, livssyn*, verdensanskuelse*, kultur*, tradisjon*, høytid**	39
Gratitude	*takk*, takknemli*, gled*, fryd*, gjeld, skyld**	18
Skin color	*brun*, svart*, hvit**	5

Table 3 Final coding and identified storylines

Final coding of excerpts	Storyline
Excerpts that explicitly or implicitly position students from minoritized groups by explaining their (lack of) opportunities in mathematics education	*The majority language and culture are keys to learning and knowing mathematics*
Excerpts that position mathematics in relation to students from minoritized groups	*Mathematics is language- and culture-neutral*
Excerpts that explicitly or implicitly explain minoritized students' (lack of) opportunities in mathematics education in relation to aspects of them being minoritized students	*Minoritized groups' mathematics achievements are linked to culture and gender*
Excerpts that explicitly or implicitly position minoritized students' presence as affecting the education system/curriculum/teaching	*Extraordinary measures are needed to teach students from minoritized groups mathematics*
Excerpts that state minoritized students' (lack of) achievements in mathematics education without giving reasons	*Students from minoritized groups underachieve*
Excerpts that position students from minoritized groups as the ones who (need to) give extra effort and time	*Students from minoritized groups put in extraordinary effort and time to learn mathematics*
Excerpts that explicitly or implicitly evaluate minoritized students' mathematics achievements in relation to their surroundings/the community	*Minoritized mathematics students are motivated by gratitude*

4 Storylines in our data material

The storylines that we identified are entangled, sometimes overlapping. We provide examples of each of these storylines in the next sections. Here, we draw on some of the 318 newspaper excerpts to report snapshots of the seven storylines that we identified. We provide an analysis and interpretation of each of the storylines and briefly mention some of the connections to other storylines about minoritized students. In "Section 5," we consider more deeply how this network of relations among storylines produces and makes available pre-positionings to students from minoritized groups.

4.1 The majority language and culture are keys to learning and knowing mathematics

The majority language and culture are keys to learning and knowing mathematics is the most commonly occurring storyline in our data. We find it referenced by students, educators, policy makers, and everyday citizens. A student, NN,[2] is quoted:

Norsk er aller viktigst. Kan du norsk, kan du lære matte og naturfag også, sier NN, som tar fatt på helsefag til høsten. (*Aftenposten*, 5 August, 2014)	Norwegian is the key. If you know Norwegian, you can learn math and science as well, says NN, who will take up health subjects this autumn.

An educator is quoted:

[2] Two uppercase letters indicate a pseudonym.

De går ett år her for å lære ulike fag som for eksempel norsk, engelsk, naturfag, samfunnsfag og matematikk. Vi fokuserer mest på norsk fordi de er innvandrere. (*Arendals Tidende*, 6 December, 2016)	They spend a year here learning different subjects such as Norwegian, English, science, social studies and mathematics. We focus mostly on Norwegian because they are immigrants.

And a teacher leader:

i Utdanningsforbundet mener mye av forklaringen ligger i språket. De som ikke behersker norsk godt nok, har også vanskeligheter med å følge med i mattetimene, tror hun. (*Aftenposten*, 19 September, 2007)	in the Education Association believes much of the explanation lies in the language. Those who do not master Norwegian well enough also have difficulty keeping up with the math lessons, she believes.

In these excerpts, we see Norwegian being framed as central to learning other subjects, as in the quotations included by the student and the teacher leader. There is also an assumption, in the quotation from the educator, that immigrants' home languages are not helpful for learning. Rather, immigrants need to focus on Norwegian. Thus, the media position Norwegian language as a gatekeeper that allows access to mathematics and science.

There is, however, complexity in this storyline. For example, a teacher recognizes some of the complexity in terms of distinctions between everyday and professional language (e.g., mathematical language) here:

[EE] har erfart at fremmedspråklige elever har hatt store problemer med å forstå fagspråk, selv om de har klart seg greit med språket i dagliglivet. (*Kommunal Rapport*, 26 October, 2005)	[EE] has experienced that foreign language students have had great difficulty understanding professional language, even though they cope/do well with the [majority] language in daily life.

Both complex and simplistic versions of the storyline and how they position Norwegian language as compared to other languages suggest a competition that is set in a storyline of limited resources. For example, the questioning of the value of the Sami language:

Det har vært for mye fokus på samiske undervisningsbøker i alle fag og som har gått utover kvaliteten i språkfag og matematikk for elevene. (*Finnmark Dagblad*, 6 November, 2008)	There has been too much focus on Sami textbooks in all subjects which has harmed the quality of language subjects and mathematics for the students.

This storyline, in settings where students are assumed to also be fluent in Norwegian, such as Sami students, positions minoritized groups' languages and cultures as irrelevant, insufficient, or unwanted because of the "harm" that is happening as a result of resources being put toward their development and use.

4.2 Mathematics is language- and culture-neutral

Mathematics is language- and culture-neutral is a storyline that is well-known in mathematics education (e.g., Moschkovich, 2017; Prediger, 2002) but has not been analyzed in news media. The storyline appears explicitly, as in:

er matematikk og fysikk de fagene hvor de kulturelle barrièrene er minst. De er universelle fag. (*Aftenposten*, 3 May, 2010)	mathematics and physics are the subjects where the cultural barriers are least/smallest. They are universal subjects.

The storyline also often appears tacitly by pointing to the fact that other subjects are language- and culturally-rich, or not, as in this excerpt in which a dental student says very little language is necessary in their work:

Man trenger ikke å lære mye mer enn «gap opp» i et nytt språk, smiler tannlegestudent [AA] (35) som opprinnelig kommer fra et kurdisk område i Tyrkia. (*Osloby*, 10 April, 2014)	You do not need to learn much more than 'open up' in a new language, smiles dental student [AA] (35) who originally comes from a Kurdish area in Turkey.

Another example of this storyline being represented comes in the newsworthiness of culturally based mathematics programs, which would not be newsworthy if the public recognized the cultural aspects of mathematics:

De poengterte at samisk kultur må være utgangspunktet for undervisningen og ikke bare et tillegg. …. De arrangerte først kulturbasert matematikkdag på flere klassetrinn, noe som ble så vellykket at de også arrangerte kulturbasert muntlig eksamen i matematikk. (*Finnmark Dagblad*, 5 March, 2014)	They pointed out that Sami culture must be the starting point for teaching and not just a supplement. … They first arranged a culture-based mathematics day at several grade levels, which was so successful that they also arranged a culture-based oral exam in mathematics.

4.3 Minoritized students' mathematics achievements are linked to culture and gender

The storyline *minoritized students' mathematics achievements are linked to culture and gender* is often present in media that refer to statistical surveys. This storyline sometimes suggests that some immigrant boys fail at school and consequently in the society at large. Immigrant girls, on the other hand, are usually positioned as more successful than students from the dominant group. The next two excerpts are also examples of news media authors "knitting" together storylines where mathematics (education) and migrational contexts are not necessarily directly connected to each other (explained in Section 3.1.1).

Under halvparten av alle dem som begynner på videregående skole fullfører på normert tid, altså tre år. Denne dystre statistikken fra er ekstra dyster for gutter med innvandrerbakgrunn. Bare en av tre med slik bakgrunn kommer gjennom på tre år. (*Nordlys*, 29 May, 2008)	Less than half of those who start upper secondary school complete on time, i.e., three years. This gloomy statistic is extra gloomy for boys with immigrant backgrounds. Only one in three with such a background gets through in three years.
Rundt halvparten av jentene med ikke-vestlig bakgrunn i [LL] tar høyere utdanning. Det er langt over snittet og viser hvilken ressurs minoritetene er for det norske samfunnet. (*Romerikes Blad*, 27 June, 2012)	About half of the girls with non-western backgrounds in [LL] take higher education. It is far above average and shows what a resource the minorities are to the Norwegian society.

This storyline is connected to other wider storylines involving cultural superiority and inferiority stereotypes. Similar to Shah's (2017) examination of racial narratives in mathematics classrooms, the storyline intersects with both national and racial narratives about academic ability: youth from Asian countries are seen as better at mathematics because they value mathematics in Asia. Thus, people are described as "positively surprised" by the success of an African youth:

[RR, MM and PP] vant mattekonkurranse. 16 av 38 finalister hadde minoritetsbakgrunn, det samme hadde seks av ni vinnere. […] Forskere tror det skyldes at matte har høyere status i asiatiske land. (*Aftenposten*, 3 May, 2010)	[RR, MM and PP] won the math competition. 16 of 38 finalists had minority background, as did six of nine winners. […] Researchers believe this is due to the fact that math has a higher status in Asian countries.
Mange er positivt overrasket over at en gutt fra Eritrea kan gjøre det så bra. Det at folk er overrasket motiverer meg veldig til å jobbe hardt videre. (*Innherred*, 18 August, 2018)	Many are positively surprised that a boy from Eritrea can do so well. The fact that people are surprised motivates me a lot to continue to work hard.

The boy from Eritrea's comment also highlights the additional labor that can be taken on by minoritized youth. His success is not only important to him, but also to other African students.

4.4 Extraordinary measures are needed to teach students from minoritized groups mathematics

The storyline *extraordinary measures are needed to teach students from minoritized groups mathematics* is entangled with the storyline *the majority language and culture are keys to learning and knowing mathematics* because they each position students as lacking the majority language and culture. Therefore, this storyline connects to work about positioning students from minoritized groups as the deficit other (discussed in "Section 5"). Here, the reporter positions the teacher as speaking and gesturing differently than normal when addressing new immigrants:

Mattelæreren prater tydelig. Han skritter opp og viser med hele seg hvordan de kan regne ut areal og volum av klasserommet. De store kunnskapsforskjellene i klassen krever litt ekstra av lærerne. (*Bergens Tidende*, 26 November, 2018)	The math teacher speaks clearly. He paces off and shows with his whole being how they can calculate the area and volume of the classroom. The large differences in knowledge in the class require a little extra from the teachers.

To a professional teacher, these two teaching strategies may appear mundane, but the reporter communicates them to the public as newsworthy and thus extraordinary. The positioning of the "large differences in knowledge" is not about valuing knowledge as a resource but indicates that it is extra work for a teacher because dominant knowledge is what matters most.

This storyline also intersects with the *gratitude* storyline ("Section 4.7") as the benevolence of the society materializes in extraordinary measures on policy levels: e.g., introduction classes, summer schools, special language programs, and national syllabuses for Sami students. These special measures position additional languages (additional to the two standard written varieties of the Norwegian language *Nynorsk*

and *Bokmål*) as problems rather than resources, which is a phenomenon of interest in multiple contexts of mathematics education (e.g., Planas & Setati-Phakeng, 2014).

4.5 Students from minoritized groups underachieve

The storyline *students from minoritized groups underachieve* intersects with the storyline *students from minoritized groups' mathematics achievements are linked to culture and gender* but differs because it makes no distinctions among genders and cultures and offers no causes for the underachievement. For example,

I Norge, Sverige, Belgia og Frankrike mangler mer enn 40 prosent av førstegenerasjonselevene elementære matematikkferdigheter. Det gjelder også en tredel av elevene med minoritetsbakgrunn som er født i Norge. (*Aftenposten*, 19 September, 2007)	In Norway, Sweden, Belgium and France, more than 40 percent of first-generation students lack elementary math skills. This also applies to a third of the students with minority background who were born in Norway.

When students from minoritized groups are positioned as underachieving, the content the underachievement relates to is typically mathematics:

Mest markert er forskjellen i fag som norsk hovedmål og matematikk, der innvandrerne fikk mer enn en halv karakter lavere enn andre elever. Norskfødte med innvandrerforeldre har noe høyere karakterer enn innvandrere, men i snitt noe lavere enn øvrige elever. (*Østlendingen*, 18 November, 2011)	The most visible is the difference in subjects such as Norwegian language and mathematics, where immigrants got more than half a grade lower than other students. Norwegian-born students with immigrant parents have somewhat higher grades than immigrants, but on average somewhat lower than other students.

This storyline is also closely entangled with and perhaps even an inevitable consequence of the storyline *the majority language and culture are keys to learning and knowing mathematics* since the majority language is a necessity for being positioned by the dominant group as knowledgeable in mathematics. Further, it relates to well-known storylines about achievement gaps among different groups (e.g., Gutiérrez, 2008).

4.6 Students from minoritized groups put in extraordinary effort and time to learn mathematics

The *students from minoritized groups put in extraordinary effort and time to learn mathematics* storyline says that students from minoritized groups work extra hard to perform well in mathematics. A student is quoted:

Jeg satser på best mulig karakterer. I de andre fagene kan jeg lese meg til det meste, i matematikk må jeg forstå alle begrepene. (*Aftenposten*, 19 September, 2007)	I go for the best possible grades. In the other subjects, I can read most things, but in mathematics I have to understand all the concepts.

Some migrant students go to community-governed extracurricular Saturday schools to excel, because their Tamil communities create spaces to educate children in ways their communities desire. For instance, a Tamil principal says that:

lørdagsskolen ikke kom i stand fordi barna lærer for lite på den vanlige, norske skolen.—Men de trenger noen som pusher dem videre, og her lærer de en kultur for å jobbe, sier han. (*Bergens Tidende*, 27 December, 2015)	the Saturday school did not come about because the children learn too little at the regular Norwegian school. But they need someone who pushes them further, and here they learn a culture to work, he says.

Other articles suggest contradictory positionings, highlighting migrants who volunteer to help fellow migrant students pass compulsory school courses in mathematics:

MM (16), som er veldig flink i matte, hjelper den mindre rutinerte SS. Praten går. På både somali og norsk. (*Bergens Tidende*, 26 November, 2018)	MM (16), who is very good at math, helps the less experienced SS. The talk goes. In both Somali and Norwegian.

These quotes show that the storyline could acknowledge strengths in the cultures mentioned or attributed to the students. However, the storyline also implies a need or requirement to put in extraordinary effort, as a migrated student offers advice:

Hvis dere skal velge; skal ungene mestre matte eller skal de mestre nynorsk? Gjør en prioritering, for det er et reellt behov for å bruke mer tid på matematikk, bokmål også videre. Fag vi faktisk får bruk for senere i livet. (*Altaposten*, 23 May, 2018)	If you have to choose; should the kids master math, or should they master Nynorsk [the non-dominant Norwegian standard written variety]? Make a priority, because there is a real need to spend more time on mathematics, Bokmål [the dominant Norwegian standard written variety] and so on. Subjects we actually need later in life.

4.7 Minoritized mathematics students are motivated by gratitude

The storyline *minoritized mathematics students are motivated by gratitude* appears in positionings of obligation, gratitude, and benevolence. This storyline differs from the others: rather than narratives on teaching, learning, and the student's own achievements and opportunities, the student becomes a means to an end for their surroundings, community, family, or society. This storyline is closely entangled with the storyline about the "grateful immigrant" which imposes certain societal behaviors, expectations, and obligations such as willingness to work hard, gratitude to the host nation, and a wish to not be a burden on state resources (Schwöbel-Patel & Ozkaramanli, 2017). It positions the model student from a minoritized group as needing to excel in education, contribute to labor, and display vulnerability and weakness to honor the benevolence and superiority of the host country's culture (Thiruselvam, 2019).

Gratitude and benevolence materialize, for example, on May 17, the Norwegian Day of Constitution, when it is common for selected students to give speeches at their schools. This newspaper article reports on an immigrant girl declaring gratitude for her life and the

opportunity to go to school in Norway as part of such celebrations. Her declaration makes available a benevolent position for the society to inhabit, as the reciprocity of positioning requires an analogous positioning for majority culture:

«Kjære alle sammen», begynner hun, «jeg er så takknemlig! Takknemlig for at jeg får gå på skole her i Norge». (*Haugesunds Avis*, 9 December, 2019)	'Dear all', she begins, 'I am so grateful! Thankful that I get to go to school here in Norway.'

This is expressed as a *debt* of gratitude by some and positions immigrants as needing to be loyal to Norway:

Norge har gitt oss en trygg plass å være. Da må vi vise Norge respekt tilbake. Jeg kan ikke sitte rolig og vente. Det er bare jeg som kan hjelpe barna til å bli gode mennesker, til å få gode jobber som kan hjelpe Norge. (*VestNytt*, 28 June, 2019)	Norway has given us a safe place to be. Then we must show Norway respect back. I cannot sit still and wait. Only I can help my children to become good people, to get good jobs that will help Norway.

To succeed, students from minoritized groups must work harder and be more ambitious than students from the dominant group—an effort that is expected of them as part of the storyline about the grateful immigrant (Schwöbel-Patel & Ozkaramanli, 2017) and that intersects with the storyline on students' *extraordinary effort*. When students put in this extra effort, their good grades are newsworthy, and there is an expectation for immigrant students to help materialize the "Norwegian dream" as exclaimed by a former Norwegian prime minister:

For fem år siden ble to minoritetsjenter med til sammen 36 seksere trukket fram i nyttårstalen til statsminister Jens Stoltenberg, som «et bilde av den norske drømmen». (*Romerikes Blad*, 27 June, 2012)	Five years ago, two minority girls with a total of 36 sixes were highlighted in the New Year's speech to Prime Minister Jens Stoltenberg, as 'a picture of the Norwegian dream.'

5 Discussion, conclusion, and potential next steps

5.1 Available storylines in the media and complex connections and contradictions among them

Each public storyline is significant and deserves more attention. Our research identifies some of the existing available storylines and also makes more explicit methods for identifying available storylines as compared to previous work on storylines. Related to articulating the methods of our analysis, we describe the phases we went through and how we used key words, concordance software, and so on. We note, however, that our goal is not replicability. Any time someone analyzes available storylines, they draw from the ones that are available to themselves based on their own experiences. Although some of the storylines may be pervasive and known in many different contexts, others may be more local. For example, *mathematics is language- and culture-neutral* is a storyline that has appeared in past mathematics education research in many different countries and contexts, but the *gratitude* storyline is one we have not seen related to mathematics education. There may

be others that we did not notice because of our own individual and collective experiences and researcher positionalities. Our investigation, nonetheless, still opens up the possibility/necessity for future research to see how the storylines play out in classrooms.

Each public storyline enables forms of interaction for classroom actors. Thus, a teacher may be motivated to put extra effort in responding to students from minoritized groups or prevailing storylines may suggest that these students perform relatively poorly. The intersection of storylines gives insight into how students and the people around them might navigate the available storylines and positionings from news media. In this section, we will not discuss each of the identified storylines. Instead, we focus on a couple of the intersections. We hope that exploring some of the connections and contradictions may recognize the complexity faced by students, teachers, families, and community members navigating multiple storylines about mathematics education and students from minoritized groups.

The storyline *the majority language and culture are keys to learning and knowing mathematics* occurs most frequently in our media data. Because education is state regulated, the Norwegian language is the language of instruction, and education in Norway is purportedly based on the national cultural heritage (The Education Act., 2019, Section 1–1). Hence, this storyline appears to be a consequence of wider storylines that say a nationally shared language and culture upholds the nation–state (Blommaert & Rampton, 2011) and positions education as playing a crucial part. Thus, the storyline that positions majority language and culture as key may intersect with storylines in the Norwegian public debate where equality is perceived as sameness (Eriksen, 2020). By definition, minoritized groups comprise people who differ from some dominant norm, thus storylines that identify minoritized groups in this way connect to storylines of racism and anti-blackness (c.f., Martin, 2019).

Teachers, then, may be drawn to sustain sameness by upholding mono-language and -culture learning spaces for the sake of equity/equality. Since positioning is reciprocal, students from minoritized groups may then be positioned as having to learn the majority language and culture for the sake of equity. Though much work has been done to position minoritized students' languages and cultures as assets (e.g., Moschkovich, 2013; Planas & Setati-Phakeng, 2014), interconnections among the storylines mentioned above show the power of the storyline *the majority language and culture are keys to learning and knowing mathematics.*

The storyline *students from minoritized groups underachieve* is closely interconnected with and perhaps even an inevitable consequence of the storyline *the majority language and culture are keys to learning and knowing mathematics* since the majority language is a necessity for being positioned by the majority group as mathematically-knowledgeable. Minoritized groups may be positioned as other than the majority groups because of language and culture. When entangled, these two storylines may position minoritized students as inevitably failing to learn or know mathematics because it is impossible to have the keys to knowing and learning mathematics—the majority language and culture—while at the same time being positioned as a student from a group which is minoritized precisely because of language and culture. From this perspective, it is interesting to note that immigrated students' low achievements in global testing programs such as PISA could be connected to the storyline *the majority language and culture are keys to learning and knowing mathematics* as an inevitable consequence. Further, considering the *gratitude* storyline, underperforming minoritized groups could be stigmatized for insufficient gratitude to their host nation.

An apparent contradiction among the storylines appears between the storyline *mathematics is language- and culture-neutral* and the storylines that highlight differences among cultural groups, for example, *minoritized students' mathematics achievements are*

linked to culture and gender. If language and culture do not matter in mathematics, why would language and culture be important factors in mathematics teaching? One way we thought about this apparent contradiction between the cultural neutrality storyline and the storylines that foreground language and culture is to consider a deeper mélange of storylines. For example, the cultural neutrality storyline may feed on characteristic moves in mathematics for objectivity and abstraction. We see moves for abstraction as situated and thus subjective, but the abstracted mathematics is often the public face. Another way we thought about this apparent contradiction is to recognize that many people see commonly taught mathematics as a pinnacle of human achievement and position it as "Western." We know that studies of ethnomathematics and histories of mathematics do not support such a view (e.g., Prediger, 2002), but we can see this view as a possible force in undermining expectations of achievement from people seen as not being from the Western or dominant contexts. A third way we thought about this apparent contradiction is to make a distinction between mathematics as culturally-neutral and mathematics teaching as contingent on language and culture. Stories that position minoritized students in deficit ways can substantiate the cultural neutrality storyline by highlighting the noteworthiness of the students' poor performance in a context of a subject that should not be impacted by language and culture. This scenario may doubly stigmatize the students: not only are they underperforming, but there would be no good reason for them to underperform, especially in mathematics.

The storylines that draw attention to language and culture seem to impact minoritized students especially, because they position minoritized students in deficit ways. These storylines resonate with research about in(ex)clusiveness and positioning of students from minoritized groups as the deficit other which has been comprehensively discussed in mathematics education research (e.g., Gutiérrez, 2008; Källberg, 2018). We see alternatives in research that use asset-based framing (e.g., Adiredja & Louie, 2020).

5.2 Concluding and returning to next steps

Our motivation to investigate the storylines about youth from minoritized groups in Norwegian news media sources is the beginning of a longitudinal project in which we are collaborating with teachers, administrators, community members, youth, and families to understand what storylines they would like to have made available to them in the teaching and learning of mathematics. Drawing on a participatory design, these storylines can then be used to imagine new positionings and practices in mathematics classrooms and in schools. We started with an analysis of media to sensitize ourselves to some of the existing storylines and, thus, to recognize storylines already potentially available and shaping positionings. We hope this will help us, our collaborators, and hopefully others to (re)imagine and to enact storylines that position youth from minoritized groups in asset-based ways.

Our investigation shows that youth from minoritized groups are positioned by an array of storylines that sometimes overlap, intersect, or contradict each other. We are struck by how the storylines (once again) show that the burden is put upon minoritized youth with no recognition of history, systems, or structures that contribute to inequities, and as the reader may have noticed, these storylines are not unique, neither to mathematics as a subject nor the Norwegian context. Positioning theory reminds us that positionings and storylines are negotiable. This means that minoritized students' available positionings can be renegotiated, for instance, by actions that remove burdens and deficit-based storylines. We are intrigued to further investigate how the connections and contradictions we have explored make their way into mathematics classrooms as tensions that become intensified in times

of national and international migration (Cenoz & Gorter, 2010). Dealing with these tensions influences how students from minoritized groups might be positioned in asset-based ways and consequently involves actions that can remove burdens.

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