(HOW) CAN MATHEMATICS TEACHING DISRUPT WHITE SUPREMACY AND OPPRESSION?

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There seems to be an increasingly shared recognition that racism is systemic and rooted in our histories and institutions.
Being uninsured is **deadly**.

A comprehensive review of studies, published in the Annals of Internal Medicine, confirms that **thousands** of people die each year because they don’t have coverage. We need to close these gaps and cover everybody with improved Medicare for all.
But the connections to our everyday practice are often left unclear.

And without making those connections, the patterns are reproduced through normalized practices.
Let’s look more closely inside some (math) teaching.
Teaching intertwines moral, intellectual, political, social, relational, and personal work.
Let’s watch a short segment from a classroom math discussion.

The mathematics task

What fraction of each rectangle below is shaded gray?
What are the challenges of teaching you see?

Consider moral, intellectual, social, relational, political, and personal challenges.
VIDEO: ANTAR AND GABI

Antar: I think it's not a fraction because all of the parts are not equally the same shape.
<table>
<thead>
<tr>
<th>Teacher</th>
<th>Prompt</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>Would you answer what you think about the second challenge? We're going to be able to ask about the idea. It's probably not finish it.</td>
<td>Launch discussion</td>
</tr>
<tr>
<td>Teacher</td>
<td>Would you clarify what you think? Antor, what do you mean?</td>
<td>Choose student to add on</td>
</tr>
<tr>
<td>Teacher</td>
<td>Could you come up to the board and explain? Thank you.</td>
<td>Frame task for student who is presenting</td>
</tr>
<tr>
<td>Teacher</td>
<td>I really like the way that people who are coming to the board are doing today. You are explaining really well.</td>
<td>Acknowledge competence</td>
</tr>
<tr>
<td>Teacher</td>
<td>With a partner, can you explain your thinking?</td>
<td>Provide material support</td>
</tr>
<tr>
<td>Antor</td>
<td>I think it's not a fraction because all of the parts are not equal but the same shape.</td>
<td>Listen</td>
</tr>
<tr>
<td>Teacher</td>
<td>Can you say that one more time to the class?</td>
<td>Support presenter</td>
</tr>
<tr>
<td>Antor</td>
<td>I think it's not a fraction because all of the parts are not equal but the same.</td>
<td>Listen</td>
</tr>
<tr>
<td>Teacher</td>
<td>Can someone repeat what Antor said? Very nice, Antor.</td>
<td>Choose student to present</td>
</tr>
<tr>
<td>Many students</td>
<td>Many students have their hands up.</td>
<td></td>
</tr>
<tr>
<td>Gabriella</td>
<td>Oh, he said it doesn't happen. It's a fraction because all of the parts are equal.</td>
<td>Choose student to add on</td>
</tr>
<tr>
<td>Teacher</td>
<td>Is that what you said?</td>
<td>Choose student to add on</td>
</tr>
<tr>
<td>Teacher</td>
<td>Okay, would someone like to comment on that? Agree or disagree with him?</td>
<td>Choose student to present</td>
</tr>
<tr>
<td>Teacher</td>
<td>Okay, let's see, how about Gabriella.</td>
<td>Choose student to add on</td>
</tr>
<tr>
<td>Gabriella</td>
<td>I disagree.</td>
<td>Listen</td>
</tr>
<tr>
<td>Teacher</td>
<td>What do you think?</td>
<td>Provide question</td>
</tr>
<tr>
<td>Gabriella</td>
<td>I think the fraction is one forth.</td>
<td>Listen</td>
</tr>
<tr>
<td>Teacher</td>
<td>One fourth? Do you want to come up and say why you think it's one fourth?</td>
<td>Frame next step</td>
</tr>
<tr>
<td>Teacher</td>
<td>Antor, do you want to stay there or do you want to sit down? Okay. Thank you very much. You did a good job of explaining your thinking.</td>
<td>Choose student to one another</td>
</tr>
<tr>
<td>Teacher</td>
<td>So, let's hear what Gabriella's thinking.</td>
<td>Choose student to one another</td>
</tr>
<tr>
<td>Gabriella</td>
<td>I think it's one fourth because, like he said, all the fractions aren't the same, but you can make them the same by dividing a line down the middle.</td>
<td>Listen</td>
</tr>
<tr>
<td>Teacher</td>
<td>What's something you can use so if someone wants to take it off again, they can? Okay, so how explain what you've done. Talk to the class, okay?</td>
<td>Provide material support</td>
</tr>
<tr>
<td>Gabriella</td>
<td>I divided it down the middle because, since it's not equal, you have to make it equal.</td>
<td>Listen</td>
</tr>
<tr>
<td>Teacher</td>
<td>And so then you decided?</td>
<td>Choose student to present</td>
</tr>
<tr>
<td>Gabriella</td>
<td>It's one fourth.</td>
<td>Listen</td>
</tr>
</tbody>
</table>
Many students have their hands up

Teacher

Who’d like to answer what you think about the second rectangle? We're only going to be able to talk about this briefly. We probably won't finish it.

Antar

I think it's a fraction because all of the parts are not equally the same size.

Teacher

That’s a great point. Can you explain your thinking?

Antar

I think it's not a fraction because all of the parts are not equally the same.

Teacher

Can you say that one more time in a different way?

Antar

I think it's not a fraction because all of the parts are not equally the same.

Teacher


Gabrielle

Oh, I see that he doesn't think it's a fraction because not all the parts are equal.

Teacher

Is that what you said?

Gabrielle

Oh, I see that he doesn't think it's a fraction because not all the parts are equal.

Teacher

Okay, would someone like to comment on that? Agree or disagree with him?

Okar

Okay, let's see. How about Gabi.

Gabi

I disagree.

Teacher

What do you think?

Gabi

I think the fraction is one-fourth.

Teacher

One-fourth? Do you want to come up and say why you think it’s one-fourth?

Kris

Yes, yes. Yes, yes.

Teacher

Antar, do you want to stay there or do you want to sit down? Okay. Thank you very much. You did a good job of explaining your thinking.

Teacher

So, let’s hear what Gabi’s thinking.

Gabi

I think it’s one-fourth because, like he said, all of the fractions aren’t the same, but you can make them the same by dividing a line down the middle.

Teacher

Okay, that’s good. What's something you can say if someone wants to take it off again, they say? Okay, so now explain what you’ve done. Talk to the class, okay?

Gabi

I divided it down the middle because, since it’s not equal, you have to make it equal.

Teacher

And so then you decided?

Gabi

It’s one-fourth.

Teacher

Antar, do you want to stay there or do you want to sit down? Okay. Thank you very much. You did a good job of explaining your thinking.
Teacher: Would you like to answer what you think about the second challenge? We're only going to be able to talk about the cafe. It's probably won't finish it.

Student: I think it's not a fraction because all of the parts are not equal in the same shape.

Teacher: Can you say that one more time is the idea? Support presenter.

Student: I think it's not a fraction because all the parts are not equal in the same shape.


Student: Many students have their hands up.

Teacher: What did he say? Lookback.

Student: Yes, he said that it doesn't have the same answer.

Teacher: Okay, let's see, how about Gabi. Choose student to call on.

Student: I disagree.

Teacher: What do you mean? Follow-up question.

Student: I think the fraction is one-third.

Teacher: One-third? Do you want to come up and say why you think it's one-third?

Teacher: Antar, do you want to say there or do you want to sit down? Okay, Thank you very much. You did a good job of explaining your thinking.

Teacher: So, let's hear what Gabi's thinking.

Student: I think it's one-fourth because the other two are the same, but you can make them the same by adding a line down the middle.

Teacher: Gabrielle, can you explain your thinking.

Student: I think it's one-fourth because the other two are the same, but you can make them the same by adding a line down the middle.

Teacher: Okay, so now explain what you've done. Talk to the class, okay?

Gabrielle: I added 1/4 to the missing box because it's not equal, you have to make it equal.

Teacher: And so then you decided.

Gabrielle: I decided.

Teacher: Is it one-fourth.
### TEACHING IS DENSE WITH “DISCRETIONARY SPACES”

A teacher is leading a discussion with students. The discussion involves students expressing their thoughts and the teacher responding accordingly. The key points are captured in the table below:

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Question/Comment</th>
<th>Student Response</th>
<th>Teacher Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>Would you agree or disagree with the statement?</td>
<td>2 students agree, 1 student disagree</td>
<td>Ask for examples.</td>
</tr>
<tr>
<td>Teacher</td>
<td>Can you explain why you think the statement is true?</td>
<td>Student A: “Because...”</td>
<td>Ask for clarification.</td>
</tr>
<tr>
<td>Teacher</td>
<td>Do you think the statement applies to all situations?</td>
<td>Student B: “Yes, but...”</td>
<td>Clarify.</td>
</tr>
<tr>
<td>Teacher</td>
<td>How does this relate to our previous discussion?</td>
<td>Student C: “It connects...”</td>
<td>Link to previous lessons.</td>
</tr>
</tbody>
</table>

The students are actively participating in the discussion, with the teacher facilitating the conversation and providing guidance. The students are engaged and contributing to the learning process.

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1. Teaching is powerful. When it is done with care and judgment, students can thrive — learn mathematics, develop positive identities, learn to value others and work collectively.

2. Teaching also involves enormous discretion.

3. How that discretion is exercised can either reinforce patterns of social, personal, and epistemic injustice and harm, or disrupt these patterns.
THE UNIQUE POTENTIAL OF MATHEMATICS TO PERPETUATE—OR DISRUPT—INJUSTICE

- The history of “mathematics” as white, male, heteronormative, western
- The melding of “intelligence” and mathematics (and the history of “intelligence”)
- Narrow constructions of “mathematics” that uphold these

- The rich resources of mathematics in many communities and cultures
- The power afforded by seeing oneself as “smart” or “good at math”
- The imaginative creative space possible in mathematics, for invention, experimentation, construction, representation, and performance
- The assets of collective work in mathematics
What would it take to harness the power of mathematics teaching to disrupt white supremacy and oppression?
What would it take to harness the power of mathematics teaching to disrupt white supremacy and oppression?

leveraging the many discretionary spaces of teaching
What would it take to harness the power of mathematics teaching to disrupt white supremacy and oppression?

and knowing mathematics in ways that support that work

leveraging the many discretionary spaces of teaching
SYSTEMIC PATTERN #1
THE DISPROPORTIONATE PUNISHMENT OF BLACK GIRLS

<table>
<thead>
<tr>
<th></th>
<th>Black girls</th>
<th>White girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of enrollment</td>
<td>15.6%</td>
<td>36.6%</td>
</tr>
<tr>
<td>% of in-school suspensions</td>
<td>52.0%</td>
<td>50.1%</td>
</tr>
<tr>
<td>% of single suspensions</td>
<td>41.6%</td>
<td>32.9%</td>
</tr>
<tr>
<td>% of multiple suspensions</td>
<td>28.4%</td>
<td>22.7%</td>
</tr>
</tbody>
</table>

Epstein, Blake, & González (2017)
SYSTEMIC PATTERN #2
DISPROPORTIONALITY IN ASSIGNMENT TO “ABILITY STATUS”

- Black students: 16.7% of student population; 9.8% of those selected to gifted programs
- Latin@ students 22.3% of student population; 15.4% of those selected to gifted programs
- 6.2% of all students are assigned to gifted programs; 10% of Asian students, 7.5% of White; 3.6% of Latin@; 3% of Black

- Black students are 2x as likely to be classified as having learning or emotional problems (special ed)
- Exclusion from class reduces opportunity to learn
- Exclusion from rigorous content; long-term effects of labeling
- Lack of access to accelerated and enrichment programs

1. Teacher’s race affects gifted program selections. Joan Brasher, Research News @ Vanderbilt, January 18, 2016
What number does the orange arrow point to? Explain how you figured it out.
ANIYAH AND TONI
VIEWING FOCUS

What do you think are the most frequent comments that educators make about Toni? About Aniyah?
VIDEO: ANIYAH AND TONI

Teacher: Listen closely and see what you think about her reasoning and her answer.
WHAT ARE THE MOST FREQUENT COMMENTS?

TONI

- Toni is fooling around with another student across the room and laughing at Aniyah.
- Toni is being disrespectful to Aniyah.
- Toni knows that Aniyah is wrong and is trying to point that out.

ANIYAH

- Aniyah has the wrong answer.
- Aniyah should not be left up there with a wrong answer, feeling bad and possibly confusing other children.
- Aniyah is being harmed by how Toni is treating her.
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What commonly would happen next?

What are the possible results?
IN THIS MOMENT, A MOVE CAN REPRODUCE PATTERNS OF MARGINALIZATION OF BLACK GIRLS AND REDUCTIONIST VIEWS OF MATH

NORMALIZED NEXT MOVES

- “Can someone help Aniyah out and show what we call the whole on the number line?”
- “Great, Aniyah, almost! But remember that the whole is from 0 to 1.”
- “Thumbs up if you agree with Aniyah; thumbs down if you disagree.”

RESULTS

- Aniyah is excluded and her mathematical contributions are sidelined.
- Aniyah’s answer is signaled to be incorrect and she is positioned as not having contributed to the work.
- Aniyah’s solution is “voted” on by her classmates.
IN THIS MOMENT, TOO

NORMALIZED NEXT MOVES

- “Toni, when you’re ready to participate appropriately by not playing with your hair and laughing, and have a question to ask, I will come back to you.”
- “You need to be a better listener, Toni. Aniyah already explained why she picked one-seventh. Who else has a real question for Aniyah?”
- “In this classroom, we are respectful of one another. When you are ready to be respectful, you can rejoin the discussion, Toni.”

RESULTS

- Toni is publicly excluded from the discussion.
- Toni is judged to not be listening, her question is judged as not good, and she is excluded from the discussion.
- Toni is publicly named and shamed as “disrespectful,” rebuked, and her role in advancing the mathematics is sidelined.
WHAT DO THESE DIFFERENT TEACHING MOVES DO TO TONI AND ANIYAH? AND THE OTHER CHILDREN?

- Toni’s contributions to the class are not read as appropriate or valuable.
- Her participation and mathematical attentiveness are made invisible.
- Her mathematical identity is not supported.
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- Aniyah is positioned as “struggling.”
- Her precise explanation is not only not highlighted and acknowledged, but not even heard.
- Aniyah is interpreted as lacking confidence and needing to be protected.
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These combine to eclipse their humanity.

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These combine to eclipse their humanity.

These perpetuate images of Black girls as “troublemakers” and not “good at math.”
VIDEO: ANIYAH AND TONI

This video and additional supporting materials are available online here.
USING DISCRETIONARY SPACES TO DISRUPT INSTEAD OF PERPETUATE PATTERNS

- Reading Toni as asking a real question that she means.
- Hearing Toni’s question as central to the advancing of the mathematical content.
- Reinforcing her mathematical identity, not choosing to read her body as disruptive.
USING DISCRETIONARY SPACES TO DISRUPT INSTEAD OF PERPETUATE PATTERNS

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- Reading Aniyah as competent to answer questions about her ideas.
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- Hearing Toni’s question as central to the advancing of the mathematical content.
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- Reading Aniyah as competent to answer questions about her ideas.
- Hearing Aniyah’s explanation as central to the advancing of the mathematical content.
- Reinforcing her mathematical identity, not choosing to read her body as struggling.

- Other children hear Aniyah as getting the discussion going, and Toni as asking an important mathematical question.
- Aniyah and Toni are both positioned as contributing to the discussion.
- Children see a teacher attending to Black girls as mathematical thinkers and contributors to collective work.
14 MINUTES AFTER WHERE WE STOPPED

TONI

ANIYAH

I did well on my goal today because my goal was to share my ideas with the class and I did. I went up to the board and shared my idea with the class on fractions.
What would it take to learn to use the discretionary spaces in teaching in ways that disrupt white supremacy, instead of reinforcing and perpetuating it?
WHAT REGULARLY FILLS THE DISCRETIONARY SPACES IN TEACHING?
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1. Teachers’ experiences in a society filled with racism and oppression.

Lortie (1975), Banks, Grant and Koskela, Moll
WHAT REGULARLY FILLS THE DISCRETIONARY SPACES IN TEACHING?

1. Teachers’ experiences in a society filled with racism and oppression.
2. Normalized practices in schools that institutionalize dominant values and habits.

Lortie (1975), Banks, Grant and Koskela, Moll
Anyon (1981), Heath, Martin, Tuck
WHAT REGULARLY FILLS THE DISCRETIONARY SPACES IN TEACHING?

1. Teachers’ experiences in a society filled with racism and oppression.
2. Normalized practices in schools that institutionalize dominant values and habits.

Professional education does not effectively intervene on these.

Professional education and teaching experience often teach these.

Lortie (1975), Banks, Grant and Koskela, Moll
Anyon (1981), Heath, Martin, Tuck
WHAT DOES IT TAKE TO DISRUPT THE PATTERNS THAT MARGINALIZE AND REINFORCE RACISM?

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Knowing and using mathematics in teaching (MKT)
WHAT DOES IT TAKE TO DISRUPT THE PATTERNS THAT MARGINALIZE AND REINFORCE RACISM?

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- Taking as axiomatic the brilliance of Black children, and thus Toni and Aniyah

WHAT DOES IT TAKE TO DISRUPT THE PATTERNS THAT MARGINALIZE AND REINFORCE RACISM?

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- Seeing Toni’s question as key to the class’s work
- Taking as axiomatic the brilliance of Black children, and thus Toni and Aniyah
- . . . AND having something different to DO


Knowing and using mathematics in teaching (MKT)

Interpreting Toni as asking a mathematical question that she means
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- . . . AND having something different to DO


Knowing and using mathematics in teaching (MKT)

Interpreting Toni as asking a mathematical question that she means

Having a repertoire of practices that can be adapted and used in contexts
WHAT UNDERSTANDING OF MATHEMATICS IS INVOLVED?

In hearing and seeing Aniyah? 

In hearing and seeing Toni?
MOVING ON

Discretionary spaces describe the many spaces and moments in which teachers make subjective judgments that either:

- act from habit and from patterns of white supremacy institutionalized in experience and professional training
- or act to dismantle anti-Black racism and white supremacy.

Understanding mathematics matters for doing this meaningfully!
There is no neutral.
Teaching is a natural human activity.

but . . .

Natural = “Normal” = White

So — teaching that enables children to thrive and that disrupts patterns of white supremacy and oppression requires **challenging** what seems natural.
This is our work.

To build mathematics teaching as a force for justice.

Our power is in our collective efforts to make mathematics teaching work. . . . . .

. . . to learn, to grow, to share, and to push forward with the fight.
THANK YOU!
dball@umich.edu
Slides will be available on my website
https://deborahloewenberngball.com/
(“Google” Deborah Ball)
CREDITS

Image on slide 3:
Photo from “Protest erupts in Phoenix after viral video shows police fatally shooting man in parked car,” by Allyson Chiu, The Washington Post

Image on slide 3:
Graphic from “Why don't black and white Americans live together?,“ by Rajini Vaidyanathan, BBC News

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Graphic from “Housing Segregation In Everything” by Code Switch, National Public Radio.
CREDITS

Image on slides 5–7:
Photo from “Be kind to your poll worker — a creature near extinction” by Josh Green, San Francisco Chronicle

Image on slides 5–7:
Photo from “Trump Rioters Storm U.S. Capitol (photos),” Variety

Image on slides 6 and 7:
Photo from “20 Classroom Interventions for Children with Anxiety Disorders” by Jerry Kennard, Ph.D., HealthCentral.
Image on slide 7:

Data on slide 24: