(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.

**OUR CRIMINAL JUSTICE SYSTEM NEEDS REFORM**

Kansas City

Baltimore

Chicago

St Louis

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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?

![Rectangle Images]
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.
How is Antar being positioned?

What is the mathematical point of this?

What does Antar mean by “it’s not a fraction”?

Should Antar stay at the board while Gabi presents?

Should I put another example up or keep working on this figure?

Shall we stay in whole group or turn and talk in smaller groups?

How shall I try to position Antar and Gabi?

Where shall I stand?

Are those two students over on the side following this discussion?

Should I explain or keep the children talking together?

What shall I say or ask next?

Whom shall I call on?

Is this a good moment to give Gabi the “sticky” line

How can I get other students to build on what Antar and Gabi have said?

How shall I try to position Antar and Gabi?

How is Antar feeling about his contribution?
<table>
<thead>
<tr>
<th>Teacher</th>
<th>Would you like to answer what you think about the second challenge? We're only going to be able to get one or two students to do it.</th>
<th>Launch discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>Would you like to explain what you think? Antone, what do you think?</td>
<td>Choose student to explain</td>
</tr>
<tr>
<td>Teacher</td>
<td>Could you come up to the board and explain? Thank you. Frame back for student who is presenting</td>
<td>Frame back 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>What's a fraction? Can you explain your thinking? Provide material support</td>
<td>Provide material support</td>
</tr>
<tr>
<td>Antone</td>
<td>I think it's not a fraction because all of the parts are not equal in the same way.</td>
<td>Listen</td>
</tr>
<tr>
<td>Teacher</td>
<td>Can you say that one more time to the class? Support presenter</td>
<td>Support presenter</td>
</tr>
<tr>
<td>Antone</td>
<td>I think it's not a fraction because all of the parts are not equal in the same way.</td>
<td>Listen</td>
</tr>
<tr>
<td>Teacher</td>
<td>Can someone repeat what Antone said? Very nice.</td>
<td>Orth student is presenter</td>
</tr>
<tr>
<td>Antone</td>
<td>Many students have their hands up.</td>
<td>Listen</td>
</tr>
<tr>
<td>Gabrielle</td>
<td>Ok. He said that he doesn't think it's a fraction because all of the parts are equal.</td>
<td>Choose student to explain</td>
</tr>
<tr>
<td>Teacher</td>
<td>Is that what you said? Position focal student as authority</td>
<td>Position focal student as authority</td>
</tr>
<tr>
<td>Teacher</td>
<td>Okay, would someone like to comment on that? Agree or disagree with him? Choose student to explain</td>
<td>Choose student to one another</td>
</tr>
<tr>
<td>Teacher</td>
<td>Okay, let's see, how about Gabrielle. Choose student to explain</td>
<td>Choose student to one another</td>
</tr>
<tr>
<td>Gabrielle</td>
<td>I disagree.</td>
<td>Listen</td>
</tr>
<tr>
<td>Teacher</td>
<td>What do you think? Praise question</td>
<td>Praise question</td>
</tr>
<tr>
<td>Gabrielle</td>
<td>I think the fraction is one-fourth.</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? Frame next step</td>
<td>Frame next step</td>
</tr>
<tr>
<td>Teacher</td>
<td>Antone, 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. Position student with agency, acknowledge competence</td>
<td>Position student with agency, acknowledge competence</td>
</tr>
<tr>
<td>Teacher</td>
<td>So, let's hear what Gabrielle's thinking.</td>
<td>Choose students to one another</td>
</tr>
<tr>
<td>Gabrielle</td>
<td>I think it's one-fourth because he said, all of 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>Here's something you can use so if someone wants to take it off again, they can. Okay, do you understand what you've done? Talk in the class, okay? Provide material support</td>
<td>Provide material support</td>
</tr>
<tr>
<td>Gabrielle</td>
<td>I blocked it down the middle because it's not equal, you have to make it equal.</td>
<td>Listen</td>
</tr>
<tr>
<td>Teacher</td>
<td>And so then you checked? Praise</td>
<td>Praise</td>
</tr>
<tr>
<td>Gabrielle</td>
<td>It's one-fourth.</td>
<td>Listen</td>
</tr>
</tbody>
</table>
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.

Many students have their hands up

Teacher: What do you think?

Gabi: I disagree.

Teacher: What do you think?

Gabi: I think the fractions are one-fourth.

Teacher: One-fourth? Do you want to come up and say why you think it is a fourth?

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 the fractions aren't the same, but you can make them the same by dividing a line down the middle.

Teacher: What's something you can do so if someone wants to take it off again, they can. Okay, so how explain what you've done. Talk in the class, okay?

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 refusal. It’s probably won’t finish it.

Teacher: Would you like to explain what you think? Anci, what do you think?

Teacher: Could you come up to the board and explain? Thank you.

Teacher: I really like the way that people who are coming to the board are doing today. You are explaining really well.

Teacher: Who’s a partner? Can you explain your thinking? Provide material support.

Anci: I think it’s not a fraction because all of the parts are not equal to the same shape.

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

Anci: I think it’s not a fraction because all of the parts are not equal to the same shape.


Teacher: Many students have their hands up.

Gabriella: Oh, she said that she doesn’t think it’s a fraction because not all the parts are equal.

Teacher: Is that what you said? Position first student as authority.

Teacher: Okay, would someone like to comment on that? Not agree or disagree with him?

Teacher: Okay, let’s see, how about Gabriella? Choose student to call on.

Gabriella: I disagree. Listen.

Teacher: What do you think?

Gabriella: I think the fraction is one-third. Listen.

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

Teacher: Anci, 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 Gabriella’s thinking. Choose students to one another.

Gabriella: I think it’s one-third because, like he said, all the fractions aren’t the same, but you can make them the same by doing a little thing in the middle. Listen.

Teacher: What’s something you can use so if someone wants to take it off, they can. Okay, so now explain what you’ve done. Talk in the class. Okay?

Gabriella: I didn’t do it the metric weights, since it’s not equal, you have to make it equal.

Teacher: And so then you decided? Note.

Gabriella: It’s one-third. Listen.
TEACHING IS DENSE WITH “DISCRETIONARY SPACES”
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

SYSTEMIC PATTERN #2
DISPROPORTIONAL ASSIGNMENT TO SPECIAL PROGRAMS
BASED ON “ABILITY”

- Black students: 16.7% of student population; 9.8% of those selected to programs for academically talented students
- Latino/Latina students 22.3% of student population; 15.4% of those selected to these programs
- 6.2% of all students are assigned to these programs for “talented” students; 10% of Asian students, 7.5% of White; 3.6% of Latino/Latina; 3% of Black

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


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What number does the orange arrow point to? Explain how you figured it out.
ANIYAH AND TONI
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 remain at the board with a wrong answer. She probably feels bad and is possibly confusing other children.
- Aniyah is harmed by how Toni is treating her.
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- Aniyah is harmed by how Toni is treating her.
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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- Her precise explanation is not only not highlighted and acknowledged, but not even heard.
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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

- Interpreting Toni as asking a real question that she means.
- Hearing Toni’s question as central to advancing the mathematical content.
- Reinforcing her mathematical identity, not choosing to read her body as disruptive.
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- Hearing Toni’s question as central to advancing the mathematical content.
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- Interpreting Aniyah as competent to answer questions about her ideas.
- Hearing Aniyah’s explanation as central to advancing 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

ANIIYAH

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 share my idea with the class on fractions.
What would it take to learn to use the discretionary spaces in teaching in ways that disrupt racism, 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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- Assuming the brilliance of Black children, and thus Toni and Aniyah

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- . . . AND having something different to DO

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

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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 that are institutionalized in experience and professional training
- or act to dismantle anti-Black racism and white supremacy.

Understanding mathematics matters for doing this meaningfully!
Nothing can be neutral.

*Imani Goffney, Ibram X. Kendi
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://deborahloewenbergball.com/
(“Google” Deborah Ball)
CREDITS

Image on slides 5–7:
Photo from “Why You Need an Experienced Real Estate Agent” by Elizabeth Weintraub, the balance. Retrieved from https://www.thebalance.com/experienced-real-estate-agents-1798883

Image on slides 5–7:

Image on slides 5–7:
Photo from “Just how bad is right-wing extremism in the German police force?”, The Local–Germany Retrieved from https://www.thelocal.de/20201006/germany-to-present-report-on-far-right-extremism-in-police/
Image on slides 5–7:
Photo from “German election: Volunteers organize the voting and count the ballots” by Dagmar Breitenbach, Deutsche Welle

Image on slides 5–7:
Photo from “Germany: Weekend of riots as thousands clash at far-right march in Chemnitz,” by Oliver Moody, The Times

Image on slides 6 and 7:
Photo from “20 Classroom Interventions for Children with Anxiety Disorders” by Jerry Kennard, Ph.D., HealthCentral.
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Data on slide 24: