Effective teaching in diverse classrooms

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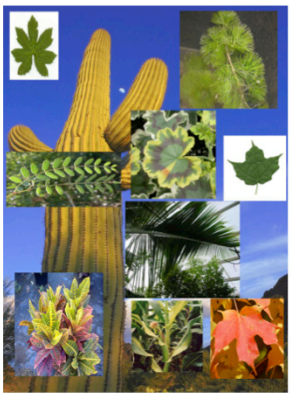
Why think about diversity?

- Diverse experiences, values, and learning styles mean that teaching is not one-size-fits-all
- Diversity can promote team innovation… but also conflict
- You can improve individual performance and create a collaborative environment



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Diversity important to teachers → impacts classroom strategies.

As for the importance of accommodating diversity and creating an inclusive environment…

Innovative/robust solutions… and/or profound disagreements/instability.

Transfers to tomorrow's workforce.

Also classroom: can **foster or inhibit** a collaborative and welcoming environment; also individual impact.

Big picture → specific goals

Goals for this session

- Increase awareness of obstacles to learning
  - in ourselves and in our students
  - that especially affect marginalized groups
- Discuss compensatory strategies
- Ground rules for discussion:
  - be honest but diplomatic
  - avoid judging or accusing each other
  - shared personal experiences stay in this room
  - in summary: both act in and assume good faith

Two types of barriers to learning…

… which I'll define on the next slide

Foundation in theory and practice via discussion

Because mere mention of words such as "diversity" and "race" can provoke defensiveness and anxiety…

First, one definition to get us on the same page…

What is a marginalized group?

- Not fully included in a mainstream environment (such as academia)
  - may feel unwelcome
  - may be unfamiliar with unspoken/implicit norms
- Often due to historical and/or current prejudice, ignorance, limited access
  - low income students ←→ first generation students
  - minority populations (race, religion, nationality)
  - women in some disciplines
  - people with disabilities

Norms can be academic, like **writing/citation** styles or peripheral, like how much or how informally it's okay to **speak up in class.**

But I treat everyone the same way…

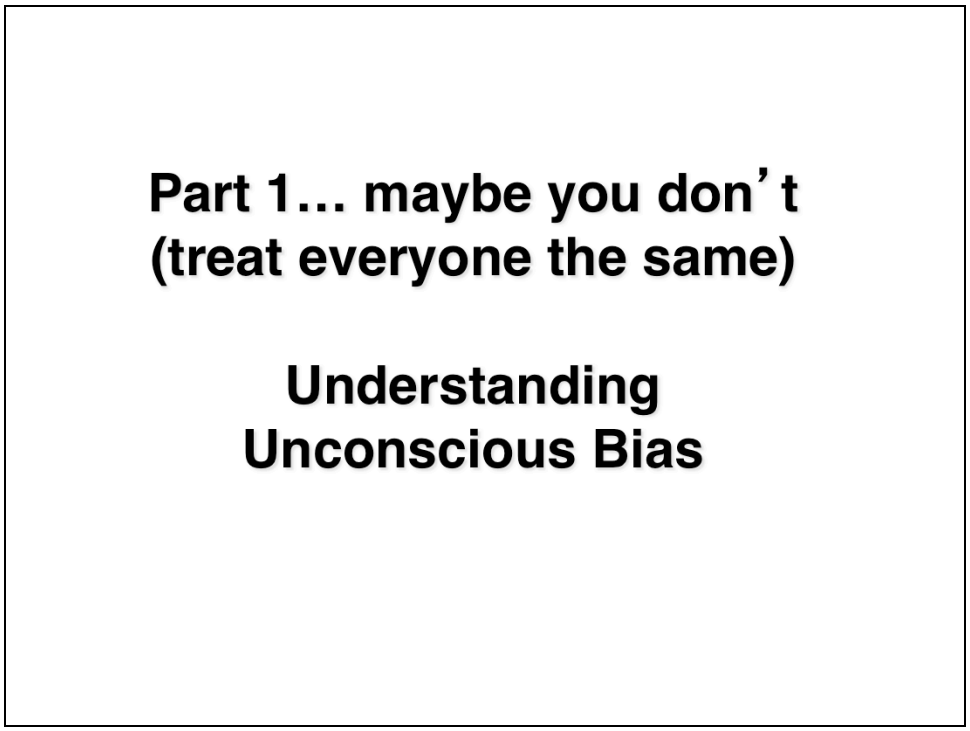
Part 1… maybe you don't

Part 2… even if you do

Part 3… best practices

Session structure comes from something I've even heard many – including faculty members here – say…

As if a simple input-algorithm-output…



Tough but true: own biases can negatively impact student learning.

What is unconscious bias?

- Implicit association test
  - typing task to measure automatic associations
- Many people display implicit bias/stereotype
- Even members of the marginalized group may internalize self-bias

There is an online test…

One explanation: like-like preference; but 50% AA also prefer EA faces…

Another explanation: bias or just awareness of a discriminatory cultural association "in the air" that we **recognize but don't act** on?

Well, we can make inferences from…

Supplementary note from Project Implicit: "If you implicitly associate GOOD with Asian faces more than Hispanic faces, then you should be able to categorize Asian faces with GOOD faster than Hispanic faces with GOOD. So, the difference in time is a measure of how these groups are associated in our memory, regardless of whether we consciously agree with the association. "

Bias linked with discrimination and performance gaps

- Female orchestra membership ↑ w/anonymity
- Job candidate bias
  - send *identical* resumes except name
  - male name called in more than female
  - stereotypically White name called more than Black
- Swedish research fellowship bias (1997)
  - women require 2.5x paper productivity to be judged equal to a man (accounting for journal tier)
- Internationally, implicit bias score correlated with stereotypical performance gaps

… real-life examples showing the impact of implicit (and possibly also explicit) bias.

25% of the orchestra increase explained by audition format

15 vs. 10 resumes

~1 stdev increase in stereotyping predicted ~0.7 stdev advantage for male over female students on science exam.

So we might like to mitigate these effects. First let's think about where they come from…

Supplementary note: There is also some research directly correlating implicit bias test scores with individual discriminatory behaviors (self-reports of racial harassment and responses to hypothetical situations, Rudman and Ashmore; eye contact and other measures of friendliness with a speaking partner, Dovidio, Gaertner, and Kawakami).

Roots of unintentional bias

- Nature *and* nurture – systemic
- Even babies favor those who resemble them
- Schemas (V. Valian)
  - expectations about an individual based on a group
  - can be very useful!
  - also can be very wrong!
  - individual male/female heights are misestimated in accordance w/*statistically* correct scheme
- Social/cultural contributions to schemas

Innate and developmental → both systemic. Goal: **empower you to counteract, not to make you feel bad**!

Plus toddlers/puppets (favor like, punish unlike).

Consistent point of reference for heights study: **door frame**. (Nelson, Biernat, Manis 1990)

If true for an **objective** measurement in accordance with a **correct** generalization, just imagine what happens for subjective measurements and untrue stereotypes…

For a number of reasons, common populations tend to have shared schemas. So the take-home is: don't take the test result too personally.

Virginia Valian – see resources list

Combating unconscious bias

- Bias test: not an accusation or an inevitability
- Changing implicit associations takes time…
  - a product of culture and personal experience
- … but changing actions is "easy"
  - cultivate experiences counter to your bias
  - consciously compensate for the bias
    - criteria in advance
    - full attention to task
- Awareness is the first step to changing behavior and ultimately implicit attitudes

… but no need to site idly by either. Yes, correlation b/w implicit bias and discrimination is a **statistical association and not a personal accusation**. But either way, the really good news is that **bias is not fixed**, and **strategies to counter hurt no one**…

My example → right after reading positive article…

Stress/time-**pressure increases reliance on schema**s and possibility of bias. (RF Martell 1991)

This may all seem pretty abstract so far. How does it relate to the classroom?

Supplementary note from Project Implicit site: "One solution is to seek experiences that could undo or reverse the patterns of experience that could have created the unwanted preference. This could mean reading and seeing material that opposes the implicit preference. It could mean interacting with people that provide experiences that can counter your preference. A more practical alternative may be to remain alert to the existence of the undesired preference, recognizing that it may intrude in unwanted fashion into your judgments and actions. Additionally, you may decide to embark on consciously planned actions that can compensate for known unconscious preferences and beliefs. This may involve acts in ways that you may not naturally act – for example, smiling at people who are elderly if you know you have a implicit preference for the young. Identifying effective mechanisms for managing and changing unwanted automatic preferences is an active research question in psychological science. The good news is that automatic preferences, automatic as they are, are also malleable."

Unconscious bias in the classroom: example

- Asian students treated as "model minority"
  - aggregate success despite discrimination
  - ignores history/context, creates division
  - skewed expectations of individuals
- Impact on struggling student of Asian heritage
  - low homework scores ignored
  - greeted by surprise if s/he comes for help
  - furthers cycle of feeling marginalized
  - overall: given less opportunity/support to improve
- Solution: check your assumptions

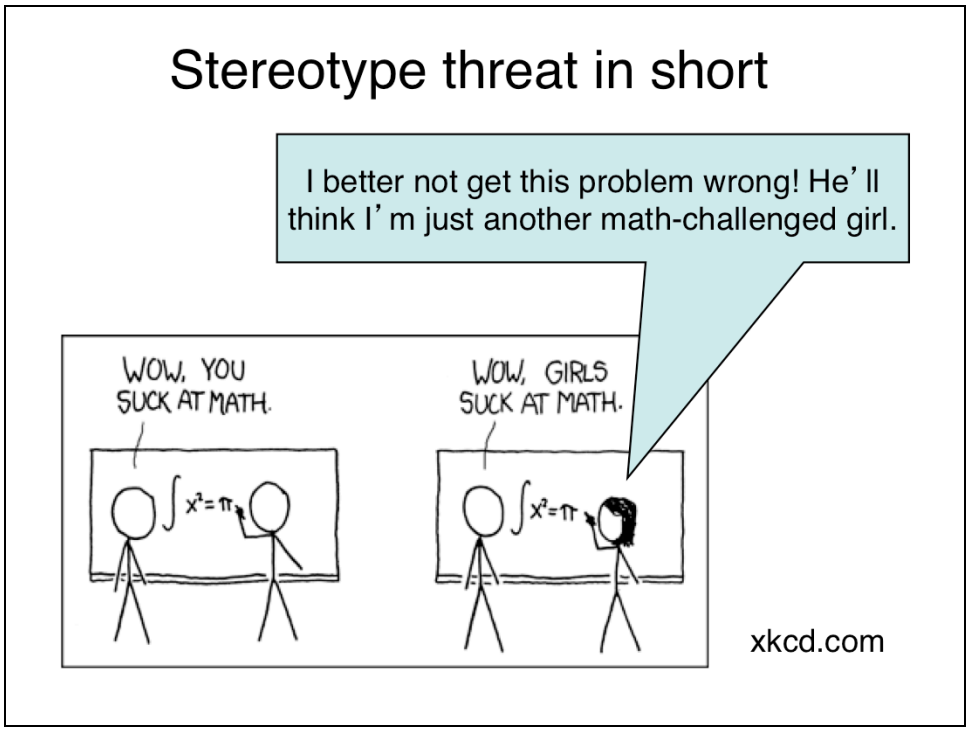
You may have heard the term "model minority"… pits groups (with different histories) against each other and also affects those w/"model" status in damaging ways: unreasonable expectations and insufficient value of individual achievements.

Part 2… even if you do (treat everyone the same)

Understanding Stereotype Threat

With all that said… even if your actions could always be the same, your students will experience them differently.

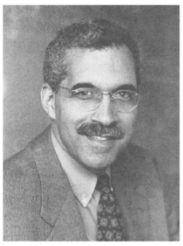
The function has many individual-based parameters…



The most concise and incisive depiction… in a word, think of it as "choking"

What is stereotype threat (ST)?

- Under-performance in anticipation of being judged according to a negative stereotype
  - anxiety diverts cognitive resources
- Activated by circumstance
  - context in which stereotype may apply
  - working at edge of one's knowledge/skills
- Academically *strongest* students most affected
  - who identify with the domain (e.g., science)
  - who are generally confident about their abilities
  - who care about not "confirming" stereotypes



Claude M. Steel
L.A. Cicerco, Stanford News Service ©

- Work of Claude M. Steele, others (>100 studies*)

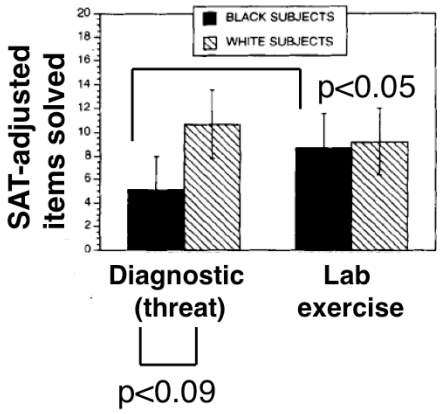
*Paul Sackett and others are skeptical of 'real-world' relevance

ST in more academic terms and in greater detail…

Pressure/anxiety → blood flow from centers of intellect to fight-or-flight amygdala; performance monitoring; emotional regulation – mess with **working memory**…

For strong students**, NOT just generalized self-doubt or stereotype internalization trigger, BUT fear of judgment and subsequent unfair treatment** according to stereotype, (e.g., F/M did poorly on an exam – inherent limitation versus bad day).

Reducing stereotype threat (ST) improves student performance



- GRE verbal exam
- High-achieving cohort
- Black student scores significantly increased to equal White student scores when threat gone

C. Steele & J. Aronson *J Pers Soc Psy* **69**:797-811 (1995).

One of the first examples of ST research was done almost 20 years ago…

Chose particularly difficult problems to bring about the threat, students working at edge of their abilities.

Normalized by incoming SAT scores. Not meant to explain all of the "achievement gap," but it's a piece.

Lab exercise "to see how certain problems are generally solved" vs. diagnostic test of intelligence

ST can affect ***anyone***

- Most obviously (and disproportionately) affects historically marginalized groups
- But context matters
- Any difference from the "in-group"
  - older person playing a memory game
  - women playing sports
  - White college-aged males primed to think about success of their Asian-/American peers in math
  - engineer in a Harvard humanities class… hypothetically, of course!

Since then, many other examples… including white men primed to feel inferior in math (compared to Asian students) – Aronson et al 1999. So it turns out **day-to-day stigma not required for threat activation→** circumstance matters, not just an internalized inferiority complex. Interestingly, middle-identified improved under the stimulation of this competitive feeling, while highly-identified men choked. Fine line b/w motivation to do your best and distraction from doing so...

Consequences of ST

- Short-term: under-performance
- Long-term: stop trying
  - have to prove oneself at each new level
  - may avoid risking failure and judgment
  - thus avoid learning!
  - "disidentify" from domain as source of self-esteem

Short-term "just" dings performance. But long-term…

Key is faltering at the edge of one's ability, which is how we learn.

Long-term demotivation, "disidentification" (C. Steele) from that domain as source of self-esteem.

But initially it's about trying "too hard" versus not hard enough.

Similarly, some of you may feel anxious about TA role. Don't disidentify. Do: **collaboration + get explicit feedback**.

Developing a personal understanding of ST

Within your group, discuss a time that you made a conscious effort to avoid "confirming" a negative stereotype.

Did anything trigger your feeling of threat – e.g., someone making a comment – or was it an automatic response?

Just to internalize the idea, let's all think about…

My example: as F, prepared for gotcha moments re: subtle details that I am purposefully oversimplifying in class (CI).

So… didn't have to *actually* be unfairly judged by *anyone* to experience anxiety. And ST occurs whether the test/instructor is biased or not. So don't take personally → be supportive.

Now that we all understand ST, I want to talk about how to mitigate it…

Part 3… best practices

Breaking Down Barriers to Learning

Reducing ST: wise criticism

- Telling students that you are using high standards AND that you believe they can meet those standards is *highly* motivating
- Perils of ignoring… need I say more?
- Perils of criticism with no context
  - student mistrust → disengagement from the task
  - misplaced efforts → miss forest for trees
- Perils of over-praising or under-challenging
  - again mistrust, disengagement
  - underachievement → discourages future effort

Key way is something Steele calls "wise" criticism… (relevant research is in the reference list, but also intuitive).

What are other types of criticism and why are they problematic? (1) No feedback at all: can assume the worst. (cf. 60 on exam w/ave 50) (2) Mistrust, "attributional ambiguity" (Jennifer Crocker and Brenda Major) – e.g., due to racial bias or high standards? Also may focus on perfecting details and missing the big picture. (3) Similarly, missed opportunity to improve. **Overall, students *want* to be challenged but also to be supported in showing themselves capable of meeting those challenges.**

Wise criticism example

Student gave a scripted oral presentation followed by a thoughtful Q&A, and overall lacked confidence.

You did such *a great job [in Q&A]. I was surprised by how good and natural an extemporaneous speaker you are, because you spent the entire talk reading from your slides and notes! This approach was really a loss and misuse of your talents, and I hope next time you will trust yourself to speak "off script" more. I appreciate also your honesty about which parts of the paper you didn't understand, or thought you didn't – in fact, you did a great job explaining [them].*

Example from my class. What do you think, and what might be not-so-wise responses?

Summary: **wise criticism is not just personal, but targeted and actionable.**

Not-so wise versions

- *Great Q&A, but please improve talk next time*
  - vague
- *You'll have to stop sounding so uncertain if you want to be taken seriously*
  - cold/demotivating
- *This was way better than I expected going in. Keep up the good work!*
  - damning with faint praise, under-challenging

Wise criticism exercise 1

Imagine that you have a student who did well on homework assignments and answered questions in recitation but bombed the first exam. What might wise and not-so-wise criticism sound like?

Reinforce: must mention your **belief that they *personally* can improve with more effort, not vague (whether praise or criticism)**. Only if you mean it! In what areas have they demonstrated competence so far? Are there reasons for the disparity that they can act on?

Wise criticism exercise 2

How about a student who has been consistently struggling with the work? How might you approach him or her when you're not sure s/he is prepared to meet the highest standards?

Maybe you are wrong – tread lightly

Can you find some handle, starting point for building on existing competence

Missing background – if you read/work through these resources, I'm confident you…

Talk to academic advisor

High standards can be relative (to one's starting point) to an extent

Wise criticism exercise 3

A student in your recitation has failed the first two exams, and hasn't even bothered to come pick them up. Why *might she behaving this way?* How *might you respond?*

This one should be a giveaway. But it really happened… worked with a TA who never once contacted the student to check in. "Her responsibility." True to a point, but…

Many MIT students at first practice avoidance and self-sabotage. A real shame to not even *try* to establish contact and prompt the student to seek help.

Reducing ST: model resilience

- Be candid about your own past struggles as part of a learning *process*
- Explore, don't downplay recitation errors: "let's talk about why this mistake is easy to make…"
- Normalize asking for help
  - casually mention "several people asked about this in OH" to decrease anxiety/stigma about attending
  - make problem-solving process and assumptions explicit, build in space for questions by default
- Intra- and cross-group sharing both important

Can also model certain behaviors explicitly…

My anecdote example: 5.12 my first semester here…

Finally… **Modeling intra-group demonstrates achievement in MIT/BE environment possible; cross-group shows that struggles are common rather than a feature of one's social identity and presumed abilities.**

Reducing ST: promote sense of community and belonging

- Reinforce student identities as (apprentice) biological engineers
  - emphasize professional development, not grades
  - draw out excitement, not anxiety
- Use inclusive language
  - avoid always saying "he" as the default human
  - diversify examples of scientists when possible
  - diversify conceptual analogies (e.g. not always sports)
  - contextualize analogies and references to pop culture

Link b/w professional development and process-focus rather than end-point focus.

This last point leads us to a population I want to talk about…

On teaching non-native speakers

- Keep your examples broad and accessible
- Engage explicitly
  - do you think this a language or a technical issue?
  - becomes a problem you are solving *together*
  - shows confidence in student's perceptions
- Seek outside expertise
  - http://web.mit.edu/fll/www/languages/ELS.shtml

On *being* a non-native speaker

- Choose your best media
  - okay to ask for written questions from students!
  - images are universal: use lots
- Actively acknowledge and bridge the gap
  - first day getting-to-know you exercise
  - before/after recitation chats
  - seek student and peer allies for honest feedback
- NB: "muddy cards" are a best practice for *all*
  - written student comments re: "muddiest" part of day
  - thoughtful written responses to common questions
- Your thoughts here

Written Q – math TA example…

First day: maybe even something explicitly about a habit growing up – answers from across US will vary too!

Would be the height of arrogance to assume I know best here…

The last type of diversity I want to spend some time on, rather than demographics, is…

On differences in learning styles

- Perceptual styles/needs:
  - whole versus parts (big picture/details)
  - abstract vs. tangible (theory/experiment)
- Conceptual styles:
  - synthetic vs. divergent
  - reflective vs. active processing (e.g., comfort with thinking out loud – hi, extroverts!)
- Emotional styles: response to criticism
- Relevance of cultural and language background
  - e.g., oral vs. written vs. pictorial processing

Different stages of learning. Variation as early as perception stage…. Then need to conceive/integrate knowledge…

Top-down/bottom-up

Some cultures more encouragement to be verbal. (Internationally, even different parts of a country, etc.)

Non-native speakers especially helped by **multimodal (pics) and reference (written) support**.

Accommodating different learners

- No *one* best way to teach or learn!
- To reach diverse learners, vary your approach
  - visual support benefits almost *everyone*
  - ditto for hands-on and real-life examples
  - interaction w/you (Socratic)
  - collaboration w/peers (discuss w/partners → class)
  - time to think (try problem alone → whole class)
- If something isn't working, don't just repeat it
  - have more than one way to explain something…
  - … getting back to the student later is okay
  - ask questions to identify key conceptual hang-up

Small groups → whole class gives **extra time both to those who just aren't as intellectually nimble and to those who hesitate due to taxed cognitive resources/anxiety**. Eventually participation becomes second nature.

Parting thoughts about diversity

Students who believe in the immutability of intelligence focus on "performance goals"; they seek to demonstrate rather than enhance their competence and are apt to withdraw from tasks where they risk failure. -from G.L. Cohen, C.M Steele, L.D. Ross, *Pers Soc Psychol Bull* **25**:1302 (1999).

NOT a zero sum game. Many strategies we discussed here improve *everyone's* learning.

I leave you with a quote… describes many Type A, high-achieving students. Best practices can impact EVERYONE. Both individual and group effects → dynamic, welcoming learning environment.

Acknowledgements

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- Thanks to all of my colleagues and students, from whom I have learned – and continue to learn – so much.
- Thanks to my husband and a fine educator in his own right, Wally Holland, for comments on an early draft of this talk.

Resources (see also slide notes)

- Implicit bias overview: https://implicit.harvard.edu/implicit/
- Implicit bias examples
  - Orchestras: C. Goldin and C. Rouse, *Am Econ Rev* **90**:715-741 (2000).
  - Resumes: M. Bertrand and S. Mullainathan, *Am Econ Rev* , **94**:991-1013 (2004).
  - Swedish fellowships: C. Wenneras and A. Wold, *Nature* **387**:341-343 (1997).
  - Stereotype: B. Nosek et al. *P Natl Acad Sci USA* **106:**10593 (2006).
- Gender schema tutorials: http://www.hunter.cuny.edu/gendertutorial/
- Stereotype threat overviews
  - Popular press summary: *http://www.theatlantic.com/magazine/archive/1999/08/thin-ice-stereotype-threat-and-black-college-students/4663/*
  - New one-stop site: http://www.reducingstereotypethreat.org
- Wise schooling
  - Overview: C.M. Steele, *Am Psychol* **52**:613-629 (1997).
  - Mentoring : G.L. Cohen et al., *Pers Soc Psychol Bull* **25**:1302 (1999).
  - Calculus seminar approach (independent of Steele's work and quite relevant): U. Treisman *Coll Math J* **23**:362 (1992).
- Learning styles http://education.jhu.edu/PD/newhorizons/strategies/topics/Learning%20Styles/diversity.html (not peer-reviewed but includes some refs)

Strongly recommend the Treisman seminar as a complementary view to Steele's with some overlap.