Effective teaching in diverse classrooms

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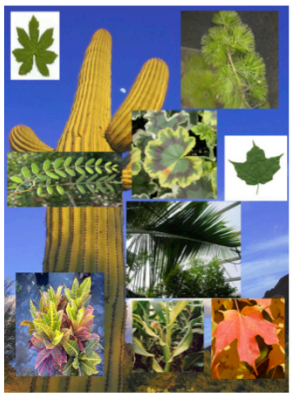
Why think about diversity?

- Students have diverse
  - experiences
  - preferences
  - learning styles
- Teachers can provide
  - varied teaching techniques
  - inclusive, collaborative setting
- Leading to
  - improved student performance
  - preparation for future



Public domain image, Wikimedia Commons.

Impact their preferred **techniques** and **environments** for learning…

Future aspect: Diverse teams create innovative/robust solutions… and/or have profound disagreements/instability.

TR Big picture → specific goals

Goals and topics for this session

- Increase **awareness** of obstacles to learning
  - in us and in our students
  - that especially affect marginalized groups
    - historical in/formal lack of access to institutions
- Discuss compensatory **strategies**
- Ground rules for discussion:
  - honest, diplomatic, nonjudgmental
  - shared personal experiences stay in this room
  - in summary: both act in and assume good faith

Two types of barriers to learning…

Informal aspect matters: **Access to mentoring/networks**

Theory and **discuss case studies**.

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

But I treat everyone the same way…

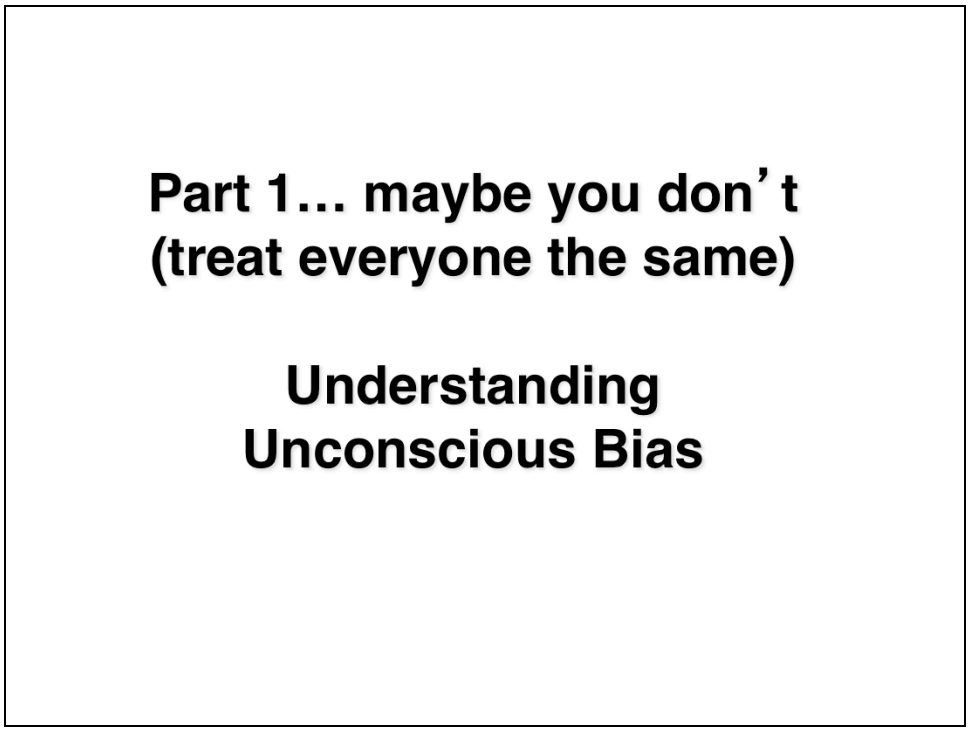
Part 1… maybe you don't

Part 2… even if you do

Part 3… best practices

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

I'll argue that this approach is somewhat **incomplete**…



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

Author: Project Implicit
Reuse: Free Art License.
http://artlibre.org/licence/lal/en

There is an online test…

Possibility 1: like-like preference; but 50% AA also prefer EA faces…

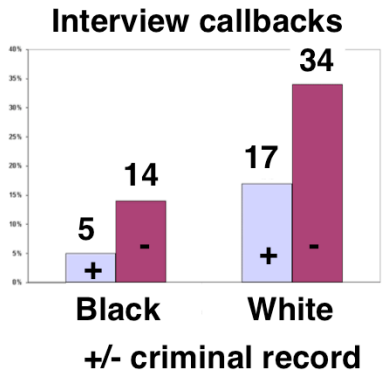
Possibility 2: awareness of a discriminatory cultural association "in the air" that we **recognize but don't act** on?

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

- Female orchestra membership
  ↑ w/anonymous auditions
- Research fellowships
  - women need 2.5x more same-tier papers than men
- Job candidate bias
  - send *identical* resumes
  - but change name
  - sex, race effects



D. Pager *Am J Sociol* (2002)

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

25% of the orchestra increase explained by audition format

same-tier = e.g. Nature IF

15 vs. 10 resumes

most striking: callbacks of matched applicants

So we might like to mitigate these effects. It may help to briefly think about where they come from…

Modified graph originally from this source: http://www.epi.org/publication/webfeatures_snapshots_archive_09172003/

Supplementary notes:

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
- Schemas (Virginia Valian)
  - expectations about an individual based on a group
  - can be useful in some contexts
  - also can be very wrong!

Same height.
He "seems" taller.

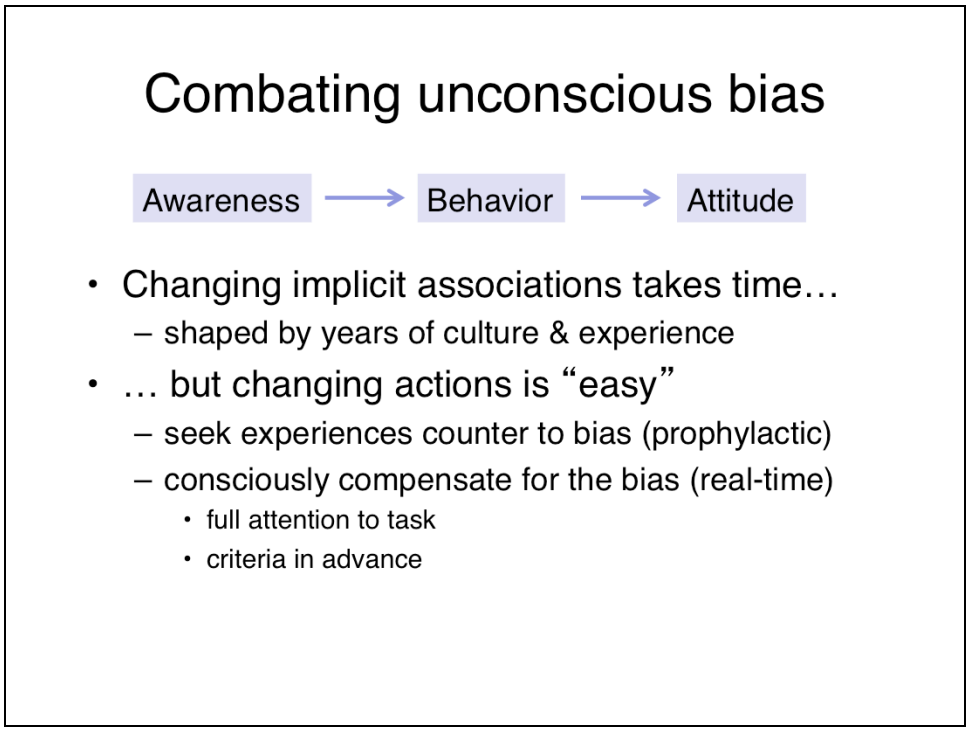
Primarily **systemic, not personal**: innate (babies' like-like preference) and cultural milieu.

Scientific pattern-matching and prediction is great, but risky when applied to individual humans.

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

So our **schemas mislead us** even for an **objective** measurement in accordance with a **correct** generalization! Just imagine what happens for subjective measurements and untrue stereotypes…

Virginia Valian – see resources list



Purpose in sharing all this: **not to make you feel bad/unenlightened, but empower you to counteract**!

What is under our **control** is our actions.

Experiences: in age of blogs/Twitter, easy to intimately observe diverse humanity.

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
  - divisive: ignores history, sub-populations
  - skewed expectations of individuals
- Impact on students of Asian heritage
  - stronger students may be taken for granted
  - weaker students may go unnoticed
  - overall: given less opportunity/support to improve
- Solution: check your assumptions

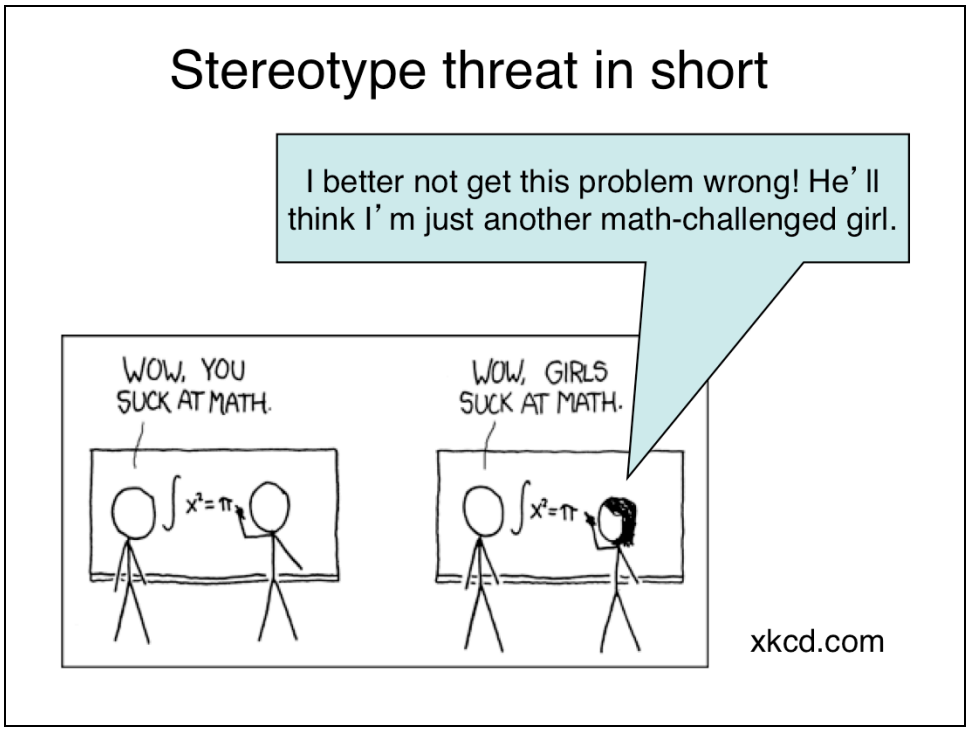
You may have heard the term "model minority"… pits groups (with different histories) against each other and also affects those w/"model" status in damaging ways: unreasonable expectations and insufficient value of individual achievements.

Fuller descriptions: stronger students may be treated as if success is inevitable, not given credit for accomplishments; weaker students may be ignored, slip through cracks, taken as slackers versus having difficulties.

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

Understanding Stereotype Threat

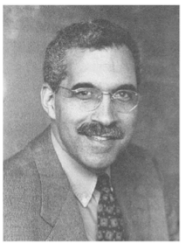
With all that said… even if your actions could always be the same, your students will experience them differently.



The 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 + regulation divert 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*)

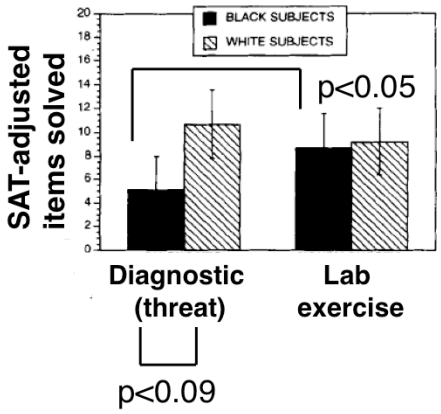
*Paul Sackett and others are skeptical of 'real-world' relevance

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).

Give you a sense of the data with one of the first ST studies (c. 20 years ago)…

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

Normalized by incoming SAT scores.

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"
- Example: weakened performance of math-identified White males primed to think about success of their Asian-/American peers

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**.

[If time: 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 *repeatedly* prove oneself
  - may avoid risking failure, judgment
  - thus avoid learning opportunities!
  - "disidentify" from domain

(shamelessly stolen from the Internet)

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).

Don'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 (WC)

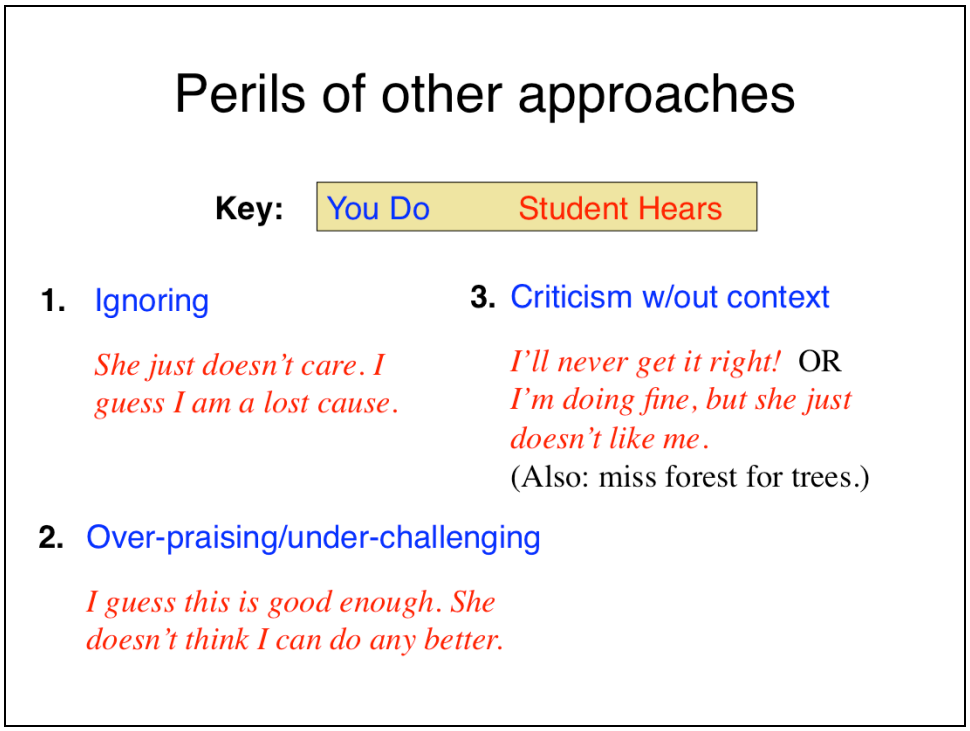
- Two parts to WC strategy for motivating students
- Explicitly say
  - that you are using high standards
  - that you believe they can meet those standards
- Cannot be cursory: "Nice job. Now here's all the stuff that's wrong with what you did…"

Mentioning --

1. High standards + 2. Demonstrated potential

-- Motivates

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. Don't always put the onus on the student to come to you. (2) Missed opportunity to improve. (3) Mistrust, "attributional ambiguity" (Jennifer Crocker and Brenda Major) – e.g., due to bias or high standards? Also may focus on perfecting details and missing the big picture.

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 excerpt 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.**

Notes after our discussion: What was intended to show genuineness versus cursory/"fake" approval (the emotions expressed here) could be taken as sarcastic/demotivating instead.

For context, the actual top summary statement on the student's evaluation was: "Overall, you have an excellent foundation for giving a scientific talk. You clearly understood the paper well, and the overall organization of your talk was on the right track. The most important thing you can do next time is two-fold: reduce the amount of text on your slides, and don't read directly off of them. Other suggestions about slide design and delivery are below, and I hope you take them to heart for the next talk."

The above statement is an excerpt/combination of the comments on the rubric specifically related to Q&A and to speaking.

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

Overall, students *want* to be challenged but also to be supported in showing themselves capable of meeting those challenges.

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!!

Talk to **academic advisor – personal** issues?

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…**

High standards can be **relative** (to one's starting point) **to an extent – but don't make the choice *for* them or assume their level of ambition**

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 → successes as part of a learning *process*
- Discuss (don't downplay) own recitation errors
- Normalize asking for help
  - casually mention questions that "were asked in OH"
- Intra- and cross-group sharing both important

Besides WC, a few **other strategies to counter ST…**

My anecdote example: 5.12 my first semester here

Recitation: "Let's talk about why this sign flip that I did is an easy mistake to make…"

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
  - deemphasize grades (AMuchAP)
- Use inclusive language
  - avoid always saying "he" as the default human
  - diversify examples of scientists when possible
  - diversify analogies

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

This **last point leads us to a population** I want to/was asked to talk about…

On teaching non-native speakers

- Contextualize any US-centric examples
- 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

Also true for pop culture jokey references – you want to connect, but also not to exclude – so give enough context, without ruining the joke ☺

On *being* a non-native speaker

- Choose your best media
  - okay to ask for written questions from students!
  - images are universal
- Actively acknowledge and bridge the gap
  - get-to-know-you exercise on 1st day
  - informal chats before/after recitation
  - seek student and peer allies for honest feedback
- NB: "muddy cards" are a best practice for *all*

Written Q – math TA example…

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

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

On differences in learning styles

- Different perceptual, conceptual, emotional styles
- Whole versus parts/details
- Abstract/theory vs. tangible/experiment
- Reflective vs. active
  - e.g., comfort with thinking out loud (hi, extroverts!)
- Emotional styles: response to criticism
- Relevance of cultural and language background

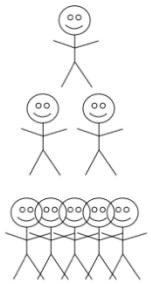
Different stages of learning. Variation as early as perception stage…. Then need to conceive/integrate knowledge…

Probably 2nd and 3rd bullets most important

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

Specific teaching techniques

- Muddy cards
  - distribute index cards at end of class
  - each students writes comment/question about "muddiest" part of day
  - you prepare thoughtful responses
- Think, pair, share
  - student thinks/writes ideas about solving a problem alone
  - discusses with a partner or two
  - only then ask the whole class for ideas



MC – especially non-native speakers; written responses especially helpful here

TPS – 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.

Accommodating different learners

- No *one* best way to teach or learn!
- To reach diverse learners, vary your approach
  - visual support
  - hands-on and real-life examples

  } these 2 benefit almost everyone
  - time to think
  - collaboration w/peers
  - interaction w/you (e.g., Socratic)
- Getting back to a student later is okay
  - with alternative, clearer explanation
  - with answer to a question you didn't know

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

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 → welcoming while rigorous learning environment.

Speaking of modeling resilience…

- Rough evals this spring
  - "overdoing" Socratic method
- Did *I* change?
- Did *students* change?
- Bottom line: they did not feel supported
  - teaching must be *responsive* to specific individuals
  - but, don't take negative comments as a *complete* description of your teaching
- Important to learn from negative experiences
  - my plan: maintain standards (students learning vs. being told answers) while increasing *follow-up* support

End of my formal talk; now, a story…

Some level of story about overdoing Socratic method, disconnect from students, even though I'm a veteran and didn't think I was doing anything differently – students are individuals, different cohorts change…

Acknowledgements

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- 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).
- 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.