Effective teaching in diverse classrooms

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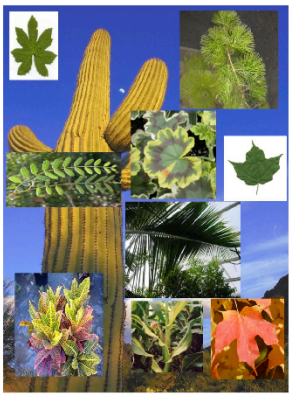
Introduction.

My focus today is on most effectively teaching the diverse population we are fortunate to have at MIT.

Why think about diversity?

- Diverse experiences and values can promote team innovation… but also conflict
- You can increase creativity and collaboration in class as well as individual performance



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I'll assume that we're all on the same page about the importance of diversity and an inclusive environment, which you will now contribute to in a special way as educators. But to briefly reiterate…

When people with diverse… solve problems, tend toward innovative and robust solutions. However, same qualities can lead to profound disagreements and instability.

In a classroom context, you want to harness the former and avoid the latter. So today we'll be thinking about how to foster a creative and collaborative environment while also helping individual students, and each of these effects will multiply, not just in your classroom, but in tomorrow's workforce.

So that's the big picture context. Our specific goals today…

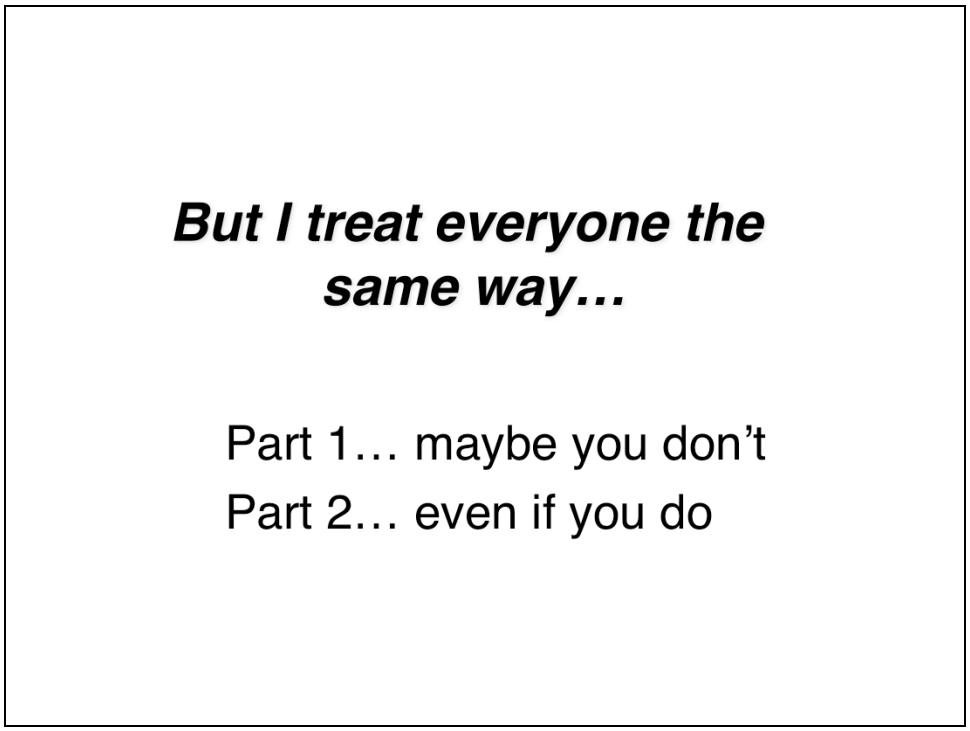
Goals for today's session

- Increase awareness of obstacles to learning
  - in ourselves and in our students
  - that especially affect marginalized groups
- Discuss compensatory strategies
- This is a difficult topic! Ground rules:
  - 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

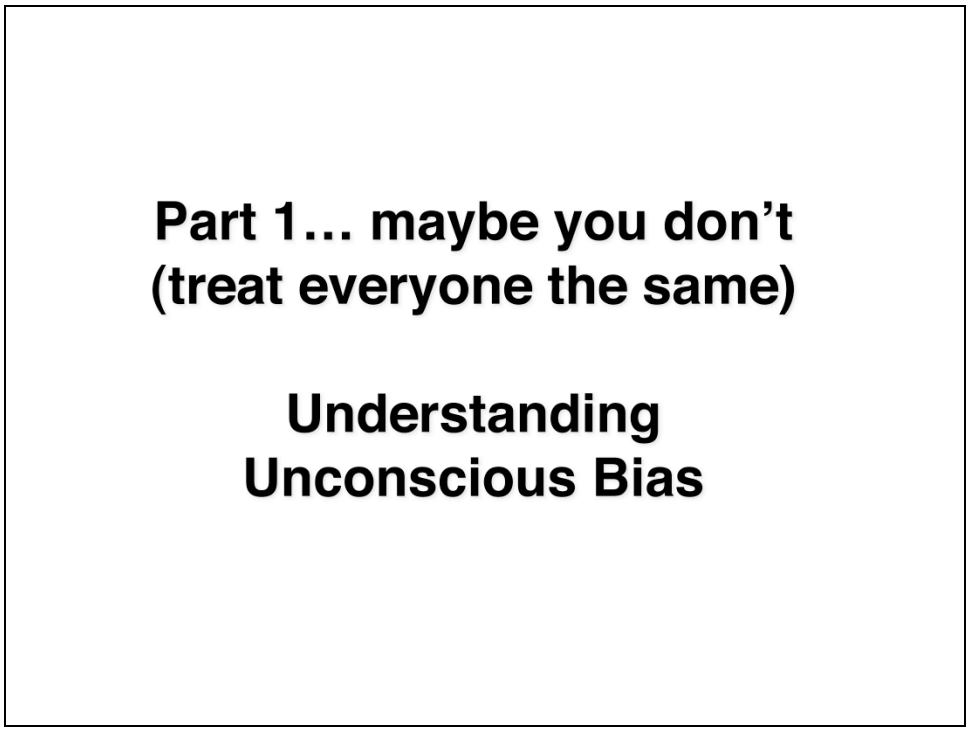
… are to discuss two types of barriers to learning…

By marginalized groups I mean…

I want to provide a foundation in both theory and practice but also to ultimately have a discussion. Because the mere mention of words such as "diversity" and "race" can provoke defensiveness and anxiety…



The structure of this session comes from something I've often heard folks from many walks of life say, including faculty members here…



We'll discuss the harder part first, namely the ways that our 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…

Is it bias or just awareness of a discriminatory cultural association "in the air"? Well, we can surmise from the following…

Discriminatory outcomes suggest implicit (or explicit) bias

- For female musicians in orchestras
  - female membership ↑ with veiled auditions
- For hypothetical job candidates
  - send *identical* resumes except name
  - male name called in more than female
  - typically White name called more than Black
- For Swedish fellowship applicants
  - women require 2.5x paper productivity to be judged equal to a man (accounting for journal tier)

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

25% of the orchestra increase explained by audition format

15 vs. 10 resumes

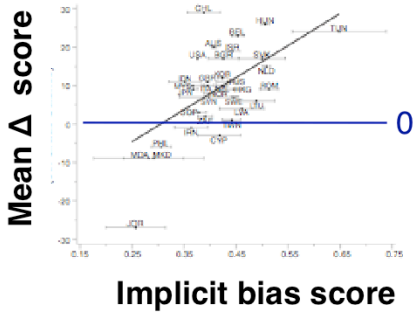
Note that all of these examples are not just about individual success, but also directly or indirectly about optimizing the performance of a group.

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), but I think real life makes the point even better.

What I *will* show briefly is implicit bias correlation with stereotypic outcomes, which will in a sense be the focus of the second part of this session.

Implicit bias correlates with stereotypical performance gaps

- All 8th-graders given same science exam
- 1 SD bias score ~ 0.7 SD exam score



Δ = boy - girl

34 countries

B. Nosek et al. *P Natl Acad Sci USA* **106:**10593 (2006).

The researchers at Harvard collected implicit bias data from 34…

About 1 stdev increase in stereotyping predicted about a 0.7 stdev advantage for male over female students.

Directionality is not clear; likely bi-directional influence from stereotypes to performance/participation and vice-versa; key take-away is, "male = science" is not an immutable law of nature, but has cultural variation, ditto any other stereotypes we may hold.

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
- Awareness is the first step to changing behavior and ultimately implicit attitudes

Should you take this test and get disappointing results, remember that the correlation between implicit bias and discrimination is a statistical association and not a personal accusation. Association/preference due to simple familiarity plays some role. Moreover, bias is not fixed…

This may all seem pretty abstract so far. How does it relate to the classroom? We can imagine an example…

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."

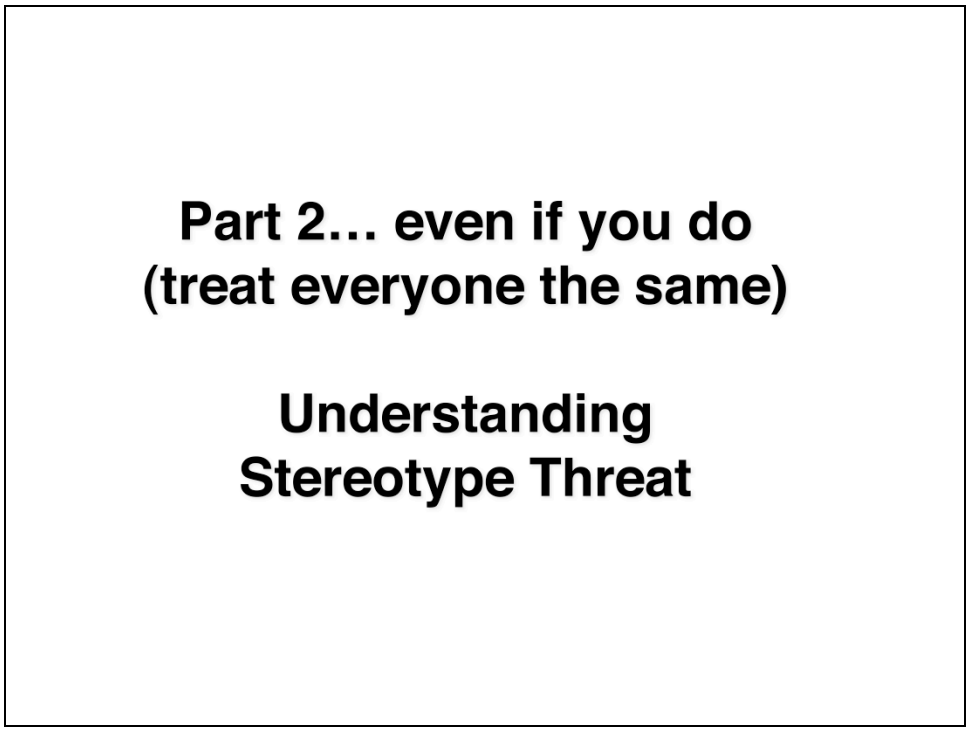
Unconscious bias in the classroom: example

- Asian students treated as “model minority”
- Impact on struggling student of Asian descent
  - low homework scores ignored
  - greeted by surprise if s/he comes for help
  - furthers cycle of feeling marginalized
- Solution: self-check your assumptions

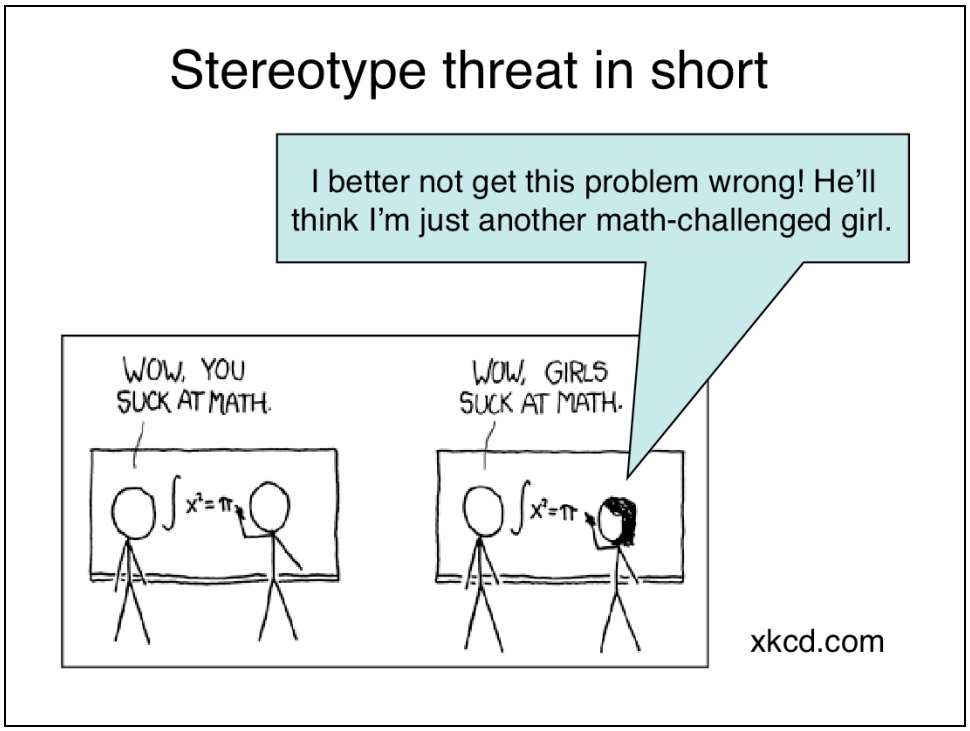
Can your group think of another example?

You may have heard the term “model minority”…

First exercise done in groups rather than individual contributions.



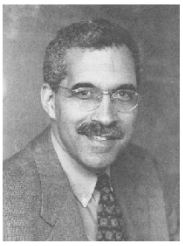
With all that said… even if your actions could always be the same, your students will experience them differently.



The most concise and incisive depiction…

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*)

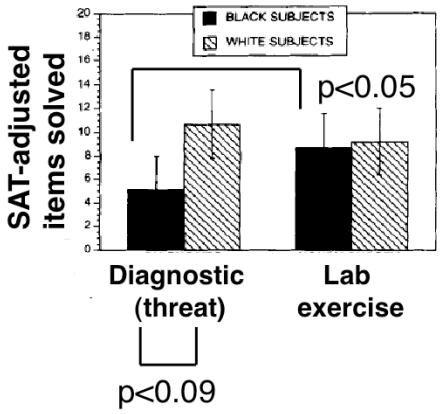
*Paul Sackett and others are skeptical of 'real-world' relevance

Now let's look at ST in more academic terms and in greater detail…

Pressure and anxiety results in blood flow from centers of intellect to the fight-or-flight amygdala…

For these strong students, it is not about a generalized self-doubt or stereotype internalization being triggered, but rather a fear of being judged and subsequently treated according to that stereotype, (e.g., a woman vs. man who 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 over 15 years ago…

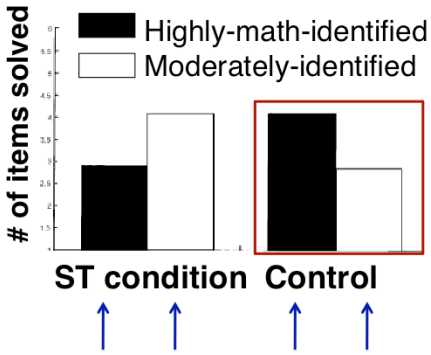
Chose particularly difficult problems to bring about the threat, students working at edge of their abilities.

Normalized by incoming SAT scores.

Lab exercise "to see how certain problems are generally solved."

In my experience, many students who are not part of a marginalized population have difficulty "getting" ST at first. In the next example…

Increasing ST affects the most motivated students



- Difficult math exam
- White male students
- Threat condition: primed stereotype that Asians are best at math

J. Aronson et al. *Exp Soc Psy* **35**: 29-46 (1998).

… let's talk about white men, who don't typically face a stereotype that they are bad at math (as do women and African-Americans).

Turns out day-to-day stigma not required for threat activation→ circumstance matters, not just an internalized inferiority complex.

Strongest, most invested students affected.

In fact, moderately identified did *better* with ST. A fine line between being motivated to do your best and being distracted from doing so...

Danger to getting too low identified…

Long-term consequence 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 identity and 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 (e.g., academic, science, etc.) as source of self-esteem.

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

ST can affect ***anyone***

- Most obviously (and disproportionately) affects historically marginalized groups
- But context - here academia - matters
- Any difference from the "in-group"
  - older person playing a memory game
  - smallest kid in a sport
  - engineer in a humanities class
  - student not familiar with U.S. pop culture

I hope I've now shown that…

Similarly, some of you may feel particular anxieties in your role as TA. Working with each other, with your mentors, and getting explicit feedback from students early on should help.

Personal experiences with ST

Can you think of a time you felt concerned that you might be unfairly judged and/or were eager to disprove a stereotype?

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

My example: moms as not being committed to their jobs.

[Keep in mind that OR As you have seen many of] you didn't have to *actually* be unfairly judged by *anyone* to experience anxiety. Similarly, recall that stereotype threat occurs whether the test itself – or the instructor him or herself– is biased or not. Strive not to take coldness or even direct claims of unfairness personally; stay supportive.

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

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 criticism with no context
  - student mistrust
  - disengagement from the task
  - misplaced efforts
- Perils of over-praising or under-challenging
  - same as above but in slightly different form
  - student underachievement, discouraging future effort

The key way is something Steele calls "wise" criticism… (relevant research is in my reference list, but also intuitive)

What are other types of criticism and why are they problematic? One is…

Mistrust: "attributional ambiguity" (Jennifer Crocker and Brenda Major) – e.g., due to racial bias or high standards? One response is "disidentification" (C. Steele).

Without context, students may focus on perfecting details and missing the big picture.

Similarly…

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

Wise criticism exercise

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?

So in summary, wise criticism is targeted, personal, and actionable. Now imagine that…

Reinforce: It's important to mention your belief that they personally can improve with more effort rather than giving vague exhortations to improve and/or vague praise. (Only if you mean it! If not, consider why not. Where have they demonstrated competence so far?)

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

Another way to reduce stereotype threat is by modeling certain behaviors explicitly…

My anecdote example: 5.12 my first semester here…

In other words: teach students to focus on the process, not the outcome, on the task at hand rather than some looming grade as a comment on their identity.

Finally, both… Modeling intra-group demonstrates achievement in MIT/BE environment possible; modeling 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
  - encourage autonomy and creativity, not grade-seeking
  - focus on our similarities – passion for BE!
- Find opportunities for collaboration
  - work in small groups *before* class-wide discussion
- 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)

Moving from small to large groups for recitation problems also gives extra time to those who hesitate due to taxed cognitive resources and anxiety, thus opportunities for participation to become 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. So keep in mind that best practices for teaching/learning are best for all. Not only because of effects on individuals, but also because of synergistic effects among the group that create a dynamic learning environment. A rising tide will lift all boats.

Acknowledgements

- Thanks to Instructor Beth Taylor and Professor Cathy Drennan in the Chemistry Department for helpful discussions and references.
- Thanks to Forest White and the 2008 BE Retreat Committee for giving me a chance to give a very (!) early draft of Part 2 of this talk.
- 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 a draft of this talk.

References

- See also papers cited directly on slides that show data.
- 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 threat overviews
  - Popular press summary: *http://www.theatlantic.com/magazine/archive/1999/08/thin-ice-stereotype-threat-and-black-college-students/4663/*
  - Book-length summary: C.M. Steele, *Whistling Vivaldi and Other Clues to How Stereotypes Affect Us*. (New York: W.W. Norton and Company, 2010).
- Wise schooling
  - Overview: C.M. Steele, *Am Psychol* **52**:613-629 (1997).
  - Wise criticism and mentoring: G.L. Cohen, C.M Steele, L.D. Ross, *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).

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