

## Reading seminar on *An Inclusive Academy*

### Notes from Week 4

#### Topics/Questions to Keep in Mind

- Facts or ideas you found Surprising, Interesting, or Troubling (SIT)
- Anything you didn't get to bring up last week.
- Beyond the three common mistakes in judgement that people make described at the beginning of the chapter, what other common mistakes in judgement do people make?
- What can we do to combat the three common mistakes in judgement, especially when we're on admissions or hiring committees?
- Were you surprised by the findings of the three studies presented on pages 74 and 75?
- The studies presented show that even experts are prone to making mistakes in judgement. Can you think of a time when you've made a mistake like the ones explained in the studies?
- Thinking in terms of schemas might not be familiar to all of us. Did you learn something interesting or new by reading about the role of schemas presented in this chapter?
- The authors briefly explained how "stereotype threat" can negatively affect students from specific groups on tests (pages 84–86). What are some things that we can do to try to reduce the effects of stereotype threat in exams that we create and administer?
- What did you think about the four examples of judgments of professional competence describes on pages 89–93? Were you surprised by the results of the fourth study in which scientists at universities were the subjects?

#### Recap from Discussion

##### Key topics/points discussed

- What data we might be able to use to track the decisions we're making.
- The series of studies.
- The workshop on grad school and how we might better-advertise and improve it.
- That not many students seem to be able to do UROPs and in pure math most UROPs should probably really be reading courses.
- Reasons to get rid of the GRE requirement in graduate admissions.

## Notes

### Data

- Action item: want to be more attentive to what the factors that are making us make certain assessments opposed to instincts. Really liked the discussion of actual data about what people did in various circumstances/how good people's judgement is/how systematically biased judgements can be.
- How much data do we have available to us? Do we have data on grad school candidates admitted/narrowly admitted, etc.?
- What systematic mistakes do we make?
- Privacy issues? Might not be useful or ethical, but maybe could be interesting.
- How do we compare people we rejected, etc.?
- MIT has a survey for students who we made an offer to but declined the offer. This is given a short time after grad school decisions are made.
  - We don't have any data tracking people who we made offers to 4/5 years after the fact.
- No survey for those we didn't make an offer to. How could we get them engaged to provide feedback? Would like to know if anyone has any ideas!

### On the series of studies

- Stimulated when methods were presented.
- Many almost always knew what results would be.
- Might hope that one's own responses would be different/less biased, but not sure if they would be.
- It is really important to make the point that people who are "truly exceptional" are recognized irrespective of gender. It is important to make sure people who come from an underrepresented group and aren't "truly exceptional" are measured on the same footing as others in the dominant group.
  - Sometimes "truly exceptional" depends on the environment. Many people felt "truly exceptional" before coming to MIT, but don't feel "truly exceptional" in the MIT community.
- One study showed how people shifted their standards. Would like to know how this affects us in admissions decisions.
  - With respect to the study, one could come up with reasonable arguments about why experience/education more important. Why do we come in with the particular preferences that we have?
- Fields that are more male dominated being perceived as requiring more innate ability than hard work.
  - Many often hear this opinion about math.

- The studies make me wonder if I should be trying to make my name sound gender neutral. Is that hypocritical?

### The study on response rate of meeting with potential doctoral candidates

- Frank Calegari was part of the study and posted about it on his blog: <https://www.galoisrepresentations.com/2014/05/11/are-business-schools-intellectually-bankrupt/>
  - E-mail looked bad/not well-designed
- Thought people would have used the short timing as an excuse to meet with people they had implicit preferences for.
  - But one day of notice is so soon that almost nobody would agree to meet with anyone they don't know.
- Links to the paper:
  - [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2063742](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2063742)
  - <http://libproxy.mit.edu/login?url=https://www.jstor-org.libproxy.mit.edu/stable/23262484>
- The point about the email looking like a “crackpot email” is very good. People without a lot of exposure to academia would have no idea what qualifies as a “good email” vs a “crackpot email.” Maybe the department could run workshops to help with this process.
- Michel would say “no” to same-day meetings with people he doesn't know. However, tomorrow he has two meetings with people he has never met before. Will discover tomorrow what they might discuss. Both asked a week early.

### Bias in applications

- A bigger problem is getting more diverse undergrads to consider grad school.
- The applicant pool in MIT math tends not to be very diverse. Maybe we can do more in terms of promoting people to have a path to grad school
- (Actually accept a higher percentage of women than in the application pool)
- (I agree that enlarging the pool is critical, but information about gender or race may be filtered through letters of recommendation, for example.)
- Minority/women don't apply if they think they won't get in, but White men just apply
- Want to point out: not lowering standards
- Women are likely to self-select and it partly caused lower number of applicants
- Gigliola checked with people at Brown, UChicago, Princeton, etc.: the number of women applying is getting lower over the years.
  - Might find out from AMS data from large state schools.
  - More women applying for stats, computational bio, applied math stuff

## On UROPs

- The Piazza discussion brought up an issue that is more concerning the UROPs for those interested in applying to grad school: a big barrier to get the education needed to be a strong grad school candidate.
- Really need to take 18.701/2 to do research in algebra, number theory, etc. Way prereqs are written you really can't do that until your junior year, and makes it very hard to apply to grad school
- Another barrier: less prepared students don't feel like they can get the permission of the instructor. White male students may feel like they can just skip prereqs. Also UROPs are mostly with people who ask professors/not advertised as much.
- Also, many students reached out to many professors and were rejected because of not having enough courses, etc.
- For applying to grad programs, it is important to note that a deficit in coursework can't easily be overcome with many early UROPs
- Also important to know that many grad students aren't ready to do research!
- One undergraduate student asked their advisor about UROPs and got the response "you should just take more classes" with no consideration if they could do a UROP.
  - Would the answer be different for a white man?
- Probably in pure math, a UROP should be more like an advanced reading course.
- Hard to find a real project that one can contribute to.
- Reading course type things could be a lot more useful.
- REUs, etc. might not have as much of an impact on admissions as students often think.
- When Henry was an undergrad, he did a UROP with Mike Hopkins that didn't lead to any publishable results (my results were greatly inferior to a preprint that came out that year), but it was still a really valuable intellectual experience for him.
- Note: there are a lot of opportunities at MIT that aren't available elsewhere. E.g., UROPs. There are many successful applications that don't have research papers, etc.
- Currently working on changing the messaging on the UROP page.
- Doing a "reading course" UROP is actually very useful. Will teach skills on how to do research and read papers.
- Trying to make it clear that this is what we can call a UROP. Postdocs and instructors can be great mentors for this too!
- Have a repository to search by topic, etc.
- Currently people are allowed to do UROPs that are reading courses. Really bad that people say no!
- Why do so many faculty turn down undergrads looking for UROPs?
  - If it's because they think most undergrads would not be productive enough, offering them an incentive to do urops wouldn't fix the issue
- Need to instruct faculty.
- Perhaps this goes back to our point about the study on emails. Maybe students could be guided in how to write UROP query emails to professors?
- Did the professors who rejected students want a UROP in the beginning?

- Many students sent cold emails
  - Often people just don't respond to cold emails. Guidance on UROP page/some other special page. Teach people how to write these emails
  - Hard to know how to write the email and not come off as a crank.

### On the workshop on grad school

- Many students (seniors) have never heard of this workshop.
- Need help to communicate well!
- Undergrads get info from undergrads.
- What's the best way to communicate?
- Something about this: hold them at hours that aren't during the day, post materials online (film them)
- In terms of advertising: had problems with low attendance in undergrad. Best way was to have professors announce in classes. For some reason this sticks in people's mind better (Esp. to classes like 18.100/18.701 and service subjects)
- Is advertising on the department website helpful or do students not look at our website?
- Have someone say it's never too early thinking about grad school.
- Asked 18.01, etc. to announce in classes, on stellar, etc.
- Should there be a lecture on what grad school is, etc. in 18.701?
- Perhaps the students don't realize how different the pure/applied math worlds are. I think both the problems and the solutions are potentially different.
- Might be good for *any* event to have all of the instructors announce things
- Couldn't hurt to be more aggressive about the advertising
- Advertising might be only one aspect: the other announcements aren't needed in other classes. People might not have friends, etc. that they see at the events
  - Put in more effort for kids who don't already feel welcome
  - Felt more comfortable going to events of different departments than same department
- Need more between events explaining grad school to getting to applying
- In last grad workshop, we had three grad students
  - Did not feel represented on the panel last fall
  - Not good representation for people who might want to apply elsewhere. Good to have contacts for MIT students who just went through the process and apply to other institutions.
- List of current grad students to e-mail who can answer questions (Peter and Araminta volunteer!)
- Use titles that suggest they'll give you info that you don't already have.
  - "Debunking myths"
- Better advertise fee waivers for grad admissions programs.
- How can we re-tune the expectation for what the needs preparation for grad school is?
- How can we help people understand why one might like to do a PhD in math?

- When experts read applications and you say “I did ---- research”, they can really judge the research.
  - They know it is a small problem.
  - Influential research is really rare.
  - One can often better learn the correct skills by doing a reading course, etc. with a professor.

### Around the GRE requirements in grad admissions

- Now we don't require the math/general GREs, but they're encouraged.
  - It is well-studied that the thing at the end of the sentence gets emphasis. Having “encouraged” at the end will make most people read the sentence as saying that the GREs are “required”.
- There is a lot of research showing that the GRE is a poor predictor of success in PhD programs.
  - Here's just one article, but there are many:
    - <https://cen.acs.org/education/graduate-education/future-GRE/97/i5#:~:text=The%20departments%20point%20to%20the,exam%20as%20white%20men%20do>
- Some applicants already do not submit scores and lack of GRE scores does not affect our ability to assess them.
  - No disadvantage to those with no GREs.
  - Many Europeans don't take the GRE.
  - Among 20 new incoming PhD students, 4 didn't submit GRE scores.
- It seems that the main thing in the way of completely getting rid of the GRE is inertia.
  - Inertia is never a compelling argument.
  - Probably the ETS is invested in maintaining the GRE.
- The cost of the GRE is quite high, as well as the cost of preparation materials.
  - This high cost helps further disadvantages low-income students.
  - Students also have to pay to send scores. Students will not generally apply to/send scores to schools they don't believe they'll get into. Women and students from underrepresented groups tend to undervalue their achievements, and we could be missing out on qualified candidates who don't even apply to MIT for these reasons.
- MIT Undergrad Admissions has removed the SAT subject test requirement. Student's cannot submit scores to the SAT subject tests (so that admissions officers cannot be biased by considering these scores anyway. We might look into the reasoning why admissions removed the requirement:
  - <https://mitadmissions.org/blogs/entry/a-special-announcement-about-sat-subject-tests/>
- The GRE requirement definitely discourages people from applying.
  - There are many myths that people tell that if you don't have a GRE score in the 99th percentile, then it is impossible to get into MIT. While these are not true, people believe them. This discourages people from applying if they don't believe that they even have a chance to get in.

- Example: A current MIT math grad student didn't apply to Berkeley because of GRE (even though the research was actually a better fit), and applied to MIT because they contacted a professor who said the GRE was not necessary. (It is important to note that many students will interpret "optional" as "required" and would not be comfortable asking an MIT professor they don't know about this.)
- The grad students in the discussion told various anecdotes about wasting a significant amount of time and money to take the GRE, without any benefit.
  - Preparing for the GRE took up a lot of time without any benefits of learning new math. Student's could have taken an extra course rather than wasted their time on the GRE. An extra course, etc. seems much more valuable.
  - Stories included having to drive to towns/cities many hours away to take the exam because test centers were full. This is a big waste of time/energy during the middle of the semester, and not everyone has the resources to be able to do things like this.
  - It is probably also worth undergrads hearing these kinds of stories.
- Certain fields are advantaged in the GRE.
  - For example, applicants from certain areas of applied math may be extremely well-qualified in their areas, but have not taken courses covering some things tested on the GRE as they're not tools that are particularly relevant to their research.
- Due to the COVID-19 pandemic, this year we are putting applicants at an unnecessary risk by making them take the GRE. At very least, this year we should not accept GRE Scores.
  - This is part of why MIT Admissions is suspending ACT/SAT requirements during this application cycle:  
<https://mitadmissions.org/blogs/entry/we-are-suspending-our-sat-act-requirements-for-the-2020-2021-application-cycle/>
  - [ETS has decided to make the general GRE online](#) so that people can take it at home. It is really unclear what the test will mean and if this is really a fair way to administer the test. As a result, many programs are dropping the GRE:  
<https://www.sciencemag.org/careers/2020/06/graduate-programs-drop-gre-after-online-version-raises-concerns-about-fairness>
- MIT is an influential place; abolishing the GRE may influence other schools to do the same. Since it is a nontrivial barrier to enter a math PhD program, this could help increase the size and diversity of the general applicant pool.
- Students from underrepresented groups often suffer from "stereotype threat" and systematically underperform on tests compared to their actual abilities. There is extensive research on stereotype threat. The following talks by Claude Steele (who was the first to research this) are a good introduction:
  - 2018 Steele talk at the Media Lab:  
<https://www.youtube.com/watch?v=HKxkl2WVEWQ>
  - If anyone is interested, Malcah can forward the information for the 2020 Steele talk. It has restricted Zoom access (she has already done this to the group mailing list).

- Do faculty have a good idea of what is currently tested on the GRE?
  - The test has changed many times over the years, and if faculty don't know the contents of what is being tested, it does not seem like the exam would be a useful admissions tool.
- The format of the test makes it impossible to do well for those who don't instantly answer questions.
  - The speed required to do well on the test does not seem to be a useful diagnostic tool for math research: research problems take a very long time to solve!
  - This advantages people who have had backgrounds in mathematics competitions.
- Summary of Henry's comments e-mailed to the group after the meeting:
  - A frustrating part of graduate admissions is people whose applications seem difficult or even impossible to assess. For example, imagine someone who attends a not very well known or prestigious college (there are several thousand in the U.S., of which at most a few hundred would be considered well known nationally). They do exceptionally well, getting an A or A+ in every math class offered at their college. However, relatively few classes are offered, and they are not at all sophisticated or demanding by MIT standards. The letters of recommendation say this is the most accomplished math major the faculty have ever taught. However, there aren't a lot of math majors, and just about none of them have ever gone on to get a Ph.D. In an ideal world, this student would participate in summer activities like REUs that would give a basis for comparison beyond their college, but suppose they didn't. Then the big question is how we can judge their application. There's nothing at all wrong with the application: they've done a great job in college and maxed out every measure of success that applies to them. However, they've never had the opportunity to do anything that would make a compelling case for admission to grad school at MIT. The ceiling is just too low.
    - There are a depressingly large number of people in this category every year. Of course they don't all apply to MIT, but each year there are various MIT applicants who have hit a low ceiling. Most of them probably just aren't qualified, but some of them are surely amazing. We just can't tell which ones.
  - Ideally, the GRE would help sort this out, by giving some standardized comparison. How often does the GRE help the applicant? Henry has seen a bunch of cases where it didn't help, with students who hit a low ceiling at college but then did poorly on the GRE. However, Henry doesn't recall offhand a case where it really helped someone get admitted
  - Key questions: how often does the GRE play a significant role in equity? How often are there admitted students we think would probably have been overlooked or misjudged if they hadn't had great GRE scores?
    - Would not suspect this happens often. If it does happen with some frequency, then it's worth thinking about how else we could make this sort of comparison.
- Data we can track:



- Does removal have an effect
- If we don't consider the GRE, we can then ask accepted students if they took the GRE. Maybe fewer people will take it.
- How often having a stellar GRE score helps a student from a diverse background who would not otherwise be admitted.

### Other points brought up

- As a rising senior with economics grad school plans: for econ, it is common to spend 2 years doing an RAship before grad school. Are there ways that MIT math can facilitate the transition, esp. for people without research experience or people who come from places not MIT?
  - Apply for an RA position at Microsoft Research! The economics RAs seem to have a great time and learn/accomplish a lot.
- Many things are long term solutions, with many years before actual results. The reading brought up thoughts about what we can do to make the people we have feel more included so that long-term things are more reachable.
  - Introductions at the beginning of courses could help to make students feel more seen/included.
  - Make UROP prerequisites more reachable.
- General view on 18.100A/P vs. 18.100B/Q: need to do this very challenging thing.
  - Turns people away from going down the path to pure math.
- Two interesting parts of the book: perception that already had, but supported by study.
  - If you are a woman/minority you have to use brainpower to fight against stereotypes and can't use it for research. Not valued enough!
    - In addition women may not realistically be able to work a couple days a month because they're really sick.
    - We all know about series that converge to  $\infty$  even though the terms are small.
  - In order to succeed, women are expected to behave assertive, etc., but can't do too much or you're considered "aggressive". A really thin line to walk.
    - Liked that they were worded in the right way.

### Concrete actions that we can start taking

- Inform faculty and instructors that UROPs can (and in many cases, should) be reading courses or more like reading courses.
- Create a repository of potential UROP "reading courses" for faculty and instructors.
- Consider not using GRE scores in graduate school applications.