# Holistic Review in Graduate Admissions

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## Covered this morning

- Why diversity?
- Legal landscape
- Research on admissions practices & why they are problematic
- Implicit bias
- Non-cognitive competencies

## Topics for this afternoon

- Review
- Your current admissions priorities
- Going deeper with non-cognitives
- Evaluation rubrics
- Student recruitment

Outreach: Build the pool → Admissions: Extend offers → Recruitment: Close the deal

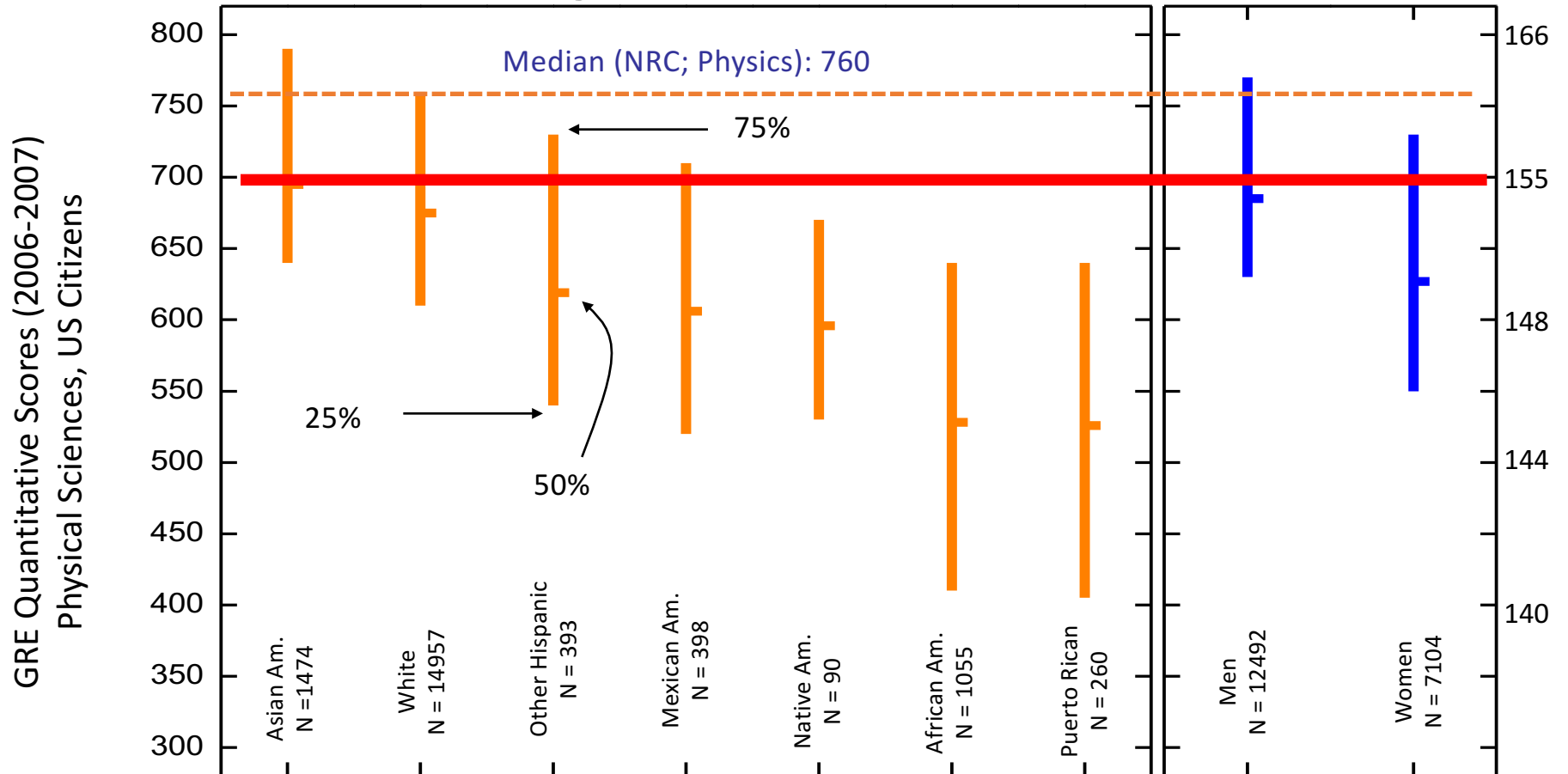Apply → Visit → Matriculate

# Common procedural barriers to admitting more diverse, successful cohorts of students.
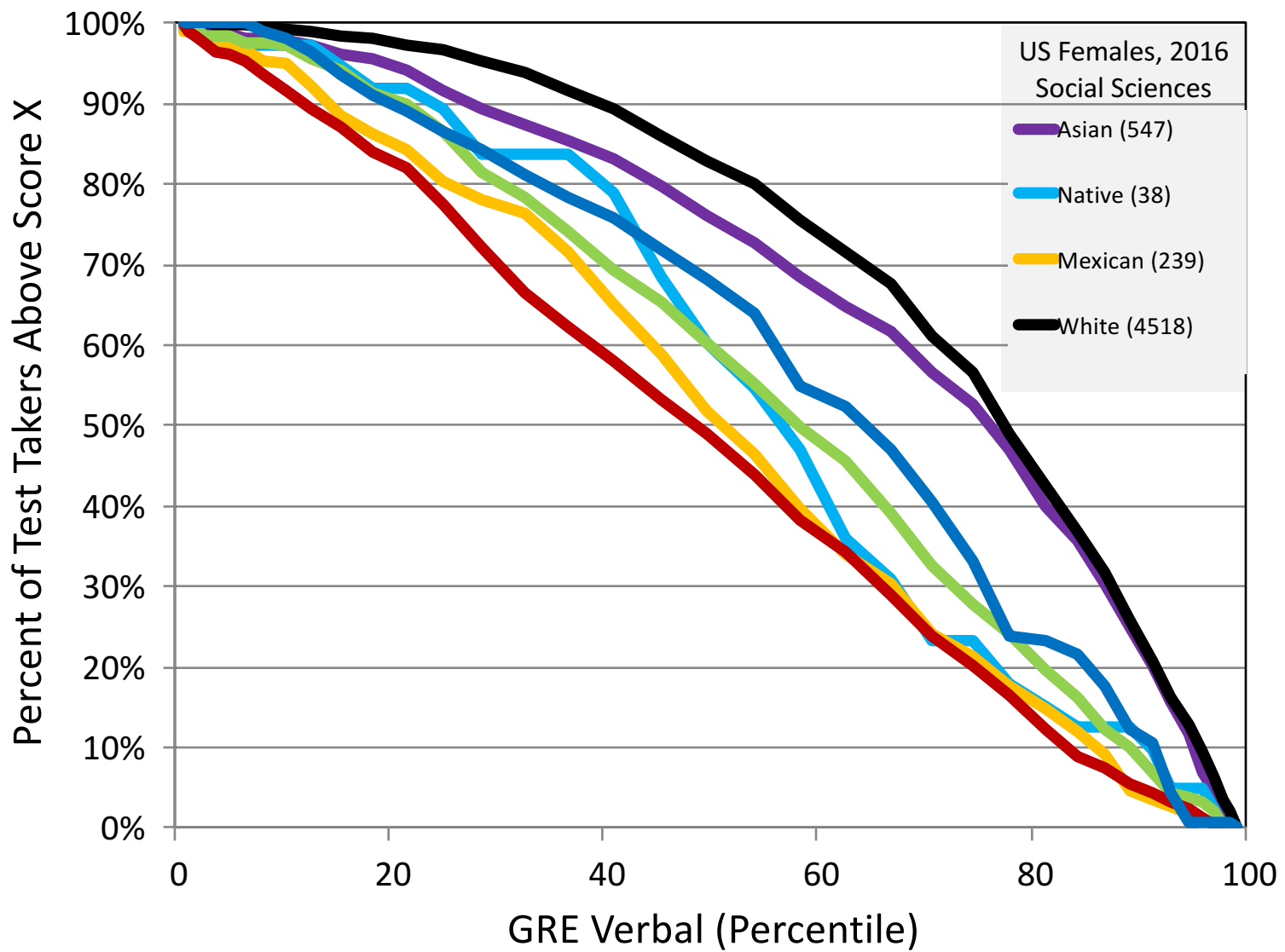
- Rigid use of high GRE score thresholds as an initial consideration, despite group variation in the distributions of high scores.
- Accounting for diversity late in the game, only after many students from key backgrounds have already been filtered from the pool.
- Substituting potentially controversial discussions of applicants with discussion of procedure.
- Comparing applicants with one another rather than with external standards of quality.
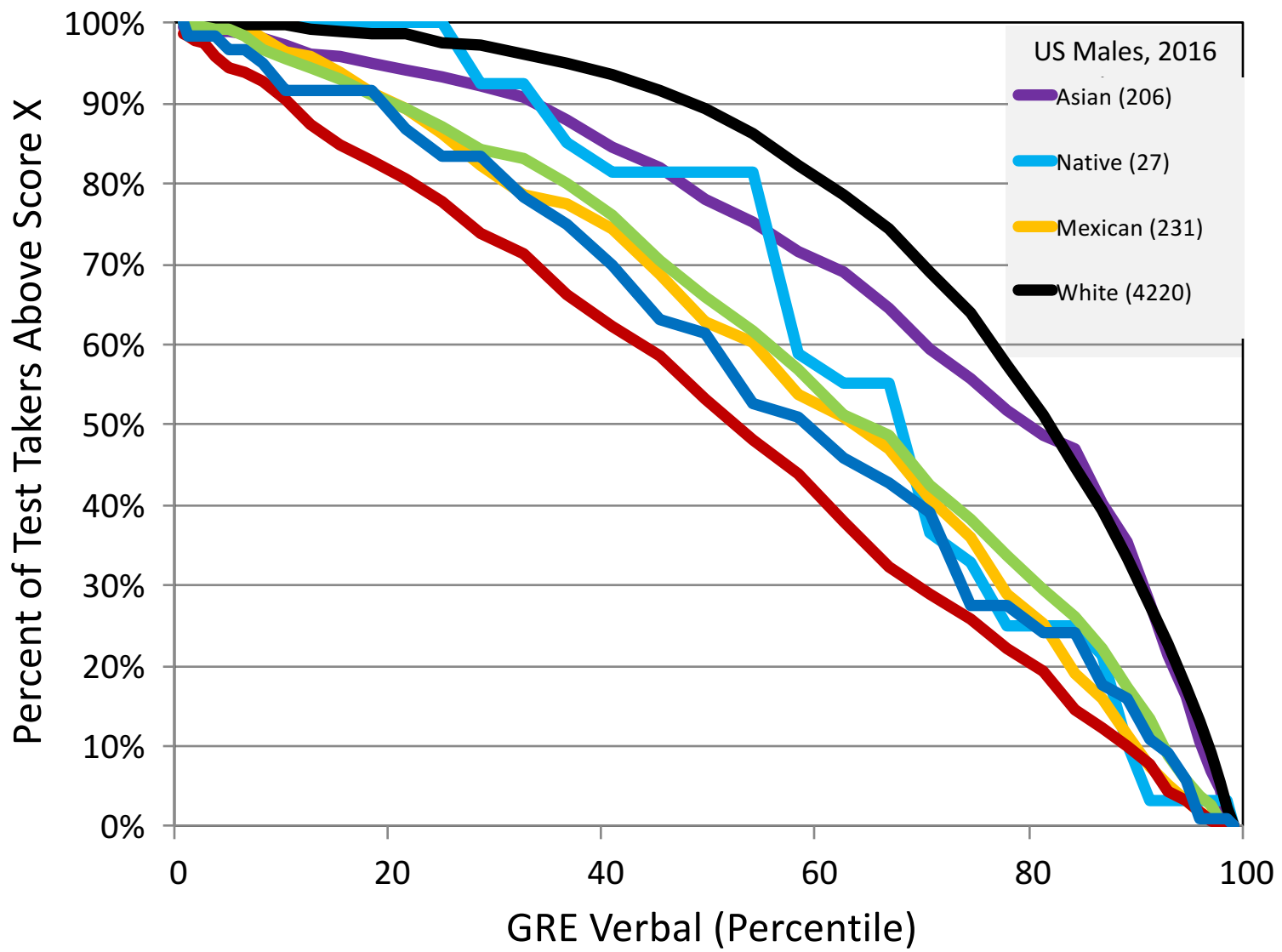- Conducting admissions as "matchmaking" without attention to the cohort.

# As a result of participating, you'll be equipped to lead your colleagues in the following:

1) Assess the role of the GRE (or at least begin conversation)

2) Develop & implement rubric-based admissions evaluation

3) Systematically look for non-cognitive qualities in students using that rubric

4) Assess strengths & weaknesses of current graduate recruitment efforts

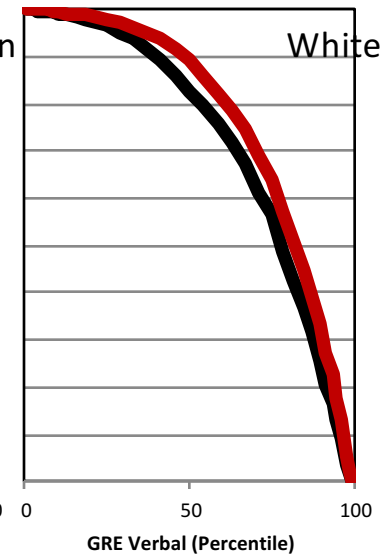From ETS document, "Factors that can influence performance on the GRE general test 2006-2007"

GRE Verbal (Percentile)

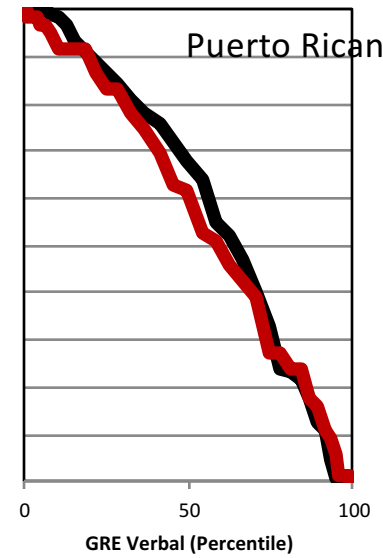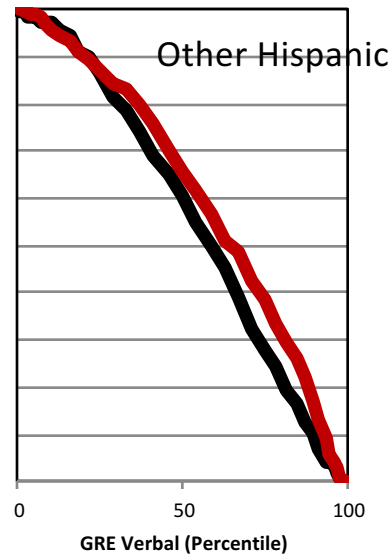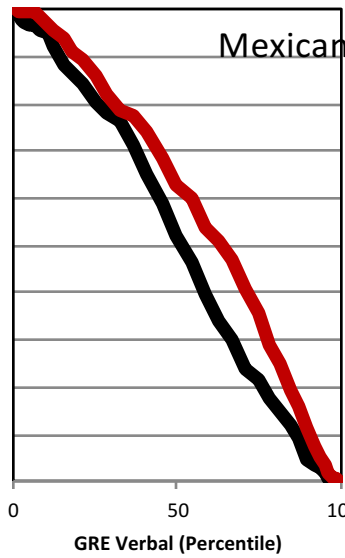Percent of Test Takers Above Score X

US Males, 2016
Asian (206)
Native (27)
Mexican (231)
White (4220)

GRE V Gender
Gap Male
Female

US Citizens
Social Sciences

Black

Native

Asian

Mexican

Other Hispanic

Puerto Rican

White

GRE Verbal (Percentile)

| GRE Physics Cut | Hispanic | | Asian | | Black | | White | |
|---|---|---|---|---|---|---|---|---|
| | Female | Male | Female | Male | Female | Male | Female | Male |
| 500 ($11^{th}$) | 59% | 86% | 85% | 93% | 43% | 64% | 74% | 90% |
| 600 ($32^{nd}$) | 23% | 50% | 58% | 78% | 12% | 30% | 41% | 64% |
| 700 ($55^{th}$) | 7.1% | 25% | 33% | 53% | 1.2% | 13% | 17% | 37% |
| 800 ($74^{th}$) | 3.2% | 10% | 15% | 31% | 0.0% | 4.9% | 4.8% | 17% |
| 900 ($88^{th}$) | 1.6% | 3.0% | 5.0% | 14% | 0.0% | 0.7% | 1.0% | 5.4% |
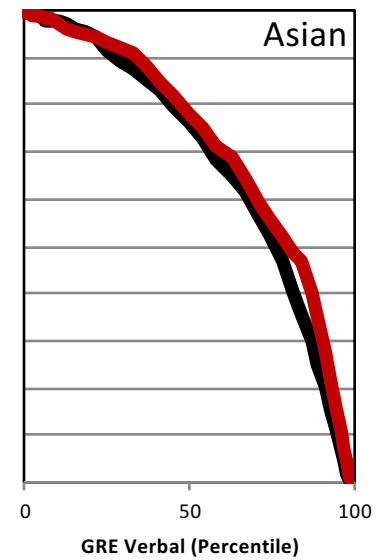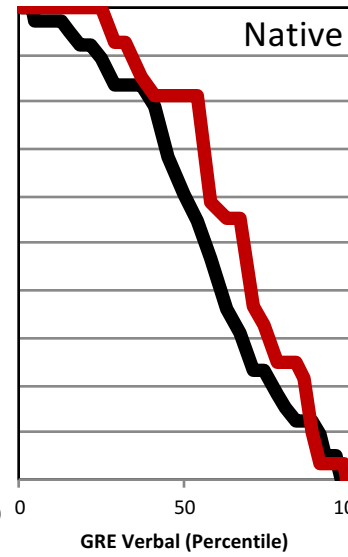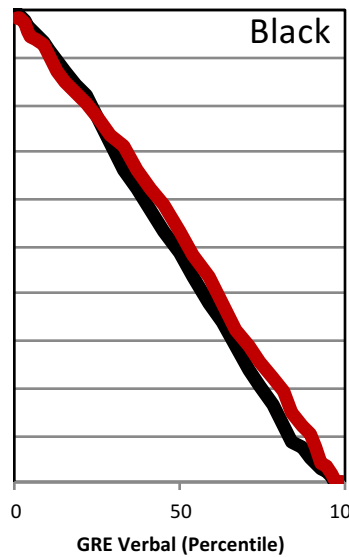
GRE Physics Subject Test — Test Years 6/2011-6/2016; US

US Male (N=10152)
US Female (N = 2472)

Testers Above Score

GRE Physics Score (Scaled, Percentile)

400    500    600    700    800    900

11%ile    33%ile    55%ile    74%ile    88%ile
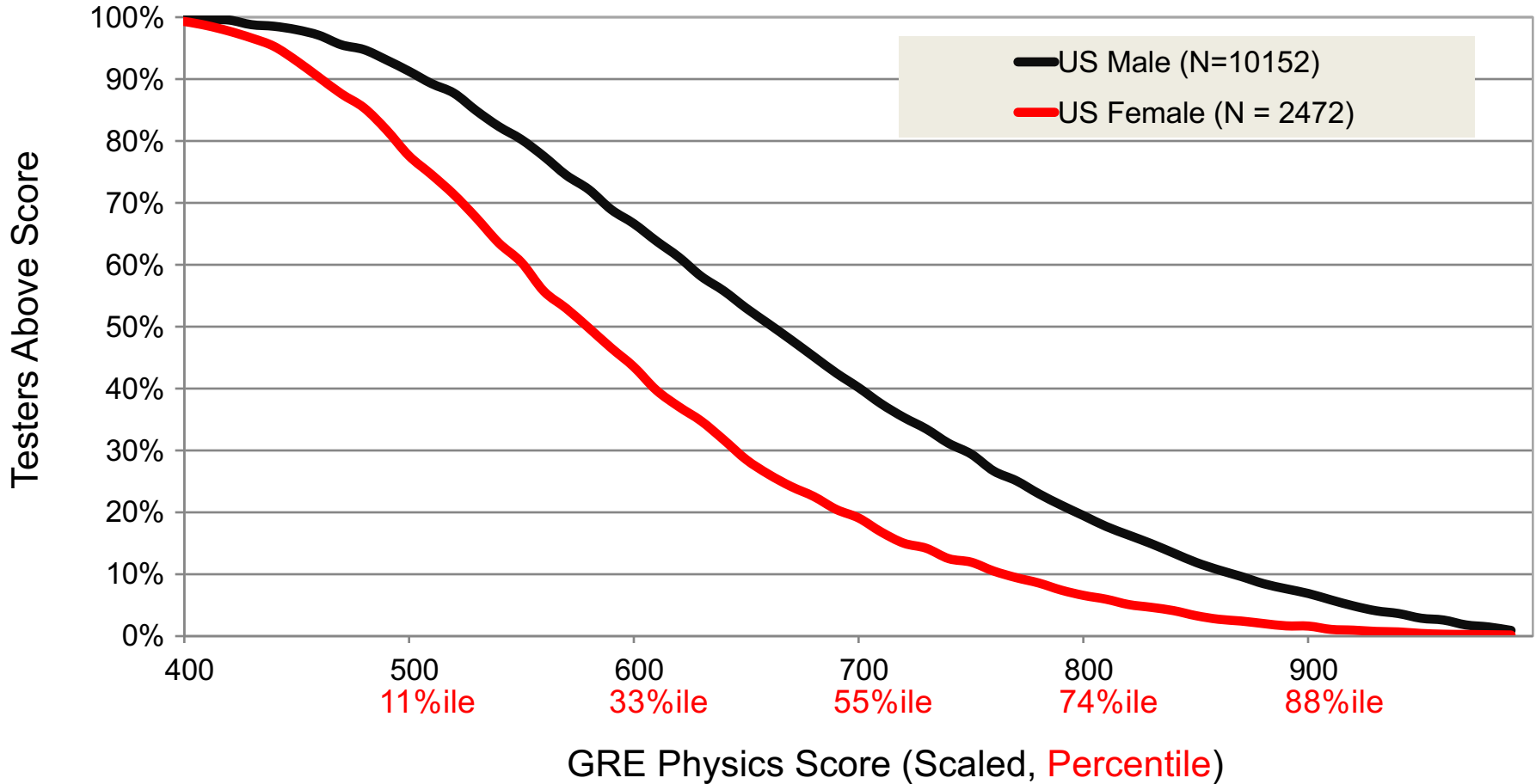
SOURCE: ETS

**Logistic regression for predicting PhD completion in physics programs**

| | US Male (df = 1890) | | US Female (df = 379) | |
|---|---|---|---|---|
| | Logit (SE) | Odds Ratio (SE) | Logit | Odds Ratio |
| (Intercept) | -2.05** (0.77) | 0.1** (0.1) | -4.46** (1.65) | 0.01** (0.02) |
| ug.GPA | 0.47* (0.18) | 1.6* (0.3) | 0.9* (0.4) | 2.5* (1) |
| GRE.Q. | 0.01 (0.01) | 1 (0.01) | 0.02 (0.01) | 1.02 (0.01) |
| GRE.V. | $-5 \times 10^{-6}$ (0.003) | 1 (0.003) | 0 (0.01) | 1.0 (0.01) |
| GRE.P. | 0.005 (0.003) | 1 (0.003) | 0 (0.01) | 1.0 (0.01) |
| NRC: 21-55 | 0.63*** (0.15) | 1.9*** (0.3) | 0.15 (0.3) | 1.2 (0.4) |
| NRC: 1-20 | 0.74*** (0.15) | 2.1*** (0.3) | 0.9** (0.34) | 2.5** (0.8) |

NOTES ON INTERPRETATION:
- Odds Ratio (OR)= $e^b$; SE= Standard Error
- OR>1.0 or <1.0 = Increased or decreased risk of the outcome compared to reference group;
- OR are multiplicative, so OR=2.0 is 2x the odds of the outcome.
- Asterisks: *=p<0.05; **=p<0.01; ***=p<0.001
- Reference group NRC Rank ≥ 56

Example:
US male PhD students in the top 20 NRC ranked PhD programs have a 2.1 times greater odds of completing the PhD than those enrolled in PhD programs ranked 56 or lower.

**Logistic regression for predicting PhD completion in physics programs: Limited statistical significance**

| | US Male (df = 1890) | | US Female (df = 379) | |
|---|---|---|---|---|
| | Logit (SE) | Odds Ratio (SE) | Logit | Odds Ratio |
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- Reference group NRC Rank ≥ 56

Example:
For US females, each additional point on the GPA scale for college grades is associated with a 2.5 times greater odds of completing the PhD, all else in the model held equal.

# What does the literature say about predicting student success?

- **Results of meta-analyses come to differing conclusions** (Morrison & Morrison, 1995; Kuncel, et al., 2001; Kuncel & Hezlett, 2010)

- **Kuncel & Hezlett 2007:** Validity of graduate entrance exam scores varies by exam and by graduate school outcome. However, it is consistently strongest for predicting first year grad school GPA.

- **Lovitts and Nelson 2000:** Women who did not complete the Ph.D. had a higher mean GPA than men who did not complete. Though they performed better academically, women left doctoral programs in higher numbers.

The usual weight given to GRE scores **exceeds its predictive capabilities** and has negative societal impact.

# Admissions Rubrics

Guide review of transcripts, statements, letters, interviews
- Combats reviewer fatigue
- Can expedite the review process
- Helps reduce implicit bias

Can be tailored to specific constructs

Inter-rater reliability

Add short answer items to probe non-cogs (develop in conjunction with a social scientist)

**Can be implemented now!**

| White Male Applicants | Female and URM Applicants |
|---|---|
| → Judged based on **potential** | → Judged based on **proven ability** |
| → Evaluators focus on **qualifications at the expense of shortcomings** | → Evaluators focus on **shortcomings at the expense of qualifications** |
| → Evaluators let **unique qualities** unlinked to competencies **override flaws** | → Evaluators **ignore unique qualities** that are unlinked to competencies |
| → Evaluators select candidates who have flaws but are **expected to succeed** | → Evaluators select candidates who are **guaranteed not to fail** |
| → Evaluators happy with a **"good fit"** | → Evaluators need a **"perfect fit"** |
| → Selected based on how they have performed (**absolute**) | → Selected based on performance of others in their group (**relative**) |
| → Evaluators **value homogeneity** | → Evaluators **ignore the "value-added"** of diversity |

# Strategies to Reduce Implicit Bias in Selection

- Devote adequate time.
- Avoid premature ranking (anchoring bias).
- Use a rubric or other evaluation form.
- Critically analyze supporting materials.
- Be transparent: What criteria? Are they the right criteria?
- Appoint diverse groups for file review and encourage maximum participation.
- Be accountable.  Be prepared to explain your decisions.
- Check your own implicit bias using the assessments at https://implicit.harvard.edu/implicit/

# Some introspection

A: Think about your
most successful students.

What qualities made them successful?

B: Recall your least successful students.

Write a few notes about why they did not work out.

What parts of your admissions
process select :
For A?
Against B?

Performance and Climate Indicators;
Strengths and Weaknesses

Shared Vision

Real self

Ideal self

vs

Action Plans
(Experiments)

Strategic
Plan
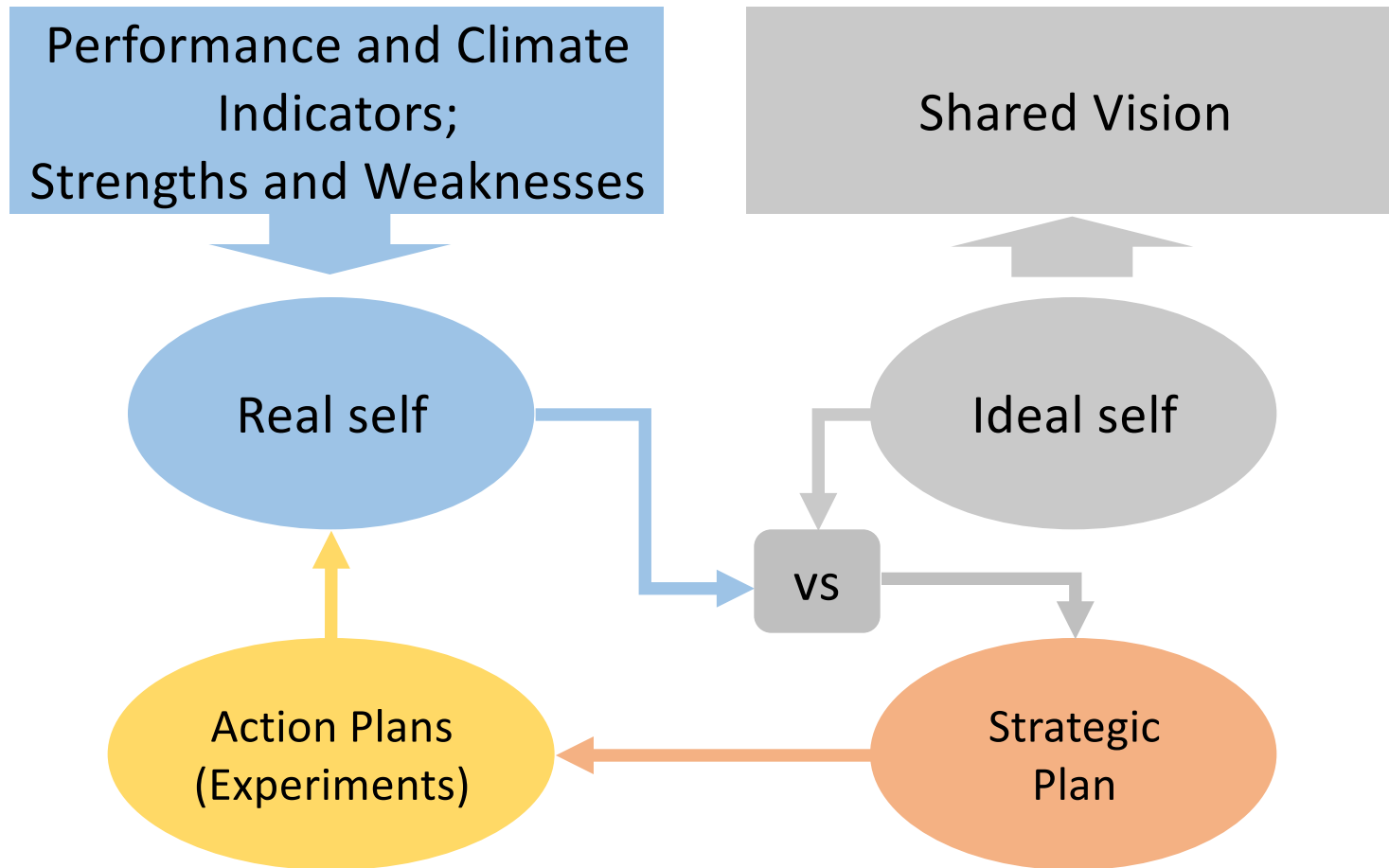
Van Oosten, E. B. "Intentional change theory at the organizational level:
a case study." *J. Management Development* 25.7 (2006): 707-717.

# NON-COGNITIVE COMPETENCIES

# Non-Cognitive Competencies

- Social and emotional skills that we use to navigate life.
  - Initiative
  - Persistence
  - Conscientiousness
  - Self-confidence

- Measurable!

- Results from decades of psychology research (developmental, social, and industrial-organizational)
  - Predict academic/job performance
  - Little, if any, group differences by gender and race
  - Orthogonal to cognitive measures (e.g., GPA, SAT/GRE)
  - Domain specific. Some will be specific to academia, grad school, and/or fields of study.

How important are these skills to students' success in research?

https://goo.gl/6FDd8m

# Results of your survey

Results in spreadsheet form are linked here

This is a link to graphs that auto generate based on the results

# Self Management
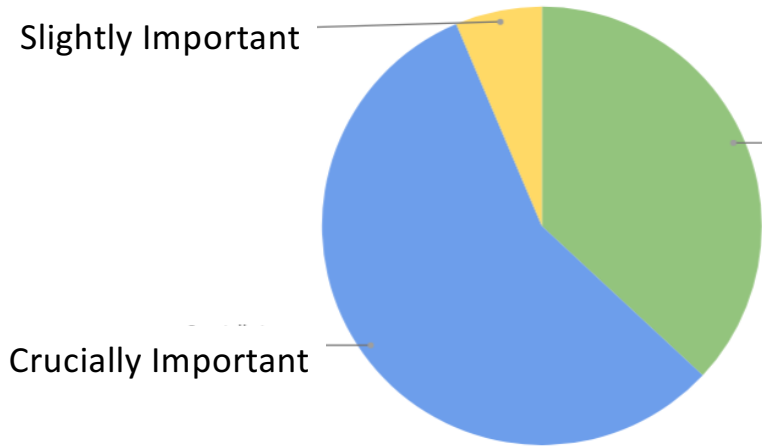
Slightly Important
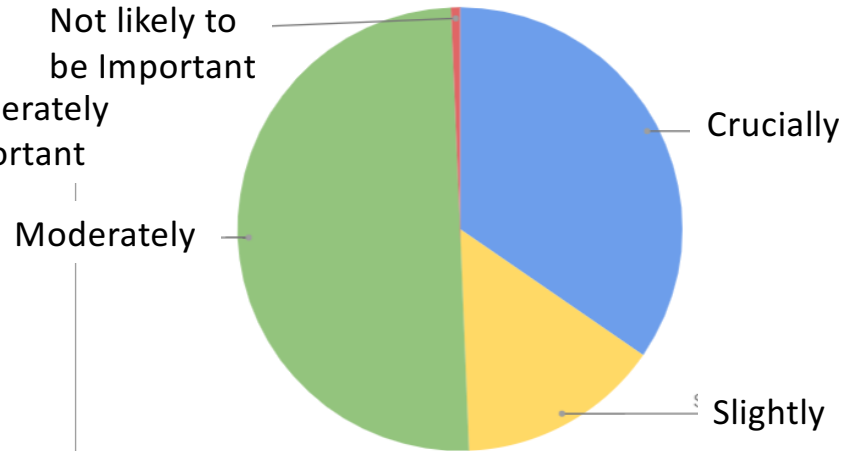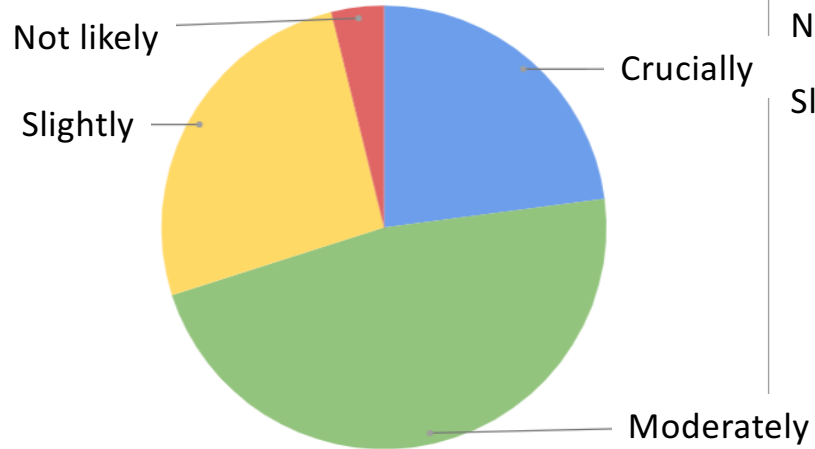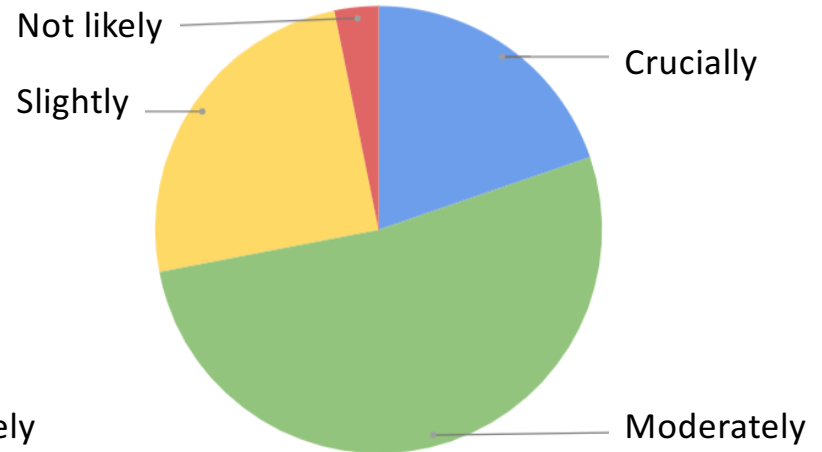
Crucially Important

Moderately Important

# Self Awareness

Not likely to be Important

Crucially

Moderately

Slightly

# Relationship Management

Not likely

Slightly

Crucially

Moderately

# Social Awareness

Not likely

Slightly

Crucially

Moderately

# Self Management



Moderately i...
44.4%

Crucially imp...
55.6%

# Self Awareness



Not likely to b...
3.7%

Slightly impor...
14.8%

Moderately i...
40.7%

Crucially imp...
40.7%

# Relationship Management



Crucially imp...
11.1%

Moderately i...
48.1%

Slightly impo...
40.7%

# Social Awareness



Not likely to b...
3.8%

Crucially imp...
11.5%

Moderately i...
53.8%

Slightly impo...
30.8%
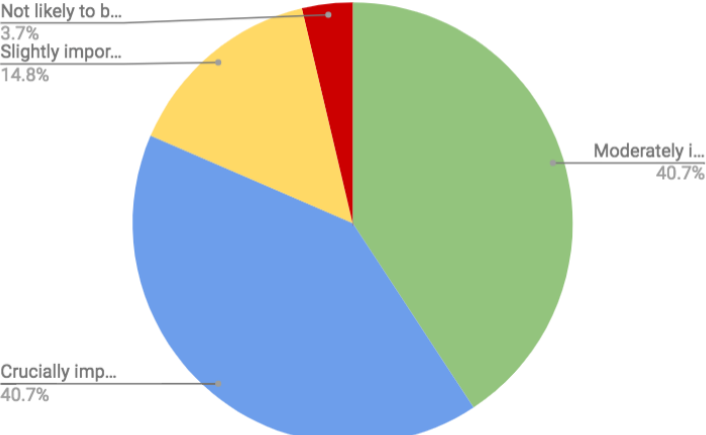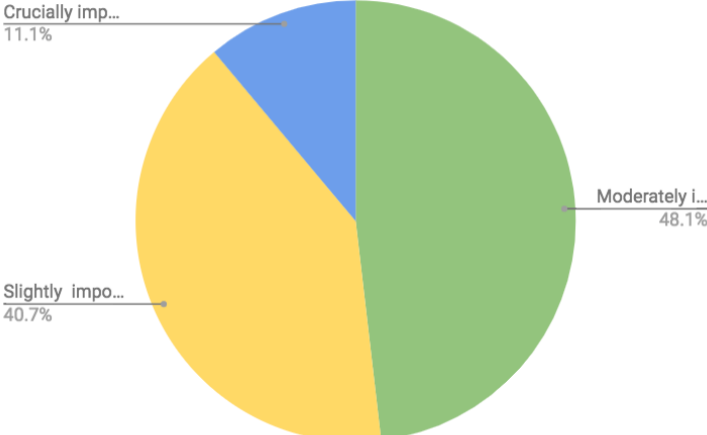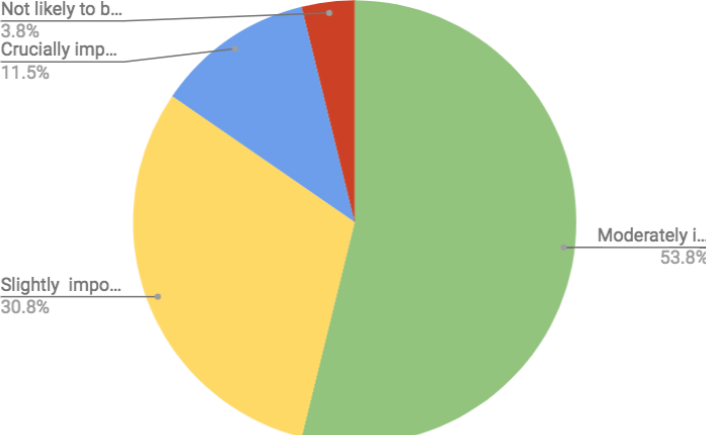
# Self Management

Optimism: Persistence in pursuing goals despite obstacles and setbacks.
Trustworthiness: Maintaining integrity.
Achievement Orientation: Striving to improve or meeting a standard of excellence.
Conscientiousness: Taking responsibility for personal performance.
Adaptability: Flexibility in handling change.
Emotional Self-Control: Keeping disruptive emotions/impulses in check.
Initiative: Readiness to act on opportunities.

# Self Awareness

Self-Confidence: A strong sense of one's self-worth and capabilities.
Accurate Self-Assessment: Knowing one's strengths and limits.
Emotional Awareness: Recognizing one's emotions and their effects.

# Relationship Management

Teamwork and Collaboration: Working with others toward shared goals and creating group synergy in pursuing collective goals.
Communication: Listening openly and sending convincing messages.
Building Bonds: Nurturing instrumental relationships.
Conflict Management: Negotiating and resolving disagreements.
Influence: Wielding effective tactics for persuasion.
Change Catalyst: Initiating or managing change.
Inspirational Leadership: Inspiring and guiding individuals and groups.
Developing Others: Sensing others' development needs, bolstering their abilities.

# Social Awareness

Cultural Awareness: Respecting and relating well to people from varied backgrounds.
Organizational Awareness: Reading a group's emotional currents and power relationships.
Empathy: Sensing others' feelings and perspectives, and taking an active interest in their concerns.
Service Orientation: Anticipating, recognizing, and meeting customers' needs.

# Recommended ways to assess non-cognitive competencies in admissions

**Look systematically for specific qualities in personal statements, letters of recommendation, and interviews**

- Consider exchanging personal statement for several short answer items
- Align these items to what qualities your program wants
- Use a rubric to define how you will recognize them in responses

## Samples

- If we called your faculty mentors, what would they say you are really good at?
- What are you most proud of accomplishing?
- Describe an academic challenge you faced, how you handled the situation, and what you learned from it.
- What will be the biggest challenge for you in graduate school?

# RUBRICS

# Rubrics offer benefits that redress common drawbacks in many programs' process.

- **EFFICIENCY** is enhanced, reducing faculty load.

- **STRUCTURE** for a process in which many applicants are compared on multiple dimensions.

- **CLARITY** about what reviewers *should* be looking for may reduce bias or unseemly considerations from creeping in.

- **TRANSPARENCY** about evaluation criteria is good for decision makers, their colleagues, and applicants themselves.

- **ACCOUNTABILITY** heads off charges that the process is unfair.

# Anonymous R1 Physics PhD Program on Efficiency

"…people just said it went faster for them with a rubric, because they knew what they were looking for, and knew they were being consistent. It's important that the range of values assigned to rubric criteria was small and each value had a clear definition."

# Anonymous R1 Physics PhD Program on Efficiency

Criteria they used this year to assess research accomplishments

## *Publications & presentations*

**0** No evidence

**1** Level of student-focused/regional conf; co-author of unrefereed pub (thesis or on-campus conf.)

**2** Level of professional conf. Of national scope or co-author of refereed pub

**3** Level of first-authored refereed pub

## *Variety & length of research commitment*

**0** None evident

**1** Comparable to a senior thesis

**2** Either worked with 1 adviser for 2+ years or multiple advisers over 2+ years (REU = 1 year)

## *Exceptional* creativity, productivity, or teamwork in research

**0** No evidence (should be typical grade in most cases)

**1** Evidence present in letters and/or essay

Developing a rubric:
# Identify qualities on which everyone should be evaluated.

- Here, knowing your program mission can be very helpful.
- Qualities can be broad if you want to leave room for individual interpretation & multiple ways for people to fulfill them
- Or, qualities, can be narrowly defined if you want a highly structured process.
- *Examples:* Research experience, Academic preparation, Clearly defined goals align with program expertise
- *Recommended:* If you choose to require GRE scores, fold GRE scores and grades into a single judgment of academic preparation, to prevent anchoring bias and/or attributing small differences in scores/grades into large differences in overall quality.

Developing a rubric:
## Define how you will measure/ operationalize the qualities named above.

- What does it means for an applicant to be outstanding, strong, acceptable, or weak on each of these?

- The more concrete your definitions, the more consistent you can expect your judgments to be.

- *Recommended:* Create space for comments to justify assessments; Leave open the possibility of naming unique strengths that merit special consideration.

- *Optional:* Weight some qualities more than others.

| Attribute | Score | | |
| --- | --- | --- | --- |
| | High | Medium | Low |
| Positive Self-Concept | Expresses confidence they can complete challenging goals, makes positive statements about abilities | Shows confidence and independence but may be unsure about adequacy or skills | Is unsure they can complete the program, exhibits low self-esteem |
| Realistic Self-Appraisal | Can clearly and realistically delineate strengths and weaknesses, works on self development | Has trouble identifying strengths and weakness but appreciates/seeks both positive and negative feedback | Over or understates abilities, does little to no self-assessment, does not appear to have learned from experiences |
| Preference for Long vs. Short Term Goals | Clearly communicates long-range goals beyond the PhD | Primary goal is PhD completion | Is vague about long-term goals, or goals are short term such as coursework |
| Support Person Availability | Can define a professional support network including mentors | Expresses support from one individual, or family or community | Expresses little or no support from family or institution for goals |
| Leadership/Community Involvement | Demonstrates involvement and leadership ability in either academics, family, community, religious group, or athletics | Demonstrates involvement in groups in academia or extramural but has not shown leadership | Not involved in institutional or community group, no demonstrated leadership |
| Knowledge in a Field/Non-Traditional Learning | Has engaged in, and learned from, experiences outside the classroom, i.e. performed independent research, extramural activities, self-taught skills | Shows some evidence of non-traditional learning experience | Has not engaged in or indicated learning from experiences outside the classroom |
| Perseverance | Can describe a time they failed or encountered an obstacle and successfully coped. | Can identify a time they hit an obstacle but has trouble defining how they overcame the challenge. | Has little experience with failure/obstacles. Cannot provide an example or describe response |

Modified from Sedlacek : Designed for assessing population of underrepresented minority students

| item | subitem | High | Medium | Low |
|------|---------|------|--------|-----|
| Fit with program | | | | |
| | | | | |
| | | | | |
| | | | | |

| item | subitem | High | Medium | Low |
|------|---------|------|--------|-----|
| Fit with program | research | research interests align with multiple faculty in multiple subfields | research interests align with multiple faculty in one subfield | limited alignment between student interests and faculty expertise |
| | faculty | someone wants to hire as RA now and/or there is a clear fit with current faculty expertise | someone could supervise, but interests do not directly support a faculty member's work | faculty aligned with applicant's interests are not seeking students |
| | community | has clearly contributed positively to prior department/school culture, and would do the same for our program | some evidence of participating in service activities | applicant only discusses him/herself; no evidence of engagement in department or university activities |
| | diversity | applicant has been an active advocate for diversity | applicant has been an advocate for diversity, or contributes to another type of diversity the department seeks | contributions to diversity are unclear from the application |

| item | subitem | High | Medium | Low |
|---|---|---|---|---|
| Academic Preparation | Physics Coursework | A- or better in all: CM1&2, EM1&2, QM1&2, SM1 | B or better in all: CM1&2, EM1&2, QM1&2, SM1; OR A- or better in CM1, EM1, QM1, SM1 | A- or better in EM1 and CM1; B average in advanced courses; any C grades without explanation |
| | Math Coursework | Real and Complex Analysis, Group Theory with A grades | DiffEq, Linear, and a Math Methods course, all with A grades; or more than this with B-A grades | Bare bones math prep (e.g., up to DiffEq), or low grades regularly on math |
| | Computational Coursework | one year or more of computational physics or equivalent, with no grade below A- | one computational physics course or equivalent programming with B or better | no formal programming apparent or low grades |
| | Academic honors and/or recognitions | multiple honors, e.g., Dept/University Honors; Phi Beta Kappa, etc | one academic award/recognition | No academic honors in college documented in the application |
| Research | variety/duration | two years in research | one year in research; only REUs | nothing more than coursework laboratories |
| | technical skills | a variety of experiment, theory, and/or computational skills | has developed only one class of skill (exp or theory or comp) | nothing more than coursework laboratories |
| | dispositions | clear commitment to and enthusiasm for research; AND understands what the process entails | clear commitment to and enthusiasm for research; OR understands what the process entails | not clear if they know what they are getting into with a PhD; seems lukewarm about research |
| | clarity of interests | student has specific interests, is clear about details, and expresses understanding of the big picture implications | student can state interests but they are general or superficial | student does not have clearly stated interests |
| Fit with program | research | research interests align with multiple faculty in multiple subfields | research interests align with multiple faculty in one subfield | limited alignment between student interests and faculty expertise |
| | faculty | someone wants to hire as RA now and/or there is a clear fit with current faculty expertise | someone could supervise, but interests do not directly support a faculty member's work | faculty aligned with applicant's interests are not seeking students |
| | community | has clearly contributed positively to prior department/school culture, and would do the same for our program | some evidence of participating in service activities | applicant only discusses him/herself; no evidence of engagement in department or university activities |
| | diversity | applicant has been an active advocate for diversity in physics | belongs to an underrepresented identity group; first generation in college or low SES; and/or contributes to another type of diversity the department seeks | contributions to diversity are unclear from the application |
| Non-Cognitive Competencies | Achievement Orientation | Consistently strives to improve or meet a high standard of excellence in all areas | Has demonstrated a high standard of excellence in selected areas | No evidence of striving for excellence provided in application or student record |
| | Conscientiousness | Takes responsibility for personal performance, both the good and the bad; AND demonstrates efficiency and organization | Takes responsibility for personal performance, both the good and the bad; OR demonstrates efficiency and organization | No evidence of taking responsibility for performance AND minimal evidence of efficient, organized work |
| | Initiative | Consistently seeks out or acts on opportunities AND takes leadership | Consistently seeks out or acts on opportunities AND takes leadership | Has not sought out or taken advantage of opportunities AND does not have a record of leadership |
| | Teamwork and Collaboration | Successfully worked with others toward shared goals in research and/or extracurriculars | May have a preference for individual work, but application describes prior work with others. | No clear evidence of prior collaborative work |
| | Perserverence | Application clearly describes successful coping with failures/ obstacles | Basic or perfunctory description of overcoming challenges | Application does not describe experience with failure/obstacles |
| | Realistic Self Appraisal | Thoughtful & clear assessment of strengths and weaknesses; Evidence of working on self | Basic statements about strengths and weaknesses | One dimensional assessment of abilities (over or understated); little evidence of self-assessment or |

Full physics example linked here.

# Develop Specifics for Rubric

Using the rubric

- A rubric is only as beneficial as users' fidelity to it.
- Calibrate and increase inter-rater reliability by having all members independently rate two applications, then meet to discuss how they came to their scores.
- Ensure each application is reviewed by 2+ people. If there is significant divergence in the ratings, bring in a third reader.
- Prepare in advance a plan to subject very unique cases to a different sort of evaluation.

# Practice with Rubric and Short Answer responses

Focusing on yield

# RECRUITMENT

Institutional actions

Outreach:
Build the pool

Admissions:
Extend offers

Recruitment:
Close the deal

Apply

Visit

Matriculate

Student actions

Location
5
4
3
2
1
0

Quality of
Interactions

Faculty
Quality

Institutional
Reputation

Financial
Support
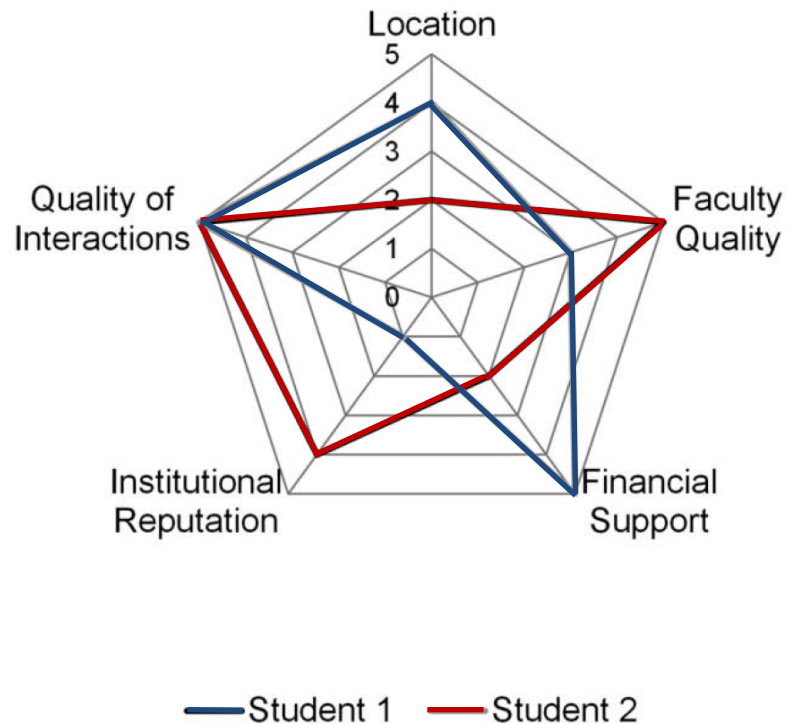
Student 1   Student 2

Bersola et al. (2014).

Importance placed on various institutional characteristics by two prospective students.

*Consider: Which one would be easier to attract, if the students were considering your program?*

Bersola et al. (2014).

# FACULTY MAY MISJUDGE WHAT IS IMPORTANT TO STUDENTS' MATRICULATION DECISIONS.

**What faculty thought**

- Financial aid is paramount

**What non-matriculants said**

- 77% of non-matriculants said they would have still enrolled at their current institution if Western University had matched their current institution's package.

Bersola et al. (2014).

# FACULTY MAY MISJUDGE WHAT IS IMPORTANT TO STUDENTS' MATRICULATION DECISIONS.

**What faculty thought**

- 85% rated their yield activities as "strong" or "above average."

**What non-matriculants said**

- When asked "which institution gave a more favorable impression," 60% named their current institution, 27% rated them the same, and only 13% rated Western University higher.

# Recruitment strategies used by high-diversity STEM programs in research universities

**Psychology**

- Website revamp
- Creation of a diversity-focused curriculum track
- Coffee hour during campus visit weekend for "straight talk" about diversity in the department.
- Beware the risk of bait & switch

Slay, Posselt, & Reyes (2017)

**Applied physics**

- Individualized curriculum
- Prominent role of administrative staff in all facets of program life.
  - "Eyes & ears of the department"
  - Family-like roles with prospective & current students
  - Cultural translators to aid faculty in serving students across race & gender
- Climate as a "competitive advantage" in the admissions process.

Posselt, Reyes, Slay, Kamimura, & Porter (2017)

# Domains of recruitment work

*DISCUSS:*

Which of these are strengths & weaknesses in your department? How could you shore up weaknesses?

- Online messaging
- Programming & points of connection for students
- Financial aid
- Faculty composition
- Faculty responsiveness & one-on-one contact
- Student ambassadors
- Climate for diversity

# FACILITATING CHANGE

# Frameworks for organizational reform

**Concession to external pressure**

- Changes are reactions to litigation-generated orders or protest demands.
- Change agents are either provocateurs or 'street- level bureaucrats'.

**Institutional self-improvement**

- Change is a negotiated response to align policy & practice with changes in the environment.
- Changes are therefore proactive, forward- looking, self-generated.
- Change agents are designers, strategists, stewards of the organization.

# Institutional self-reform comes with several important advantages.

1. When changes are self-generated, resources can be spent, allocated, and sought on your own terms.

2. It builds buy-in among those who are participating in the change process and/or affected by it. Compliance is voluntary, and therefore not begrudged.

3. When you bring in people to catalyze and guide change, people are less likely to be defensive. Change happens on your terms.

4. The most effective methods for increasing workforce diversity result from actions taken by people within institutions/ organizations.

Carle, S. (2008). Progressive Lawyering in Politically Depressing Times: Can New Models for Institutional Self-Reform Achieve More Effective Structural Change? http://ssrn.com/abstract=1087119.