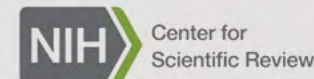
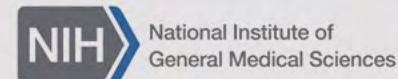
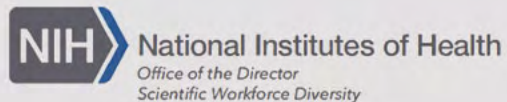




# Understand and Mitigate Potential Biases Maximizing Investigators' Research Award (MIRA)

Science Workforce Diversity, NIH Office of the Director  
National Institute of General Medical Sciences  
Center for Scientific Review





# Educational Module Objectives

- ◆ Increase your awareness of how implicit bias might occur in the MIRA review process.
- ◆ Provide you with strategies to mitigate effects of bias and ensure objectivity and fairness throughout the review process.





# Bias Module Outline

1. Decision points in the MIRA process – potential for bias
2. Scientific evidence that bias (implicit or explicit) affects judgment and decision making in a variety of situations including in peer review of manuscripts and grant applications
3. General principles for recognizing and mitigating effects of bias on decision making
4. Recognizing and mitigating potential biases in review:  
Case studies



# Maximizing Investigators' Research Award (MIRA) Submission to Award: Decision Steps





# Why are we undertaking implicit bias training?

MIRA reviews present an excellent opportunity to pilot an implicit bias training program:

- ◆ Person -based award
- ◆ Size of the MIRA program is ideal for a pilot

Data thus far show no statistically significant differences in success rates between demographic groups for ESI MIRA awards. However, that is not an argument against implicit bias training particularly given that NIH's mission to fund the most impact science is dependent on assessments free of bias.





# Bias: Definition and Impact

- ◆ Tendency or inclination toward or against something or someone
- ◆ Often based on stereotypes (about race, ethnicity, gender, religion or sexuality), rather than actual knowledge of an individual or circumstance
- ◆ Results in judgments that lead to rash or inaccurate decisions
- ◆ Increases susceptibility to “stereotype threat” - behaving in ways to avoid confirming a common stereotype one’s own particular group
- ◆ Bias can be implicit and/or explicit

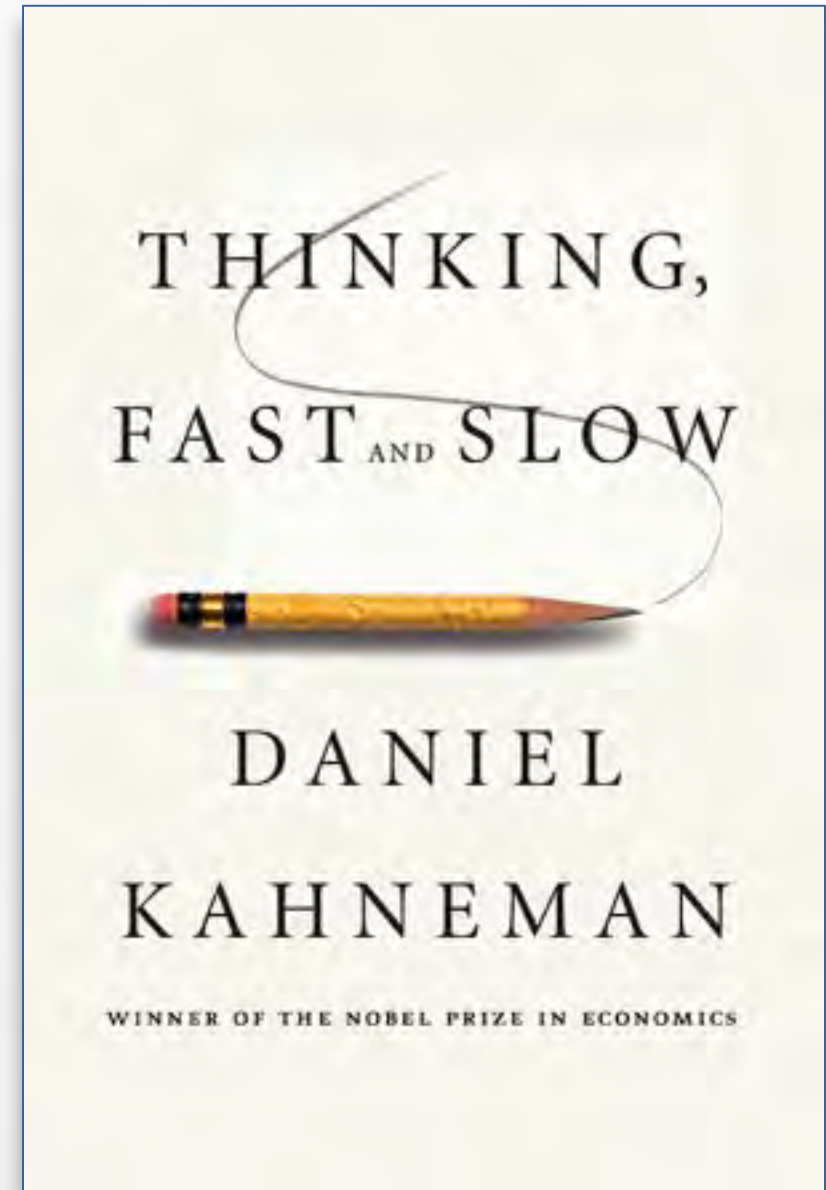
BIAS!



# The Science Behind Implicit Bias

Daniel Kahneman – Nobel Prize-winning psychologist: “mental shortcuts” lead to errors caused by:

- ◆ Overweighing evidence
- ◆ Ignoring baselines
- ◆ Only recalling certain aspects of information to inform a judgment

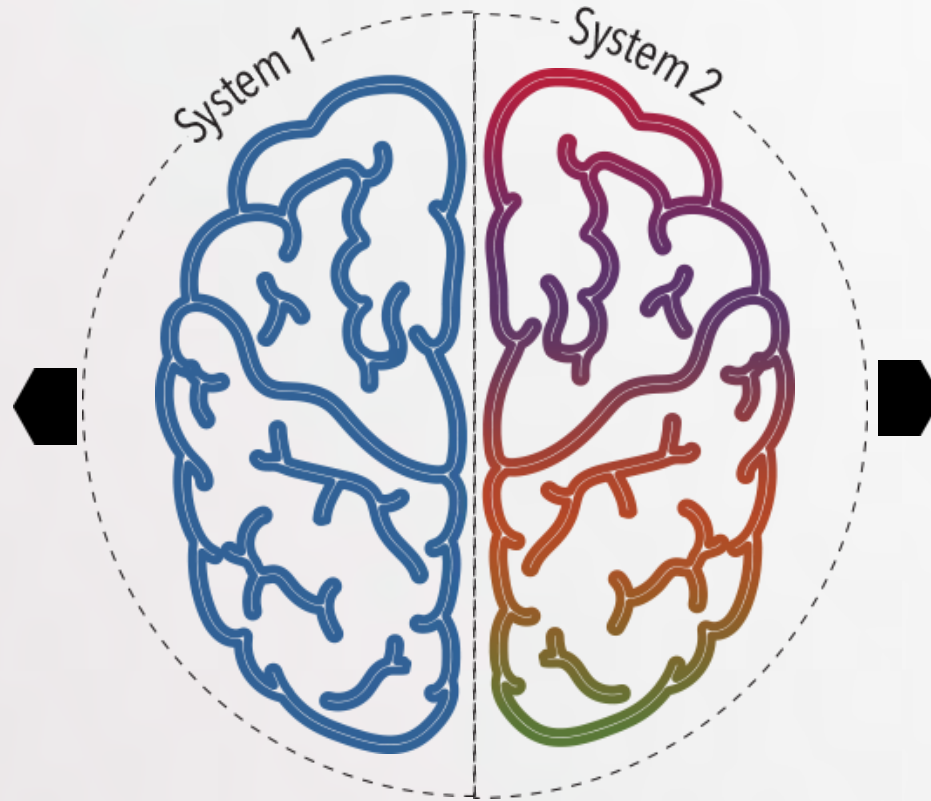




# Brain Mechanisms of Cognitive Bias

## Dual-system models of the human brain

Automatic, fast, and unconscious  
More dominant in decision making due to cognitive busyness, distractions, time pressures, or automatic thoughts



Enhanced when decision involves an important object or personal relevance and when decision-maker is held accountable

Cognitive biases have practical (efficiency) implications in clinical judgment, entrepreneurship, finance, and management





# Cognitive Biases that Affect Scientific Decisions

## Confirmation bias



Reviewers were strongly biased against manuscripts that reported results contrary to their theoretical perspective

Mahoney, M.J. Cogn Ther Res, 1977

## In-group bias



Men were more successful than women (manuscript acceptance) when the reviewers were all male.

Murray et al., 2018

## Halo (Matthew) effect



Among equally talented scientists, early funding success creates and perpetuates a cumulative advantage over time.

Bol et al., PNAS 2018;115:4887-4890.

## Group think



Study section discussion increased preexisting differences between study sections in their evaluation of the same grant proposals

Pier EL et al., Res Eval. 2017;26(1):1-14.



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4. Recognizing and mitigating potential biases in the review process: Case studies



# Impact of Bias on Decisions in Scientific Settings



AMERICAN  
SOCIETY FOR  
MICROBIOLOGY

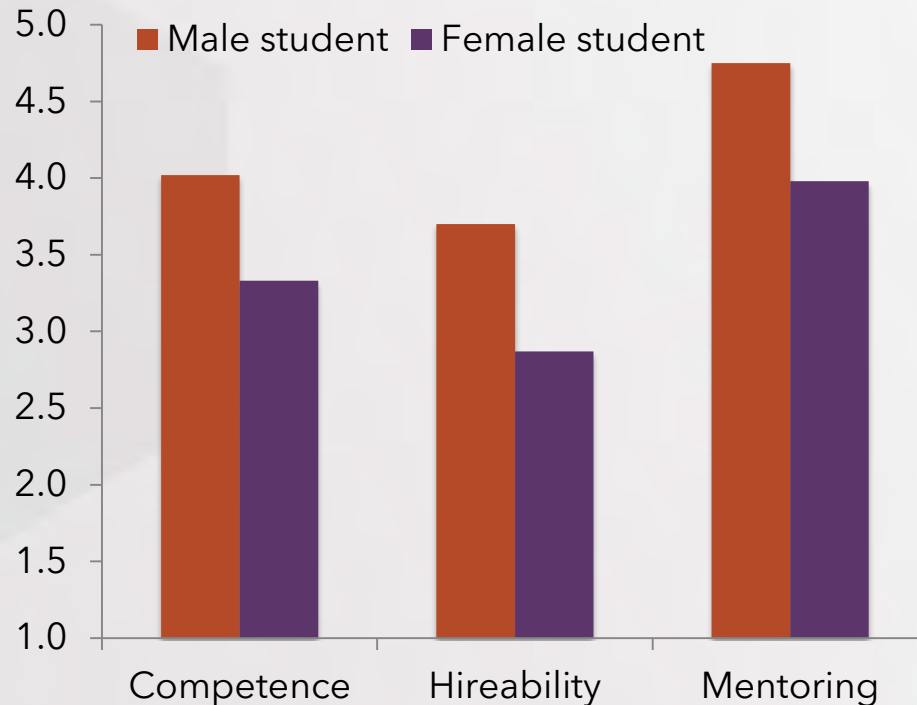
*“While most faculty and scientists believe that they are fair and unbiased, numerous well-designed studies published in leading peer-reviewed journals show that gender bias in sciences and medicine is widespread and persistent today in both faculty and students.”*

- 
- ◆ Scientific workforce diversity
    - Hiring, promotion, grants, tenure
  - ◆ Peer review and grant proposal success
  - ◆ Grading of faculty by students and trainees
  - ◆ Respect, salaries, institutional culture
  - ◆ Patient care and research subjects



# Evaluations in Academic Science

A nationwide sample of biology, chemistry, and physics professors (n=127) evaluated application materials of an undergraduate science student (female or male) for a lab manager position.



1. Both male and female faculty participants rated the female student as:
  - Less competent
  - Less hireable
  - Offered lower salary (\$3.7K)
  - Less mentoring
2. Even though the female was rated more likeable



# Gatekeeper Characteristics Affect Outcomes of Scientific Peer Review

- ◆ Gender disparity greatest when reviewers were all male
- ◆ Mixed-gender reviewer teams lead to more equitable outcomes
- ◆ Manuscripts more likely to be accepted when reviewed by at least one gatekeeper from the same country as the corresponding author



Gender and international diversity improves equity in peer review (2018, bioRxiv)  
Dakota Murray, Kyle Siler, Vincent Larivière, Wei Mun Chan, Andrew M. Collings, Jennifer Raymond,  
Cassidy R. Sugimoto – submitted to PLOS Biology



# Bias Module Outline

1. Decision points in the MIRA process – potential for bias
2. Review the scientific evidence that bias (implicit or explicit) affects judgment and decision making in a variety of situations including in peer review of manuscripts and grant applications
3. Evidence-based principles for recognizing and mitigating effects of bias on decision making
4. Recognizing and mitigating potential biases at each stage



# Debiasing: How to Reduce Cognitive Biases in Yourself and in Others

**Research** suggests that cognitive debiasing does work in some cases, and proper training and interventions can help reduce certain biases\*

- ◆ Raise awareness (Devine et al. 2017)\*\*
- ◆ Broaden images of success (Gołowska et. al, 2013)\*\*\*
- ◆ Be consistent in judgment and evaluation criteria
- ◆ Avoid ambiguity and time pressure
- ◆ Use bias interrupters: Practice speaking up when bias perceived\*\*\*\*

\* Lutz Kaufmann et al., Journal of Business Logistics. 2009

\*\* A Gender Bias Habit-Breaking Intervention Led to Increased Hiring of Female Faculty in STEMM Departments.

\*\*\* Counter-stereotypic thinking decreases stereotyping and increases creative ideas

\*\*\*\* Joan Williams: Harvard Business Review. 2014: Identify type of bias and be ready to speak up



## Criteria, Clarity, Consistency

- ◆ **Clarify** what **criteria** are most important BEFORE evaluation
- ◆ Be **consistent** in applying the criteria
- ◆ Use and stick to the same set of criteria for everyone under consideration
- ◆ If the benefit of the doubt is given to one person, make sure that it is given to ALL
- ◆ Be aware of shifting standards
- ◆ Pause and ask questions



### Guidelines for Blocking Bias

Stanford Center for the  
Advancement of Women's  
Leadership





# Bias Module Outline

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4. Recognizing and mitigating potential biases in the review process

# SRO Scenarios

Recognizing potential biases you may hold



# SRO Scenario 1 – Situation

- You are recruiting reviewers for your upcoming panel. You need expertise in stem cell biology and the best candidate in terms of expertise and accomplishments seems to be Dr. X (foreign name).
- Instead of reaching out to Dr. X, you move on to the next person in your QVR hist list, Dr. Y (American name), because you are concerned that Dr. X will have an accent and be difficult to understand.

