

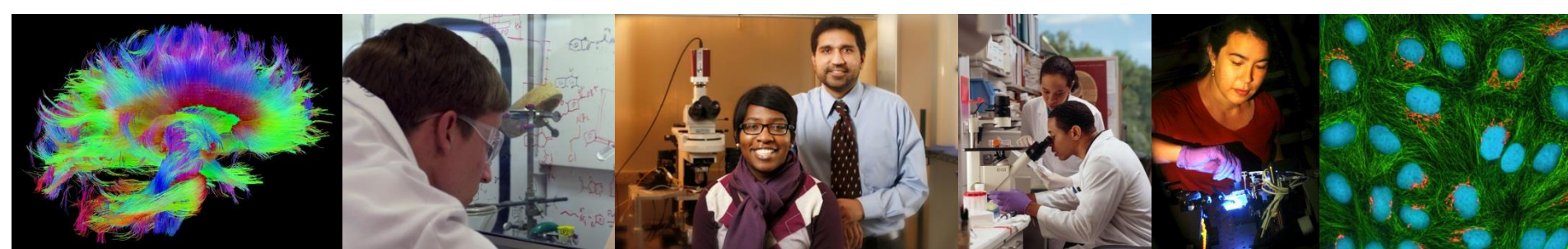
The Science of Diversity and the Impact of Unconscious Bias

H. Anna Han, Ph.D. (anna.han@nih.gov)

NIH / Scientific Workforce Diversity

Symposium for Advocates of Women Physician Scientists

◆ May 11th, 2016



National Institutes of Health
Office of the Director
Scientific Workforce Diversity

Today's Agenda

- Why diversity matters
 - Why & How
- Unconscious bias as hurdle
 - Judgment and Decision-making
 - Everyday Interaction
- Strategies to mitigate influence of unconscious bias
- NIH/Scientific Workforce Diversity
 - Our approach

Shining a Light on the Problem: Racial Disparity in NIH R01s

Science

VOL 333 19 AUGUST 2011

Race, Ethnicity, and NIH Research Awards

Donna K. Ginther,^{1*} Walter T. Schaffer,² Joshua Schnell,³ Beth Masimore,³ Faye Liu,³
Laurel L. Haak,³ Raynard Kington^{2†}

NEWS & ANALYSIS

BIOMEDICAL RESEARCH FUNDING

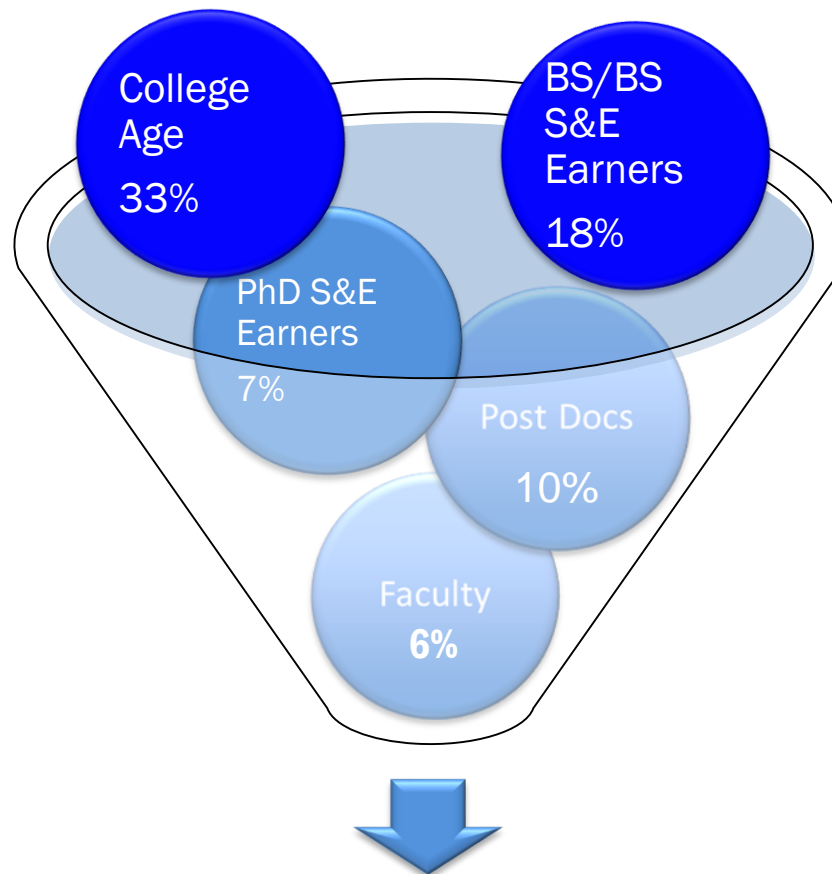
NIH Uncovers Racial Disparity in Grant Awards

The initial surprise was that R01 proposals from black Ph.D. scientists (including 45% non-U.S. citizens) were extremely rare. They totaled only 1.4% of all applications, compared with 3.2% for Hispanics and 16% for Asian scientists. (By contrast, African Americans make up about 13% of the U.S. population.) About 60% of all proposals

STUDY AT A GLANCE

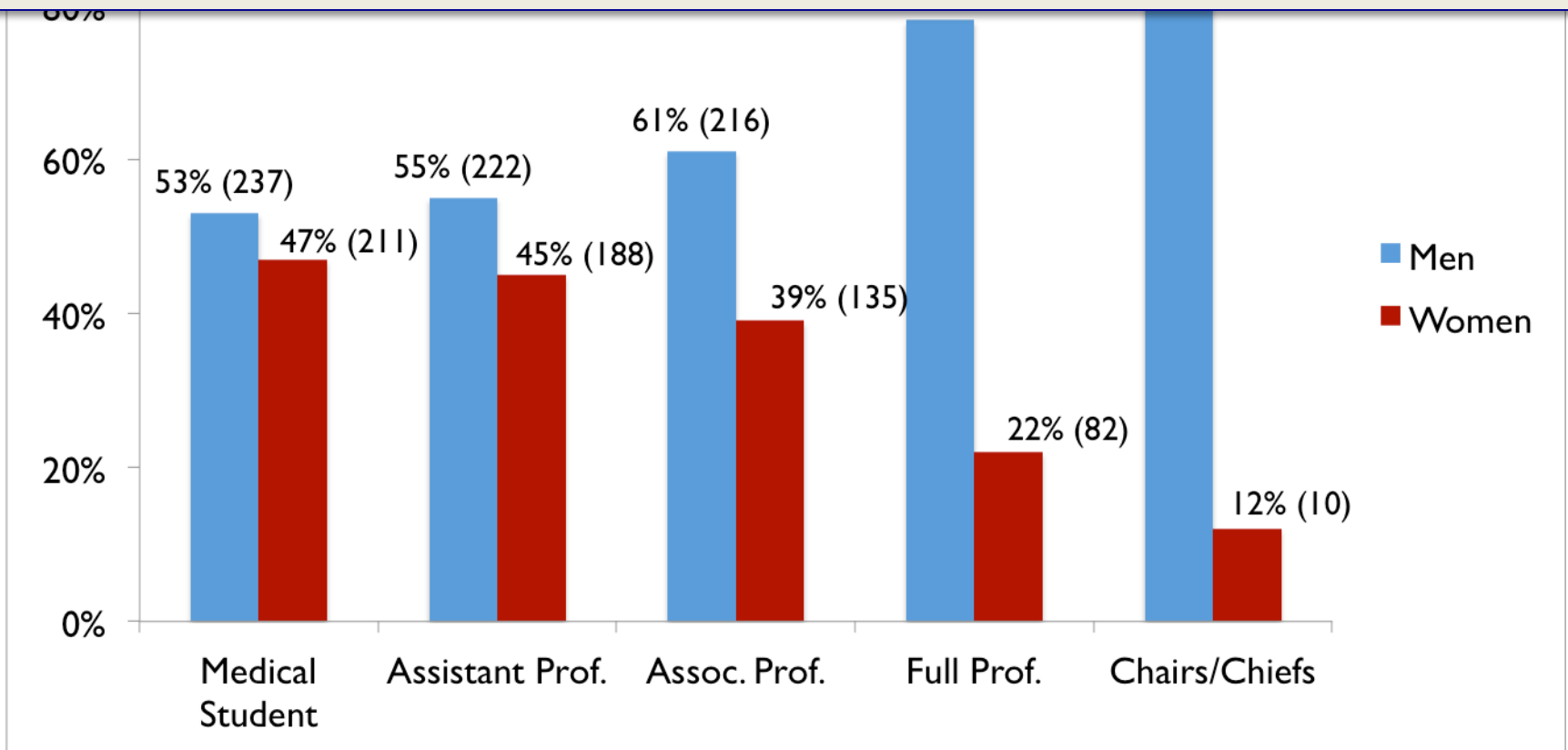
83,188	R01 applications from Ph.D.s analyzed
40,069	Unique Ph.D. investigators
1149	R01 applications from black Ph.D.s
337	Expected awards to black applicants if same success chance as whites
185	Actual awards to black applicants

The Biomedical Career Path Is Really a **Funnel** *Underrepresented Groups (%)*



Gender Gap in Academic Medicine 2013 – 2014

At the current rate of improvement, attaining gender parity will take a very long time (48 years nationwide)



Adapted from: The state of women in academic medicine 2013-14: AAMC Report
Diana M. Lautenberger, et. al.

Why Diversity Matters

Capitalizing on the Opportunity

- Excellence, creativity, innovation
- Broadening scope of inquiry - solutions to complex problems in increasingly complex world
- Impact of workforce diversity on health disparities
- Ensuring fairness
 - Changing demographics
 - Leveraging the U.S. intellectual capital





Impact of Workforce Diversity on Health Disparities: The Evidence

ANNALS OF
FAMILY MEDICINE

Patients' Beliefs About Racism, Preferences for Physician Race, and Satisfaction With Care

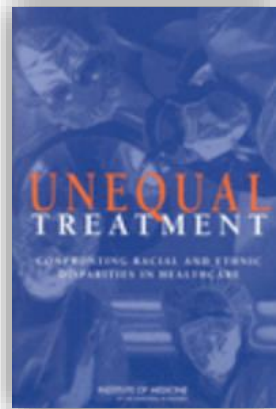
Frederick M. Chen, MD, MPH¹

George E. Fryer, Jr, PhD²

Robert L. Phillips, Jr, MD, MSPH²

Elisabeth Wilson, MD, MPH³

Donald E. Pathman, MD, MPH⁴



Unequal Treatment: Confronting Racial and Ethnic
Disparities in Health Care

- Underrepresented racial, ethnic minority health professionals disproportionately serve racial, ethnic minority and other underserved populations (Cantor 1996; Komaromay et al. 1996)
- Racial, ethnic minorities more likely to receive better interpersonal care from practitioners of their own race or ethnicity (Chen 2005; Garcia et al. 2003)

Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between blacks and whites

Kelly M. Hoffman^{a,1}, Sophie Trawalter^a, Jordan R. Axt^a, and M. Norman Oliver^{b,c}

^aDepartment of Psychology, University of Virginia, Charlottesville, VA 22904; ^bDepartment of Family Medicine, University of Virginia, Charlottesville, VA 22908; and ^cDepartment of Public Health Sciences, University of Virginia, Charlottesville, VA 22908

Edited by Susan T. Fiske, Princeton University, Princeton, NJ, and approved March 1, 2016 (received for review August 18, 2015)

Approximately 50% white medical students and residents falsely believe that:

- Black (vs. white) patients feel less pain
- More likely to suggest inappropriate treatments for black (vs. white) patients

Diversity of Thought: Driving Force of Innovation

- Cognitive Diversity increases:
 - Creativity
 - Search for novel information
 - Search for novel perspective
 - Better decision making

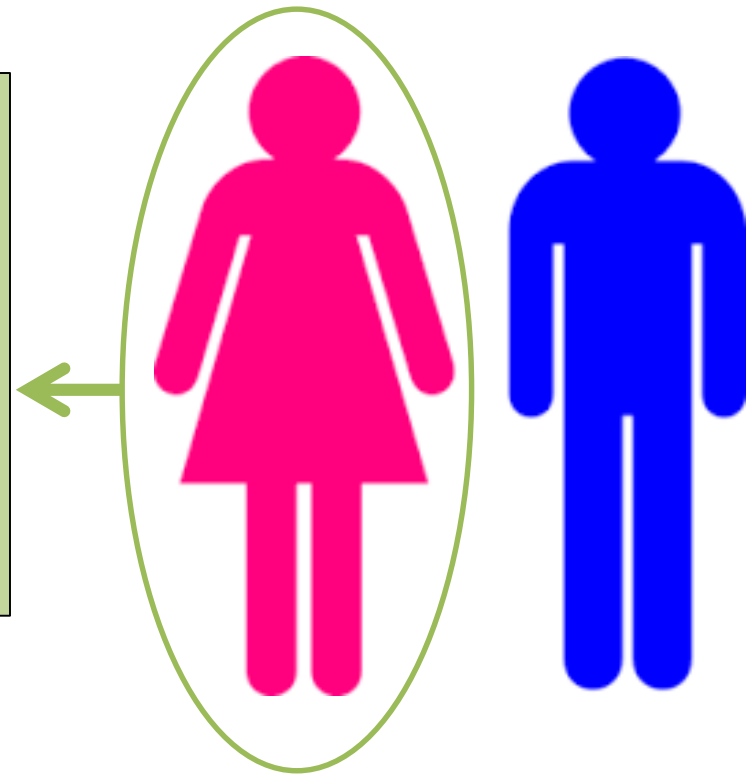


Diversity and Performance

- Examined size and gender composition of top 1,500 management firm from 1992-2006 (collected from S&P).

Representation of females at top management → increase of \$42 million in firm values on average.

Firms that value innovation saw even greater gains – \$44 million.



Diversity and Quality Science

- 2.57 million scientific papers between 1985-2008 (only authors with U.S. addresses).
- Surnames of co-authors

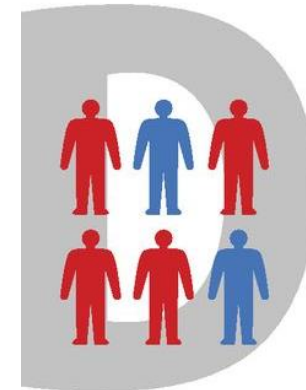
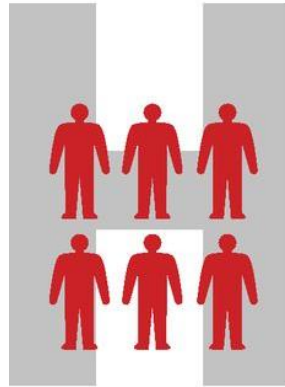
Papers written by a diverse groups:

- Receive more citations
- Published in journals with higher impact factor



Diversity and Financial Decision Making

Ethnically homogenous financial traders vs. Ethnically heterogeneous financial traders



Less able to accurately predict stock prices (33% decline)

More likely to accept inflated prices (contributes to financial bubble) and when bubbles burst, crashed more severely.

“Diversity facilitates friction that enhances deliberation and upends conformity.”

Diversity and Jury Decision Making

Racially homogenous jurors

vs.

Racially heterogeneous jurors

HOMOGENEOUS



HETEROGENEOUS



Measure	All-White Group	Diverse Group
Deliberation Length, in mins	38.49	50.67
# of case facts discussed	25.93	30.48
# of factual inaccuracies	7.28	4.14
# of uncorrected inaccurate statements	2.49	1.36

Sommers, S. R. (2006). On racial diversity and group decision making: identifying multiple effects of racial composition on jury deliberations. *Journal of personality and social psychology*, 90(4), 597.

Why?


- Simply being exposed to diversity can change the way you think:
 - Anticipate differences
 - Encourage consideration of alternatives
 - Dissent provokes more thought when it comes from someone who is different from us.
 - Opinion dissent in diverse groups contribute to novelty and integrative complexity
- Diversity can be a catalyst for change, growth, and innovation.

Hurdles to Diversity



- Easy answers have not been sufficient.
- Implicit or unconscious processes can be a hurdle to reaping the benefits of diversity.
- We are exposed to approximately 11 million pieces of information at any moment.
 - We process about 40 every moment.
- Nobel prize winning neuroscientist, Eric Kandel, estimates that 80-90% of our mind works unconsciously.
 - Must use shortcuts and past knowledge to make assumptions, aka “Mind Habits”
 - These habits influence our thoughts, judgment, and interpretations

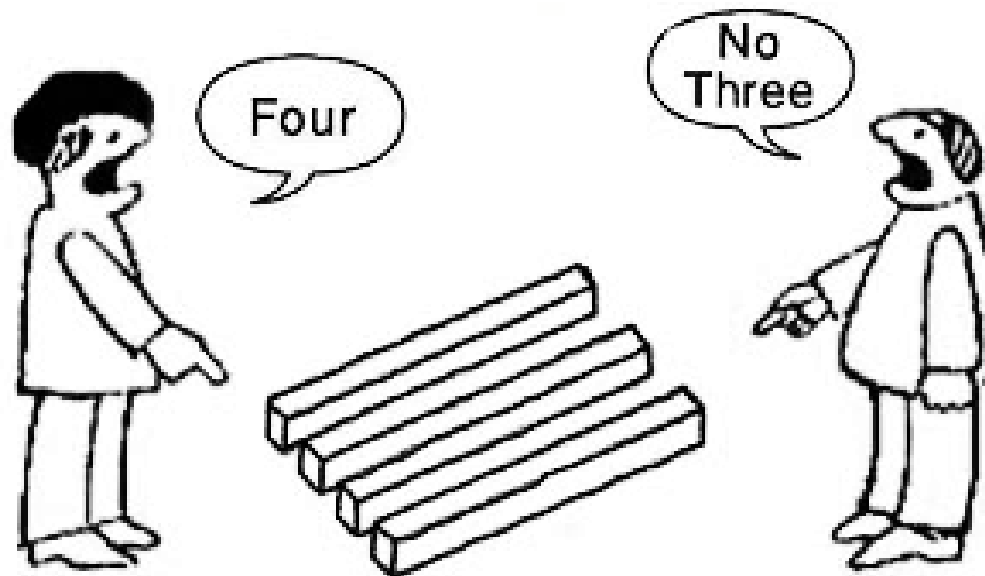
Meanwhile, we believe...



“I am able to assess others in a fair and accurate way.”

“I am objective.”

Fact: Ingrained mind habits often produce errors in how we perceive, judge, and make decisions.



Unconscious Bias

DEMO 1

“We see what we look for, and look for what we know” - Goethe

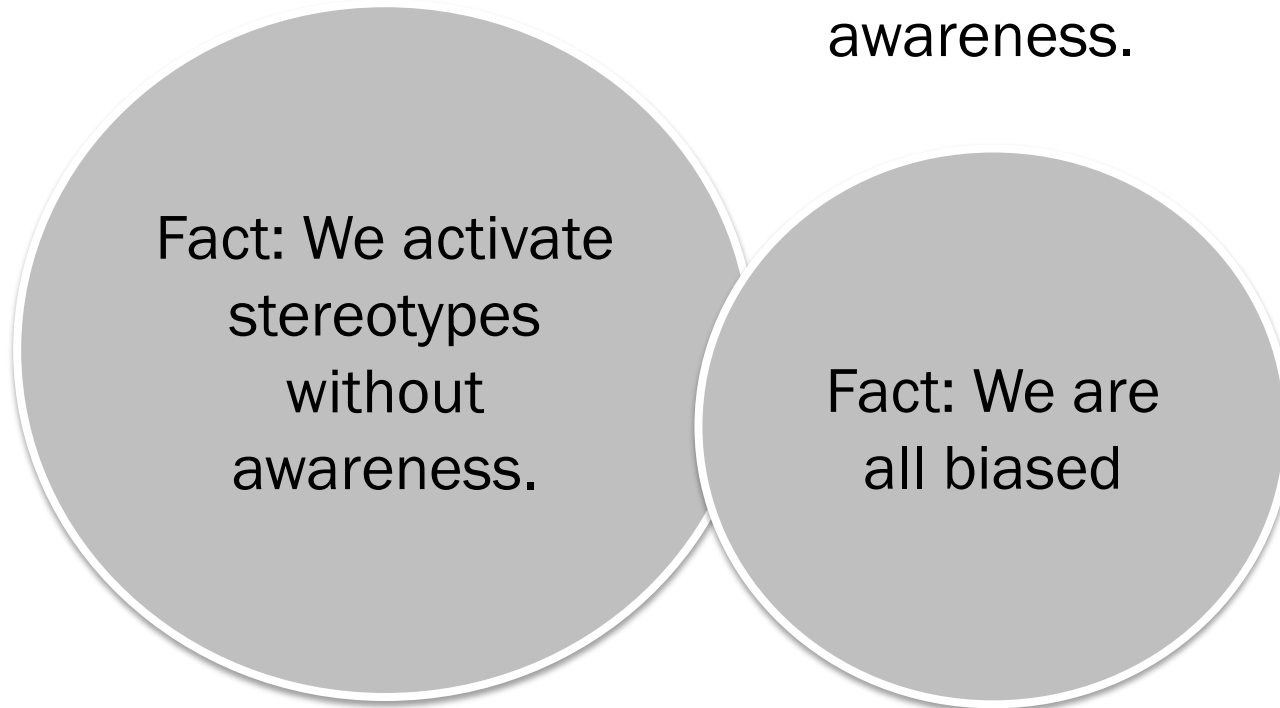


DEMO 2

DEMO 3

Categorization

- We ALL innately and automatically categorize (e.g., stereotype).
- And these categorizations alter and impact our *perceptions* and *judgments* without awareness.

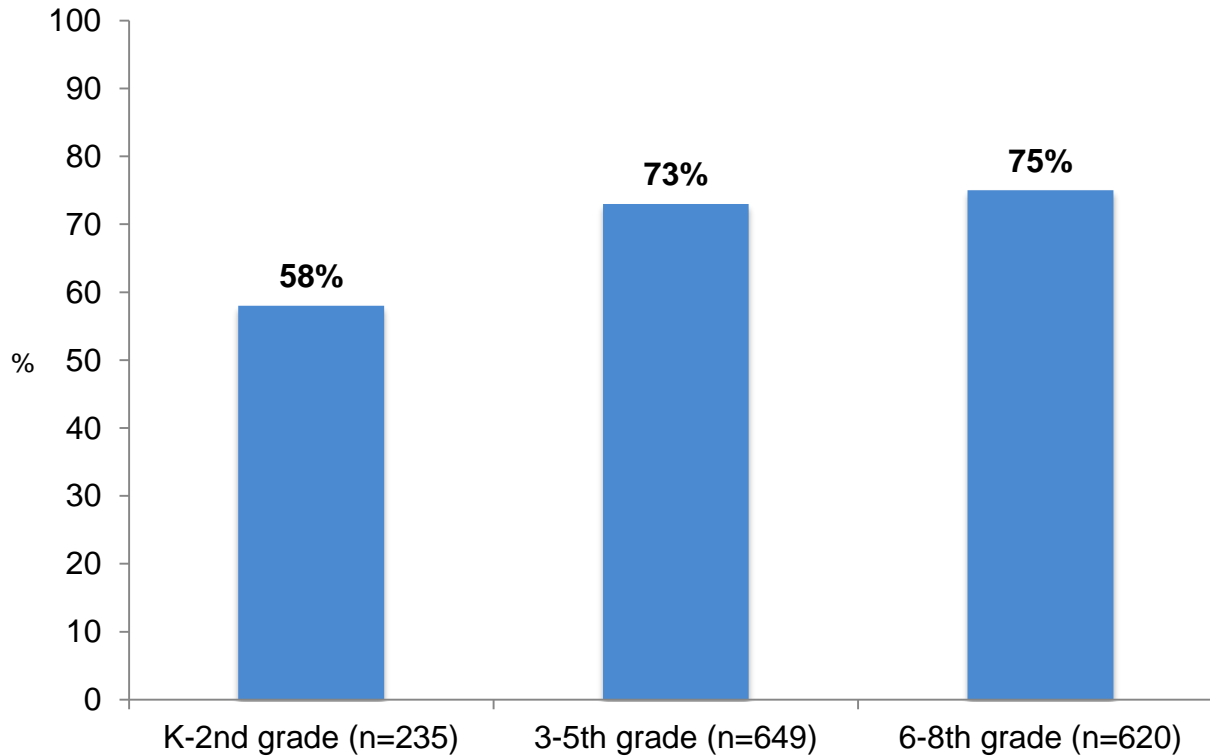


CANON AUSTRALIA - “A photograph is shaped more by the person behind the camera than what is in front of it.”



Who is a “Scientist”?

Draw-A-Scientist Test: Percent of Students
Who Drew A Male Scientist
(N=1504)

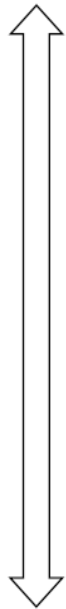


But You Don't Look Like Scientist!

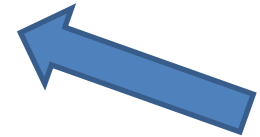
- Feminine women are deemed less likely to be a scientist.



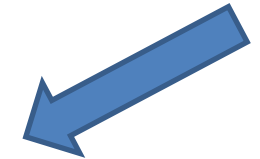
Masculine



Feminine

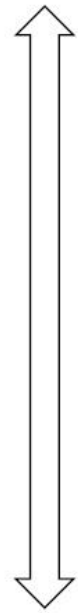


NO Differences in Likelihood Of Being Scientist vs. Teacher



* Low likelihood for males to be teachers

Masculine



Feminine

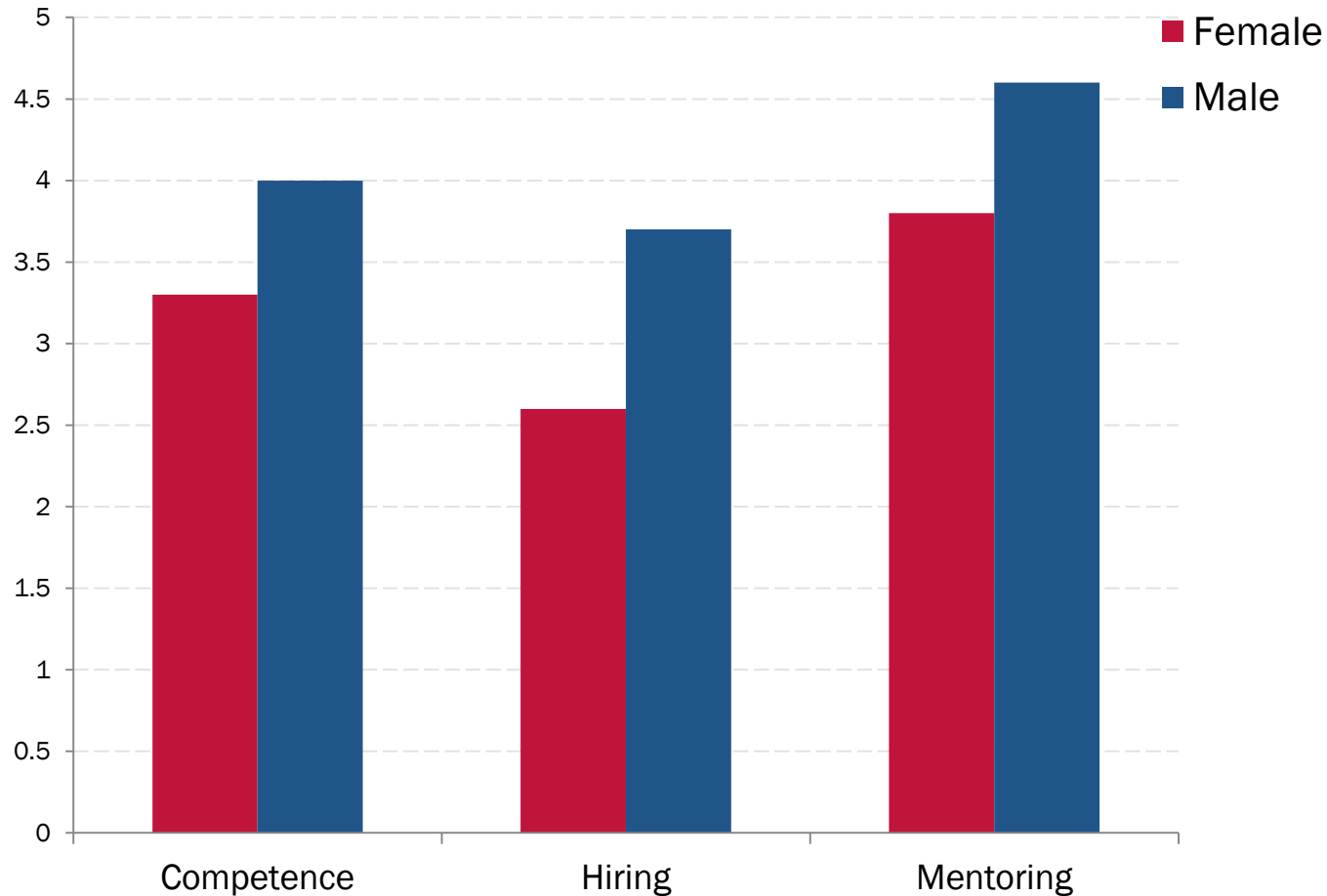


High likelihood of scientist (low likelihood of teacher)



High likelihood of teacher (low likelihood of scientist)

Evaluation In Academic Science



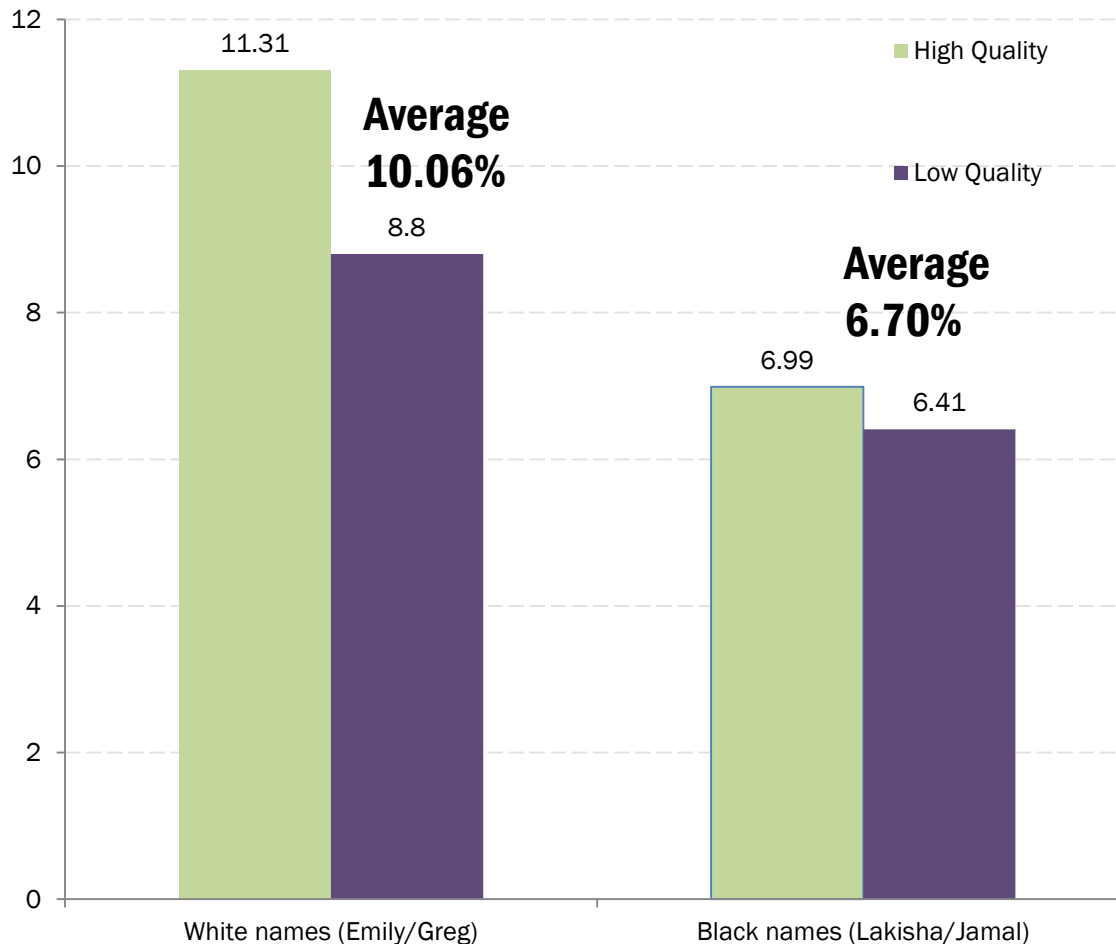
Both *male and female* faculty members:

Rated female student as less competent, less hireable, and offered less salary (\$3.7K) and mentoring.

Even though the female was rated more likeable.

All $ps < .05$

Evaluation of Identical Resume



50% difference in call back rates. White applicant can expect 1 call back for every 10 jobs and 15 for black applicants.

Black applicants do not see increase in callbacks with improvement in their credentials. (ps<.0001)

This study has just been replicated (2015)- with similar findings and show that education level (college education) does not seem to matter for Black applicants!

Bertrand, M., & Mullainathan, S. (2003). National Bureau of Economic Research.

Nunley, J. M., Pugh, A., Romero, N., & Seals, R. A. (2015).. *The BE Journal of Economic Analysis & Policy*.

Motherhood Penalty / Fatherhood benefit

Four Identical applications:



Nonmother

Mother
“Active in PTA”

Nonfather

Father
“Active in PTA”

Motherhood Penalty / Fatherhood benefit



Nonmother

Mother
"Active in PTA"

Compared to nonmothers, mothers were:

- Received about 50% of call backs
- Rated less competent
- Less likely to be recommended for hire
- Offered less pay (11k)
- Lower likelihood of promotion
- Seen as less committed
- Less days allowed late
- Required higher score on exams (4.5 pts higher)

Motherhood Penalty / Fatherhood benefit

Compared to nonfather, fathers were:

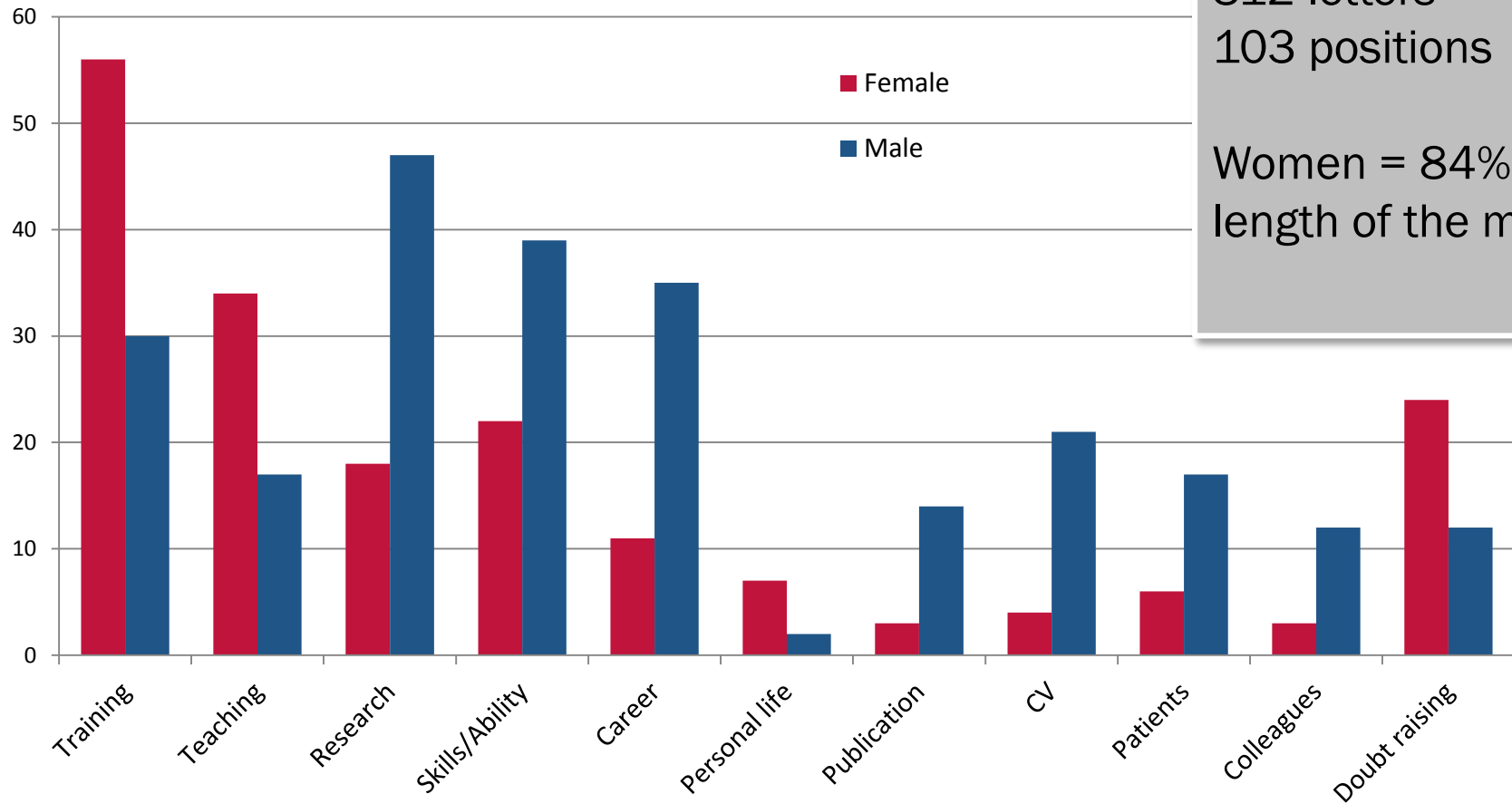
- Offered more pay (6k)
- Higher likelihood of promotion
- Seen as more committed
- Allowed more days late



Nonfather

Father
“Active in
PTA”

Recommendation Letters for Medical Faculty



312 letters
103 positions

Women = 84%
length of the men's.

Strategies to Mitigate the Influence of Unconscious Bias

**WHAT
CAN WE
DO?**

**How can we
control what
we are not
consciously
aware of?**

What Does Not Work

Thought/Stereotype Suppression

(“Color blind”- race or gender)

Trying not to think about stereotypes often back fires-
“Suppression rebound”

Macrae et al. (1994)
Monteith et al. (1998)

Belief in Personal Objectivity

Belief in your ability to be objective.

“When people feel that they are objective, rational actors, they act on their group-based biases more rather than less”

It’s not whether you have biases. It’s about which one is your bias?

Uhlman & Cohen (2007)

Managing the Unconscious

- We can learn to adapt and correct for our unconscious biases.

**Motivation/
Intention**

Awareness

**Efficacy &
Opportunity**

Accountability

Educational Intervention Works!

- 92 departments, matched by school/college
- Randomized controlled intervention vs. not
- Intervention group reported:
 - Greater personal bias awareness
 - More motivation to promote gender equity
 - More confidence in being able to enact gender equity
 - Feel that it would be personally beneficial to promote gender equity in one's department
- Persisted 3 months later

What's Your Motivation?

Start by reminding yourself of your intrinsic motivations.

I enjoy relating to people of different groups

I value diversity.

I can freely decide to be a nonprejudiced person.

Use Habit Breaking Routine

Plan out in advance when, where, and how to act on one's goal in an if-then format:

“If I encounter a member _____ group, Then I will think _____ .”

- Interrupts routine behavior
- Uses situational cues
- Serve as subtle reminder

- “If I am the most senior person in the room, then I will share my ideas last.”

Have Some Imagination

Imagining an ideal candidate can *limit diversity* because people are more likely to imagine a prototypical candidate.

“Ideal may render minorities invisible to mind’s eye.”

Taking 30 seconds to imagine a broad scope of candidates (different ways people can imagine and assess science) can change who you consider.

Mental image matters because likelihood of performing that behaviors increases with mental representations



Imagine Counter-Stereotypical Individuals

Think of individuals who do not fit stereotypes

- Reduces stereotypes
- Increases creativity and cognitive flexibility



Sylvester James Gates
(physicist famous for
super string theory)



Mae Jemison
(astronaut,
first black
woman
in space)



Jane Goodall
(primatologist,
famous for her work on
chimp social interactions)



Neil deGrasse Tyson
(astrophysicist,
director of the Hayden
Planetarium)

Walk a Mile in Their Shoes

Try to walk a mile in someone's shoes – adopt his/her perspective and imagine what it's like to be a member of stigmatized group.

Imagine:

- What would it be like to get a job callback for every 15 jobs when your friend gets one for every 10?

Take Your Time

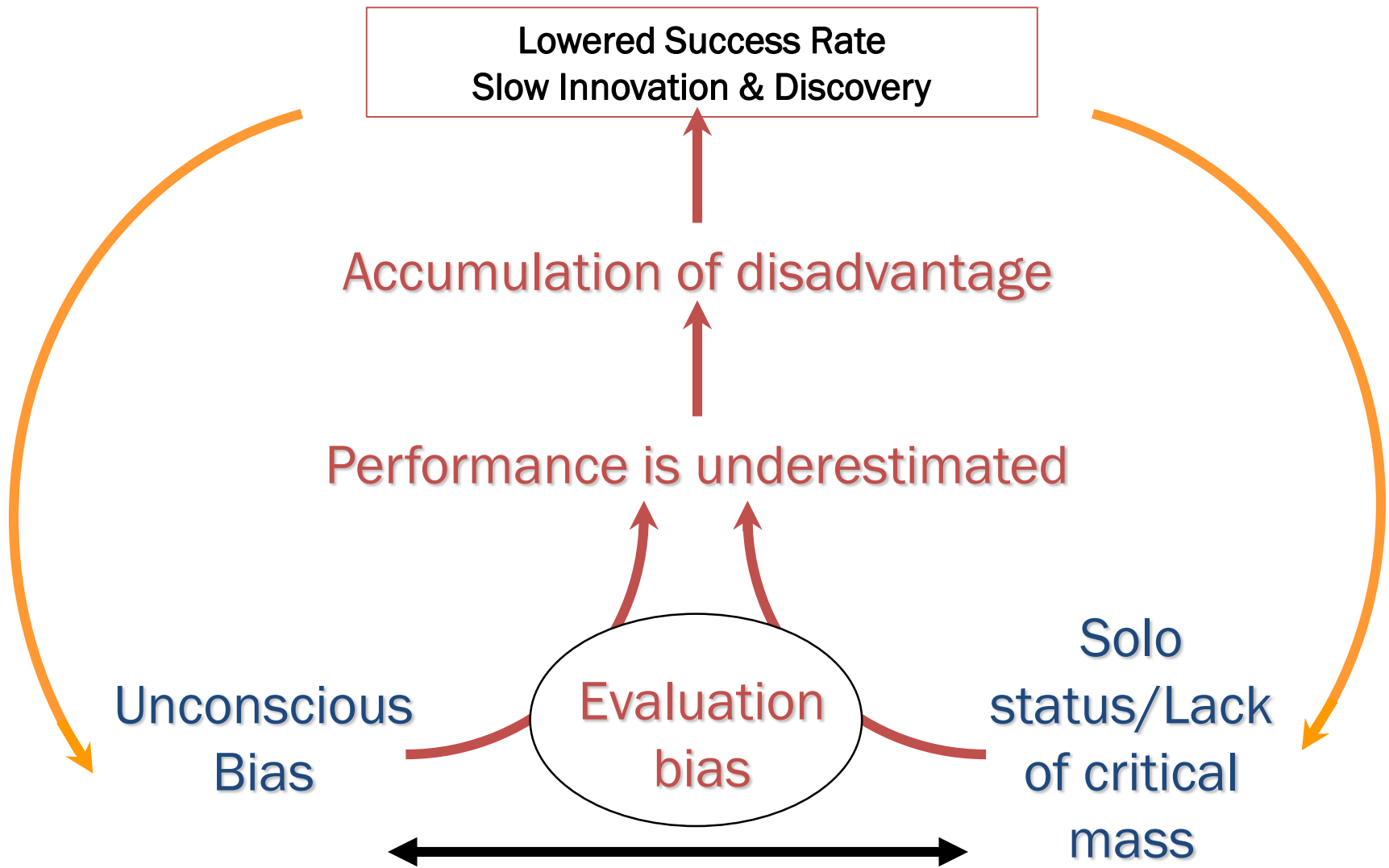
- More likely to fall for cognitive errors (unconscious bias) when distracted, under time pressure, or tired.
- If possible, be rested:
 - Morning people are more likely to rely on stereotypes at night vs. night people are more likely to rely on stereotypes in the morning.
 - Sleep deprived individuals are less cognitively flexible

Creating Opportunity for Positive Interaction

- Cooperative vs. competitive
- Common identity or goals
- Norms of egalitarian beliefs
 - Expression of egalitarian goals and beliefs
 - Norms of overcoming bias



If We Do Nothing... The Cycle Reproduces Itself





National Institutes of Health addresses the science of diversity

Hannah A. Valantine^{a,1} and Francis S. Collins^b

^aChief Officer for Scientific Workforce Diversity, US National Institutes of Health, Bethesda, MD 20814; and ^bDirector, US National Institutes of Health, Bethesda, MD 20814

Cross-Cutting Challenges

- Science of diversity: what is the impact of diversity on the quality and outputs of research?
- Identifying psychological and social factors that mitigate individual and institutional barriers to workforce diversity
- Which evidence-based approaches to training and persistence in biomedical research work? And in which contexts?
- Develop a scalable strategy to effectively disseminate and sustain diversity within the nationwide scientific workforce



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What are the psychosocial factors that affect workforce diversity and how can they be mitigated?

Evidence

- Effects of bias on hiring
- Social science interventions are effective for mitigating bias, stereotype threat

Question

- Effects of bias on review?

Actions

- Implicit bias interventions in NIH search committees
- Measuring hallmarks of success and their impact on career progression
- Testing anonymized review to detect potential bias

NIH IRP Stadtman Search Implicit Bias Intervention Pilot

Experimental Intervention Group

Pre-IAT
(Gender &
Science)

unconscious
Awareness/
Habit
Interv

Post-IAT
(Gender &
Science)

Range of
diversity in
candidate
selection
(behavioral
measure)

Should see more
diverse group of
candidates in the
intervention group vs.
no intervention group

Control-Matchme... Group

Pre-IAT
(Gender &
Science)

Should see
lower IAT scores
(reduced
implicit bias)

Range of
diversity in
candidate
selection
(behavioral
measure)



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Which evidence-based approaches to training and persistence in biomedical research work?

Evidence

- Research experience, mentoring important for career success
- Gender/racial representation in science leadership low

Actions

- Funding research on recruitment/retention in science careers
 - Experimental training awards (BUILD)
 - National mentoring network (NRMN)

Implementation of a Major ACD WG Recommendation

NIH Diversity Program Consortium

Pipeline, Mentoring, Evaluation

Awards made October 2014

BUILD: 10 sites

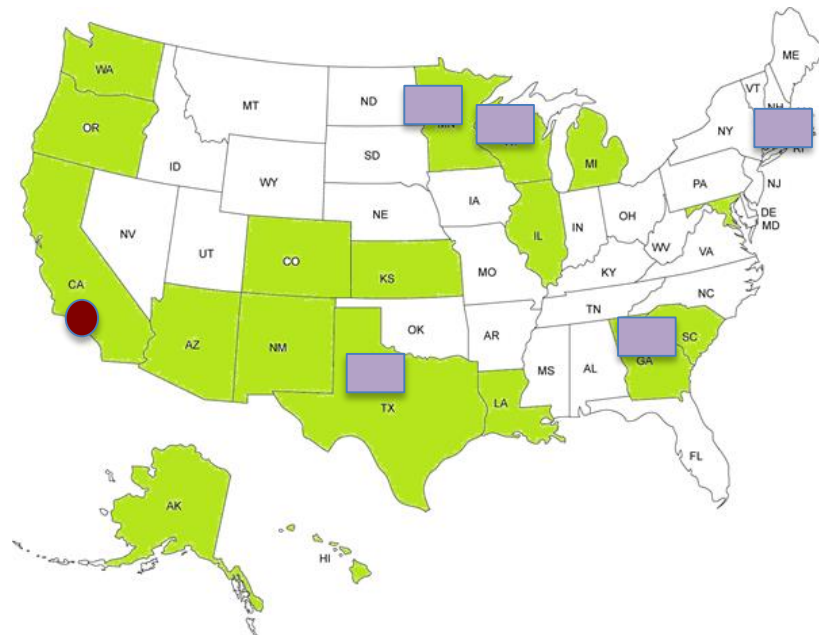
NRMN

CEC

Total: \$250 million (5 yrs)

BUILD

- California State University Long Beach
- California State University Northridge
- Morgan State University
- Portland State University
- San Francisco State University
- University of Alaska Fairbanks
- University of Detroit Mercy
- University of Maryland Baltimore County
- University of Texas El Paso
- Xavier University of Louisiana



NRMN

- Boston College
 - Morehouse SM; U. Min.; U. North Texas; U. Wisconsin

CEC

- University of California Los Angeles

NRMN Innovation — <http://nrmnet.net/>



- **Diverse leadership** across race, ethnicity, gender, geography
 - Mentoring, networking, mentor training, professional development
- **Regional hubs** (5) – building capacity
 - Partnership (majority, HBCUs, HSIs, and TCUs), BUILD recipients, societies
 - Via a proven online web portal
- **URM postdocs and junior faculty** – focus on grantsmanship
 - Proven track record in mentoring trainees to successfully prepare fundable NIH grants
- **“Train-the-trainer”** – large-scale implementation of mentoring
 - Include cultural responsiveness and competency

National Research Mentoring Network (NRMN)

Mentoring to Diversify the Biomedical Workforce

[Home](#)

[Join NRMN](#)

[About NRMN](#)



NRMNet Mentoring
and Networking



Mentor Training



Professional Development

How can we sustain diversity within the nationwide scientific workforce?

Issues

- Scientific workforce diversity is a shared responsibility with shared benefit
- Many programs are “islands” of success
- Unlinked programs create, sustain career transition gaps

Actions

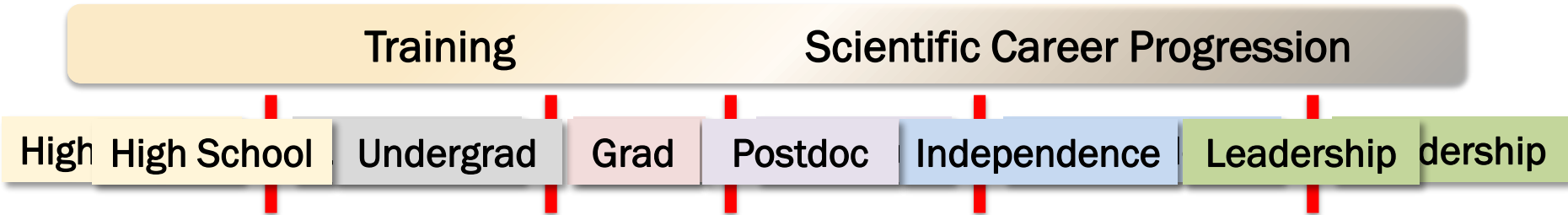
- Evaluating, inventorying existing diversity programs
- Shaping public-private partnership for joint-sector involvement (Hubs of Innovation) to seal gaps in career progression

Retiring the Pipeline ...



... and thinking about a system

Integrated National Strategy for Scientific Workforce Diversity



- **Overarching Goal:** To eliminate transition barriers and achieve sustainable transformation in scientific workforce diversity
- Identify gaps (postdoc -> faculty/other research careers)
- Draw evidence from existing regional programs
- Focus on transition to independent careers
- Needed: Program linkages across career stages

CONNECT WITH SCIENTIFIC WORKFORCE DIVERSITY

NIH Scientific Workforce Diversity, led by Dr. Hannah Valantine, harnesses the power of a diverse scientific workforce to illuminate discoveries for human health.



@NIH_COSWD



Facebook.com/NIHCOSWD

GREAT MINDS

THINK DIFFERENTLY...

Anna Han



Anna.han@nih.gov



National Institutes of Health

Office of the Director

Scientific Workforce Diversity