Procedures that activate or mitigate gender bias in scientific review

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What is “unconscious bias”

- Unconscious bias and assumptions
- Previously held beliefs about a social category
- Schemas
- Stereotypes
- Mental models
- Cognitive shortcuts
- Statistical discrimination
- Implicit associations
- Spontaneous trait inference

The tendency of our minds to judge *individuals* based on characteristics (real or imagined) of *groups*
Background on Gender

DESCRIPTIVE: How men and women actually behave

PRESCRIPTIVE: Unconscious assumptions about the way men and women in the abstract “ought” to behave:

- **Women**: Nurturing, nice, supportive, helpful, sympathetic, dependent = generally less valued in society (i.e. paid for)
- **Men**: Decisive, inventive, strong, forceful, independent, “willing to take risks” = generally more valued

RELEVANT POINTS:
- **Leaders, physicians, scientists, professors**: Decisive, inventive, strong, independent
- **Social penalties** for violating prescriptive gender assumptions
- **Unconscious gender stereotypes** are easily and automatically activated and once activated readily applied
Consistent story in field and experimental studies over several decades –

- Women and the work performed by women receive lower evaluations than men and the work performed by men – even if the work is identical – multiple studies: e.g. Heilman, 2004; Wenneras and Wold, 1997; Steinpreis, 1999
- Sex of the evaluator makes no difference – i.e. both men and women give women lower evaluations – nearly universal
- Women are particularly disadvantaged at evaluation points advancing to high authority positions, especially elite leadership positions – multiple studies; e.g. Sczesny et al., 2006
- Women, but not men, who self-promote receive lower evaluations – Several studies; e.g. Rudman, 1998
- Those who think they have no biases provide the most biased evaluations – Uhlmann and Cohen, 2005
- Letters of recommendation for recruited faculty are significantly different for female vs male applicants – Trix and Psenka, 2003

We all have gender-biases (conscious or unconscious) and they would be predicted to disadvantage women in their academic career advancement
Conditions which activate gender bias in evaluation to the detriment of women

- Time pressure and high cognitive load
- Small number of women in applicant pool or review group
- Ambiguous performance criteria for traditionally male position (e.g. “potential” “shows leadership”)
- “Feminine” appearance or scent (even among men)
- Use of abstract rather than concrete language to describe attributes (e.g. “he broke a test tube” “she is clumsy in the lab”)
- Semantic priming with gender-linked words
# Taking an Evidence-Based Approach: Interventions in at least one randomized, controlled study that mitigate bias in evaluation

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Example of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least 25% women in the pool being evaluated</td>
<td>Heilman ME. Organ Behav Hum Perf 1980; 26: 386-395, 1980</td>
</tr>
<tr>
<td>Instruction to try to avoid prejudice in evaluation</td>
<td>Blair IV, Banaji MR. J Pers Soc Psychol 70:1142-1163, 1996</td>
</tr>
<tr>
<td>Establishing the value of credentials before any applicant is seen to avoid “redefining” merit</td>
<td>Uhlmann and Cohen, Amer Psychol Assoc 16:474-480, 2005</td>
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</tbody>
</table>
Type 2 translational social science research: can we apply it to academic institutions?

- Language activating unconscious gender-linked bias in evaluation through *semantic priming*?
  - NIH Director’s Pioneer Award
  - Tenure criteria
- Changing faculty attitudes and behaviors through workshops for search committees
NIH Director’s Pioneer Award

- First NIH Roadmap initiative to be rolled out
- Intended to accelerate innovative research unsupported through traditional NIH funding mechanisms
- $500,000/yr for 5 years
- None of 9 awarded first round were women
- Women: 6/14 second round (43%); 4/13 third round (31%); 4/12 fourth round (25%)

Carnes, et al. JWH, 2005
<table>
<thead>
<tr>
<th>2004</th>
<th>2005+</th>
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<tbody>
<tr>
<td><strong>Characteristics of target scientist and research</strong></td>
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<tr>
<td><strong>Risk-taking emphasized:</strong></td>
<td><strong>Emphasis on risk removed:</strong></td>
</tr>
<tr>
<td>• “exceptional minds willing and able to explore ideas that were considered risky”</td>
<td>• “pioneering approaches”</td>
</tr>
<tr>
<td>• “take…risks”</td>
<td>• “potential to produce an unusually high impact”</td>
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<tr>
<td>• “aggressive risk-taking”</td>
<td>• “ideas that have the potential for high impact”</td>
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<td>• “high risk/high impact research”</td>
<td>• “highly innovative”</td>
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<tr>
<td>• “take intellectual risks”</td>
<td>• URL no longer includes “risk”</td>
</tr>
<tr>
<td>• URL includes “highrisk”</td>
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<tr>
<th><strong>Goals of research to be supported</strong></th>
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<tbody>
<tr>
<td><strong>Technological advances highlighted as desirable:</strong></td>
<td><strong>Mention of technological breakthroughs removed; human health added:</strong></td>
</tr>
<tr>
<td>• “support the people and projects that will produce tomorrow’s conceptual and technological breakthroughs”</td>
<td>• “encourage highly innovative biomedical research with great potential to lead to significant advances in human health.”</td>
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</tbody>
</table>
“Leader” in tenure criteria

- 25 top research academic medical centers
- Tenure criteria from websites
- Scanned for “Leader”
- Also scanned for other Bem Sex Role Inventory male, female, neutral words
- Slopes of regressions for annual % faculty who are tenured women x 7 years
- “Leader” = OR 6.0 (1.02, 35.37; p=0.04) for slope below median compared to those without

Marchant et al. 2007
Words describing stereotypically male traits predominate in tenure criteria

<table>
<thead>
<tr>
<th>Male</th>
<th>Neutral</th>
<th>Female</th>
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<tbody>
<tr>
<td>Analytical</td>
<td>Friendly</td>
<td>Sensitive</td>
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<tr>
<td>Competitive</td>
<td>Helpful</td>
<td>Understanding</td>
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<td>Defends</td>
<td>Inefficient</td>
<td>Yielding</td>
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<tr>
<td>Independent</td>
<td>Truthful</td>
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<tr>
<td>Individualistic</td>
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<td>Leadership</td>
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<td>Risk</td>
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Med 5.5/school; 2-50

Total 183

Neutral

Friendly: 4 schools; Total 5

Female

Sensitive: 3 schools; Total 3

Understanding: Yielding
Teach faculty how to run effective searches

Active learning
Principles of adult education
Tenets favoring diffusion of innovation and institutional change

Introduce research on biases and assumptions
Present evidence-based strategies

Searching for Excellence and Diversity – Workshops for faculty search committees
Percent Female, New Tenure-Track Faculty
Biological & Physical Sciences

Participating Departments 2005:
- 21/84

Non-Participating Departments 2005:
- 33/89

2006:
- 17/49
- 6/20

2003-2005

Purple: 2003-2005
Yellow: 2006
New Hires' Satisfaction* With the Hiring Process

Biological & Physical Sciences

* Agree Strongly to the item "I was satisfied with the hiring process overall."

Participating Departments

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<thead>
<tr>
<th>Year</th>
<th>Departments</th>
<th>2000-2002</th>
<th>2003-2005</th>
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<tr>
<td></td>
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<td>New Hires</td>
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<td>29/53</td>
<td>28/45</td>
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| Non-Participating Departments

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<thead>
<tr>
<th>Year</th>
<th>Departments</th>
<th>2003-2005</th>
<th>2006 Survey</th>
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<tr>
<td></td>
<td></td>
<td>39/58</td>
<td>19/44</td>
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The Climate for Faculty of Color is Good

Biological & Physical Sciences

Participating Departments 2004-05

Non-Participating Departments 2004-05

2003 Survey

2006 Survey
Summary

- Gender-linked unconscious biases and assumptions are ubiquitous
- These disadvantage women in academic medicine whenever evaluation is required (e.g. receiving awards, tenure)
- Evidence from randomized, controlled studies indicates that activation and application of these biases can be mitigated
- Our work suggests that exposing faculty to this area of social science research may increase the number of women faculty recruited and appears to change perceptions of departmental climate for faculty of color