Creating Diverse and Inclusive Science Teams

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The Rise of Team Science

• The prevalence of scientific collaboration (i.e., team science) has risen over the past several decades.

• Teams are getting larger, more interdisciplinary, and increasingly diverse.

• The process and outcomes of team science have been empirically investigated to identify the benefits and challenges.

The Benefits and Challenges of Team Science

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased expertise</td>
<td>Knowledge integration</td>
</tr>
<tr>
<td>Greater access to resources via multi-</td>
<td>More time spent communicating and coordinating</td>
</tr>
<tr>
<td>institutional collaboration</td>
<td></td>
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<tr>
<td>Increased productivity</td>
<td>Potential conflict over misaligned goals or working styles</td>
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<tr>
<td>Ability to onboard additional expertise as</td>
<td>Difficult to maintain team cohesion</td>
</tr>
<tr>
<td>needed</td>
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<tr>
<td>Diversity of the team enhances creativity</td>
<td>Realizing the benefits of diversity requires intentional,</td>
</tr>
<tr>
<td>and innovation</td>
<td>inclusive approaches</td>
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</tbody>
</table>

What is Diversity?

Demographic Diversity
- Gender identity
- Race
- Ethnicity
- Nationality
- Linguistic
- Ability Status
- Sexual Orientation
- Class Background
- Age
- Etc.

Cognitive Diversity
- Information
- Knowledge
- Heuristics
- Rules of Thumb
- Causal Models
- Frameworks
- Processing
- Perspectives

Experiential Diversity
- Degree field
- Academic Discipline
- Academic Genealogy
- Alma Mater
- Career path
- Expertise
The Diversity Effect

Diversity Interrupts Group Think

• Group Think: Overly cohesive teams ignore information or ideas that challenge group norms or flow.
• Diversity leads to generative “friction that enhances deliberation and upends conformity.”
• Diversity results in a wider range of information exchange, more discussion, and fewer errors.

Diversity Leads to Innovative Solutions

• Diversity encourages us to anticipate differences.
• Diverse perspectives lead groups to consider alternatives.
• Resolving dissent requires novel, integrative, complex solutions.

Sources:
The Benefits of Diversity in Team Science

• From a pool of agents of similar ability, diverse groups outperform homogenous groups because...

...Diverse groups draw from a larger space of:

• Perspectives (i.e., internal representations of problems)
• Heuristics (i.e., algorithms used to locate solutions)

“When trying to solve complex problems, progress often results from diverse perspectives. That is, the ability to see the problem differently, not simply “being smart,” often is the key to a breakthrough. As a result, when groups of intelligent individuals are working to solve hard problems, the diversity of the problem solvers matters more than their individual ability. Thus, diversity is not distinct from enhancing overall quality—it is integral to achieving it.”

--- The Difference, S. E. Page (2008)

The Benefits of Diversity in Team Science

• In a review of 2.57 million scientific papers published between 1985-2008 across 11 scientific fields…

…Papers written by ethnically diverse groups:

• Were more highly cited

• Were published in journals with higher impact factors.

*After controlling for the number of authors and population density of author locations.

• Similar findings for gender diversity (Campbell et al., 2013).

Creating the Conditions to Realize the Benefits of Diversity

- Establish inclusive systems to increase and retain the diversity of the research team (e.g., admissions, hiring, evaluation).

- Build capacity for inclusive interactions and behaviors among team members.

- Plan for the collaborative and interpersonal aspects of the research as well as the scientific and technical aspects:
  - Decision-making
  - Conflict resolution
  - Providing and receiving feedback
  - Team development and cohesion

Sources:  
NASEM. (2015). Enhancing the effectiveness of team science.  
Barriers to Diverse and Inclusive Systems: Homophily

Homophily is common in research collaboration.

- Academic pedigree and genealogy shape primary collaborative units.
- Areas of expertise structure teams and lead to bridging ties.
- Familiarity, particularly when formed on other funded projects, can increase network closure.
- There is also evidence of gender disparities in access to research networks.

Sources:
Barriers to Diverse and Inclusive Systems: Biases

Team formation requires that we make judgments about people, their competence and abilities. These judgments can be influenced by implicit and explicit biases.

- **Affinity Bias**: Tendency to prefer people who share similar interests, backgrounds, and experiences.
- **Confirmation Bias**: Tendency to (consciously or unconsciously) seek out information that conforms to your pre-existing viewpoint, while ignoring information that goes against your pre-existing view.
- **Halo/Horn Effects**: Judgment of a person's character is generalized from a positive (halo) or negative (horn) impression in one specific area.
- **Contrast Effect**: Comparison of two or more things that you have been in contact with simultaneously or one right after the other, causing you to exaggerate the performance of one in contrast to the other.
- **Anchor Bias**: Tendency to hold onto an initial, singular piece of information to make decisions.
- **Stereotyping**: Expecting a group or person to have certain qualities without having real information about the person; generalizing while ignoring individual difference.
- **Conformity Bias**: Increased likelihood to adopt a belief as more people hold that belief; groupthink.
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Biases Can Affect Our Assessments of High-Ability STEM Talent

In an experimental study, biology and physics faculty were asked to evaluate postdoc candidates based on otherwise identical CVs with gendered/racialized names.

<table>
<thead>
<tr>
<th>Gender Bias</th>
<th>Racial Bias</th>
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<tbody>
<tr>
<td><strong>Biology</strong></td>
<td></td>
</tr>
<tr>
<td>Hireability and Competence: Male = Female</td>
<td>Hireability and Competence: Asian &gt; Black</td>
</tr>
<tr>
<td></td>
<td>Hireability: Asian &gt; Latinx</td>
</tr>
<tr>
<td><strong>Physics</strong></td>
<td></td>
</tr>
<tr>
<td>Hireability and Competence: Male &gt; Female</td>
<td>Hireability and Competence: Asian and White &gt; Black and Latinx</td>
</tr>
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</table>

## Biases Can Contribute to Inequitable Experiences

The following table shows the percent of U.S. women in STEM who report experiencing various forms of bias:

<table>
<thead>
<tr>
<th>Experience</th>
<th>Percent</th>
<th>Black</th>
<th>Latina</th>
<th>Asian</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having to provide more evidence of competence than others to prove themselves</td>
<td>77%</td>
<td>65</td>
<td>64</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>That colleagues have suggested they should work fewer hours after having children</td>
<td>37%</td>
<td>8</td>
<td>9</td>
<td>37</td>
<td>26</td>
</tr>
<tr>
<td>That at work, they find themselves pressured to play a stereotypically feminine role</td>
<td>79%</td>
<td>56</td>
<td>28</td>
<td>41</td>
<td>36</td>
</tr>
<tr>
<td>That women in their work environments support one another</td>
<td>71%</td>
<td>23</td>
<td>47</td>
<td>32</td>
<td>77</td>
</tr>
<tr>
<td>They’ve been mistaken for either administrative or custodial staff</td>
<td>77%</td>
<td>48</td>
<td>47</td>
<td>23</td>
<td>32</td>
</tr>
</tbody>
</table>

*SUCH AS “OFFICE MOTHER” OR “DUTIFUL DAUGHTER.”

**Sources:**
Strategies to Mitigate the Influence of Bias

Practice De-biasing Techniques
- Stereotype Replacement
- Counter-Stereotypic Imaging
- Increase opportunities for contact.

Avoid Your Triggers for “Biased” Decision-making
- Doubt your own objectivity
- Improve conditions of decision-making (maximize time, minimize stress)
- Rely on data, not perceptions of “fit”

Use Tools to Optimize Decision-Making
- Seek clarity in criteria and how to evaluate performance before evaluation begins.
- Be consistent and apply criteria to all candidates.
- Articulate the reasoning for every decision.
- Look for other/outside perspectives.

Constructing a Diverse Science Team

Be Intentional

• Include personnel from historically underrepresented populations

• Seek out those who have done training in a range of geographical locations, institutions

• Represent a range of career stages

• Look to different types of institutions and organizations (e.g., MSIs: HBCUs, HSIs; research active and/or master’s level institutions (e.g., R2s); Non-IHEs)

• Consider individuals from varying scientific fields to contribute to transdisciplinary aspects of the proposed work

Be Strategic

• Think about diversity early, and play the long game

• Seek out ways to build in training and mentorship opportunities for diverse student- and postdoctoral researchers

• Cultivate reciprocal relationships and partnerships
Consider multiple profiles of knowledge, deep expertise, and skill sets

- Increases pool of potential collaborators/team members
- Broadens possibilities for reaching outside of your network
- Counterforce against network closure
Build Capacity for Inclusive Interactions and Behaviors

Psychological Safety

• Shared perception among team members that they will not be embarrassed, rejected, or punished for speaking up with ideas, questions, concerns, or mistakes.

Inclusive Behaviors

• Develop the ability to think with others.
• Value the diverse ways people frame questions, process new information, and innovate new ideas.

Recognize Subtle Acts of Exclusion

VERBAL
"You’re so articulate."

NONVERBAL
Avoiding Eye Contact or Interaction

ENVIRONMENTAL
Only pictures of white male physicists in the hallways


Strategies For Addressing Subtle Acts of Exclusion:

1. Assume good intent, explain impact
   • I know what you meant….but the impact of it….

2. Ask a question about it
   • What do you mean by that?

3. Interrupt the sentence/behavior and redirect the conversation
   • Let’s talk about _______

4. Broaden it back out to a universal human behavior
   • I think that applies to just about anyone….

5. Help individualize it
   • Is there someone in particular you’re talking about?

6. OUCH
   • ouch, that hurts
### Establish Team Processes: Conflict Resolution

<table>
<thead>
<tr>
<th>Type</th>
<th>Management Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship Conflict</td>
<td>Reactive Approach: Working through disagreements via problem solving, compromise, and flexibility.</td>
</tr>
<tr>
<td>Task Conflict</td>
<td>Preemptive Approach: Anticipating and guiding conflict in advance via cooperative norms, charters, or other structures to shape conflict processes.</td>
</tr>
<tr>
<td>Process Conflict</td>
<td></td>
</tr>
</tbody>
</table>

Establish Team Processes: Reporting and Addressing Harassment and/or Bias

<table>
<thead>
<tr>
<th>RE-FRAME</th>
<th>Research integrity and ethical behavior includes maintaining a research environment free from harassment, bias, and discrimination.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREVENT</td>
<td>Develop a shared understanding of what is meant by harassment and engage in regular training to prevent it.</td>
</tr>
<tr>
<td>SET STANDARDS</td>
<td>Maintain clear, unambiguous standards of professional behavior and policies.</td>
</tr>
<tr>
<td>FACILITATE REPORTING</td>
<td>Provide accessible and effective means for reporting in all research environments, and ensure process is well-known by all team members.</td>
</tr>
<tr>
<td>LEVERAGE RESOURCES</td>
<td>Partner with the Title IX or similar office to ensure the safety of all parties, investigate the allegations, and determine the appropriate sanctions in the event of findings.</td>
</tr>
</tbody>
</table>

Establish Team Processes: Giving and Receiving Feedback

- Ensure feedback is timely, specific, actionable, candid
- Reflect on your intention for giving feedback
- Examine how biased norms can lead to biased feedback
- Focus on substance, not style
- Deliver feedback with the Situation-Behavior-Impact framework
- Get comfortable feeling uncomfortable

Case Study Activity

Use the QR Code to download the case study.

Take the time you need to read the case study.

Work in small groups to complete the worksheet in the PI Launchpad workbook.

https://tinyurl.com/LMPLaunchpad
Questions and Discussion

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