Invisible threats: CONTENDING WITH SYSTEMIC STEREOTYPE THREAT IN STEM FIELDS

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Context: Women in STEM

Leaky Pipeline in STEM Fields in Academia

Leaks in the academic pipeline for women in STEM fields

<table>
<thead>
<tr>
<th>Rank</th>
<th>% Women at Different Academic Ranks</th>
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<tbody>
<tr>
<td>Ph.D. students</td>
<td>50%</td>
</tr>
<tr>
<td>Post-docs</td>
<td>37%</td>
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<tr>
<td>Assistant Professors</td>
<td>24%</td>
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<tr>
<td>Associate Professors</td>
<td>22%</td>
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<tr>
<td>Full Professors</td>
<td>12%</td>
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<td>National Academy of Sciences members</td>
<td>6% (in 2000)</td>
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</table>
“It does appear that on many, many different human attributes - height, weight, propensity for criminality, overall IQ, mathematical ability, scientific ability - there is relatively clear evidence that whatever the difference in means - which can be debated - there is a difference in the standard deviation, and variability of a male and a female population. And that is true with respect to attributes that are and are not plausibly, culturally determined.”

Lawrence Summers, President of Harvard University

“Let me tell you about my trouble with girls… Three things happen when they are in the lab: You fall in love with them, they fall in love with you, and when you criticize them they cry.”

Tim Hunt; Honorary Professor, University College of London, Nobel Laureate
June, 2015, World Conference of Science Journalists, South Korea

Explanations for disparities as an invisible threat

- How do these explanations about “group deficits” as the reason for their underrepresentation influence women who work in these systems?
  - How might this heightened the visibility of their gender identity?
  - How might this heightened the invisibility of their professional identity?
Systemic Stereotype Threat

- A **chronic systemic threat** that occurs when:
  - an individual is in a system that is characterized by gender or racial disparities
  - Dominant discourse about the reason for these disparities is stereotypes about the deficits of women and people of color rather than systemic inequalities

Stereotype Threat

![Stereotype Threat Image](image-url)
Stereotype Threat

- An **acute situational threat** that puts people at risk of confirming, as self-characteristic, a negative stereotype about one's group

- Awareness that one's behavior might be viewed through the lens of stereotypes creates a **“threat in the air”**

- Stigmatized groups fear being **reduced to the stereotype**

- This threat **can impact performance**

Documented in a Large Number of Groups

- **Women on math tests**  
  (Spencer, Steele & Quinn, 1999)

- **African-Americans on standardized tests**  
  (Steele & Aronson, 1995)

- **Hispanics on standardized tests**  
  (Gonzales, Blanton & Williams, 2002)

- **Low SES students on standardized tests**  
  (Croizet & Claire, 1998)

- **Women on negotiation tasks**  
  (Kray, Galinsky & Thompson, 2002)

- **Men on social sensitivity tasks**  
  (Koenig & Eagly, 2003)

- **Whites on tasks that require being non-racist**  
  (Richeson & Shelton, 2003)

- **White men (compared with Black men) on athletic tasks**  
  (Stone, Spunelung, Lynch, & Darley, 1999)

- **White men (compared with Asian men) on math tests**  
  (Aronson, Lustina, Good, Koenig, Steele, & Brown, 1999)
Chronic effects of stereotype threat?

- Vast majority of this research in laboratory settings
  - Results in a static picture of individual’s responses to an acute threat in a given situation

- Far less research in the field (Kalokerinos, von Hippel & Zacher, 2014)
  - Need to understand how people cope with chronic effects of having a career in these environments

Research Questions

How do women scientists navigate careers in a stereotype-threatenining system?

- What strategies do they use when faced with a stereotype-relevant cue?
- How and why might strategies differ between women?
- What are the potential costs and benefits for employing a specific strategic approach to managing threat on the job?
Methodology

• Semi-structured interviews

• Sample
  - 26 STEM women at a top tier research university sampled by specialization and career stage
  - Funded through NSF ADVANCE Grant

• Analytical approach informed by grounded theory
  - Qualitative theory elaboration by way of narrative analysis

Research Participants

26 women scientists and engineers employed at a top tier research university sampled by specialization (biology, geology, engineering, earth sciences) and by career stage (post-doc through full professor).

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**Sr. Researcher/Post-Tenure (n=9)**
8/9 are married/living with partner
8/9 have children
5/9 are U.S. citizens
Age range: 41-51

**Jr. Researcher/Pre-Tenure (n=10)**
5/10 are married/living with partner
2/10 have children
3/10 are U.S. citizens
Age range: 31-43

**Post-Doc (n=7)**
4/7 are married/living with partner
1/7 have children
3/7 are U.S. citizens
Age range: 28-46
Women Scientists Employ a Variety of Strategies in Response to Systemic Stereotype Threat at 3 Different Levels

**Intrapersonal:**
Strategies are focused on managing self

**Interpersonal:**
Strategies are focused on managing relationships with colleagues

**Institutional:**
Strategies are focused on creating change in the institution or field of science

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**Strategies for Contending with Systemic Stereotype Threat**

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<tr>
<th>Response Patterns</th>
<th>Goal</th>
<th>Strategies</th>
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| **Fending off the Threat**         | Demonstrate threat is not self-relevant | • Downplay the threat  
• Blame self  
• Over-effort  
• Isolation |
| **Confronting the Threat**         | Stand up for self by active fight or flight strategies | • Revenge productivity  
• Advocacy  
• Collaborate with women  
• Work outside of the system |
| **Sustaining self in the presence of threat** | Take care of oneself while strategically managing threat | • Redefine criteria for success  
• Choose battles  
• Awareness of benefits of gender identity  
• Change the game |
Pattern 1 – Fending Off Threat

“Here I reworked my papers over and over until I couldn’t find anything more to fix, before sending them off. I kept adding and checking references. Two of my papers were accepted with no changes requested. One of my papers was even being typeset at the time that they notified me that it was accepted for publication. What did I do? I called and told them that I had some changes that I wanted to make. What a waste! In the same time and with the same energy I could have written three papers not one.”

Pattern 2 - Confronting Threat

“It’s almost like because you’re a woman, what comes out of your mouth seems less credible than any stupid shit that any man ever shot off his mouth….I thought it was a generational thing, but it’s not. I’d like to think that I’m trying to help the women that I have an impact on…that’s important to me…to make it easier for them to be who they are…I still get pissed off. I still get angry. It’s hard not to.”
Pattern 3 - Sustaining Self

• “What I do advise anybody, male or female, is that fundamentally follow your heart. You'll end up doing something you don't want to do for 20 years if you don't understand yourself well. So, you've got to follow who you are and fight for that.”

• “I go off to these committee meetings and I'm the only woman... they're all very male dominated, and they're all very – by and large, quite pompous... I look at it as where is there an opportunity for doing what I want to do, and get moving, and that's it”

• “I think my first strategy was simply to duck my head and just carve out a piece of work and often a piece that wasn't in this institution...I think my new strategy is...to try and define where the science, or where things are going, so you can change the playing field. Instead of fighting an individual battle with an individual person, try and change the system.”

Costs and Benefits of Each Response Pattern

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<tr>
<th>Response Pattern</th>
<th>Benefits (+)</th>
<th>Costs (-)</th>
</tr>
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</table>
| Fending off      | • Productivity  
                  • Visibility  
                  • Potential access to network of those in power  
                  • Avoidance of conflict  | • Overwork/burnout  
                  • Perfectionism – lost time  
                  • Isolation from other members of social identity group  
                  • Institution functions “as is”  |
| Confronting      | • Build a network with members of social identity group  
                  • Recognized as a visible champion for identity group  
                  • Satisfaction from creating change (being proactive)  
                  • Openness to alternative career options  | • Feelings of marginalization  
                  • Distraction from work  
                  • Turnover  
                  • Seen as a “trouble-maker”  |
| Sustaining       | • Increased clarity on professional and personal goals  
                  • Development of relationships with different colleagues  
                  • Creative expansion of field  | • Distancing from social identity community  
                  • May feel they are sacrificing professional goals to honor other needs  |
### Responses Patterned Depending on Goals for Managing (In)visibility

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<tr>
<th>Response Pattern</th>
<th>Understanding of Dominant Discourse</th>
<th>Goals for Managing (In)visibility</th>
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| Fending Off Threat        | Accept dominant discourse for women's underrepresentation | • Keep gender invisible to others  
• Keep systemic threat invisible to self |
| Confronting Threat        | Reject dominant discourse for women's underrepresentation | • Make systemic threat visible to others |
| Sustaining Self in Presence of Threat | Not controlled by dominant discourse about women's underrepresentation | • Recognizing (in)visibility as a dilemma to be navigated rather than a problem to be solved |

### Contributions and Implications

- **Women’s responses to systemic stereotype threat varied greatly**
  - One size fits all diversity practices that may do more harm than good

- **No one is immune to systemic stereotype threat – since it is “in the air” and a characteristic of the system not the individual**
  - Interventions should focus on fixing the system rather than fixing the women

- **Different type of invisible labor identified**
  - Cognitive and emotional labor women must take on to manage their own understanding of their underrepresentation in male-dominated professions

- **Need to change our reliance on a “meritocracy narrative” in systems characterized by gender and racial disparities**
  - Individual deficit explanations for system level inequities can create the predicament of systemic stereotype threat
Limitations and Future Research

• Generalizability of our findings
  – Sample was primarily white women
    • Steele et al. (2002): some groups have more experience dealing with stereotype threat and have developed more effective individual and collective strategies
    • Bell and Nkomo (2001): differences in strategies Black and White women managers used when responding to gender and race-based injustices
  – Future research should examine patterns for contending with systemic stereotype threat with more experienced groups

• Examination of factors that influence responses to systemic stereotype threat
  – Individual factors (gender identity, identity centrality, career stage, power)
  – Contextual factors (token status, occupational segregation)
  – Future research should examine these factors in other settings

• Developing a measure of response patterns
  – Inventory of responses to systemic stereotype threat (under development)