Leadership and Management Practices for Responsible Research

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Introduction

I'm an workplace psychologist, specializing in behavior in the research work setting.

What decisions and behaviors yield innovative, rigorous, ethical research?

Research Motivation

Importance of leadership and management in science overlooked
Excellent leadership and management practices are necessary
Identify Practices and Establish Link to Outcomes
Training and Development

Overview of Talk

1. Interviews with Wash U investigators (N = 32)
2. Interviews with "Research Exemplars" (N = 52)
3. PI Program root cause analysis & comparison to Exemplars (N = 100*)
4. Self-assessment survey of NIH-funded investigators (N = 472)
5. Postdocs report on PI behaviors & outcomes (N = 530)
Leadership and Management

Leadership = influencing people
Inspiring people, developing talent, and building relationships

Management = overseeing work
Planning work, directing personnel, and structuring workplace

Leadership and management are the social mechanisms and organizational processes by which people achieve success through collective effort.

1. Study of WU Investigators

- Principal investigators reflect on transitioning to leading their own independent lab:
  - “playing it totally by ear”
  - “jumping into the deep end”
  - “haphazard and hazardous”
  - “You go from doing the work to managing the work...”

2. Research Exemplar Study

Learn practices “research exemplars” employ to lead and manage research labs.

What explains the success of research exemplars? Their reputations of integrity?

What is a research exemplar?
- Federally-funded PI in any empirical discipline
- Produces high-quality, high-impact research
- Outstanding reputation of professionalism and integrity

Data collection
- Exemplar nomination and peer review
- 1-hour semi-structured interviews
- Brief research practices survey
- 600 pages of transcript coded for themes

Exemplars
- 70% Male
- Highly experienced (M = 28, SD = 12 years)
- Career publications (M = 138, SD = 96)
- Career grant funding ($18,500,00 median)
### Essential Practices

<table>
<thead>
<tr>
<th>Leadership</th>
<th>Management</th>
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<tr>
<td>Build relationships</td>
<td>Hold effective meetings</td>
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<tr>
<td>Encourage engagement</td>
<td>Establish rigorous research habits</td>
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<tr>
<td>Create team atmosphere</td>
<td>Learn from mistakes &amp; problems</td>
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<td>Address conflict</td>
<td>Prioritize compliance &amp; integrity</td>
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<tr>
<td>Provide routine feedback</td>
<td>Provide oversight</td>
</tr>
<tr>
<td>Celebrate successes</td>
<td>Establish operational &amp; training procedures</td>
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**Individualize interactions**

### Supportive Environment

“Rule number one in the lab is harmony. First and foremost, we have to get along, we have to respect each other, we have to trust each other.”

“We try to talk about being altruistic and helping each other...being altruistic and giving of yourself and your time to others will pay many more dividends in the end...”

### Communicating Values

“I also let my laboratory know... it doesn’t matter how long it takes us to do something, we’re gonna do it right, because we’re going to be able to say to people we have confidence in what we do, because here’s what we’ve done to get there.”

“...have them understand that no one person is better than the other. No person is more important, and if someone thinks they’re too good to do something, they probably need to find somewhere else to go.”

“I also let my laboratory know... it doesn’t matter how long it takes us to do something, we’re gonna do it right, because we’re going to be able to say to people we have confidence in what we do, because here’s what we’ve done to get there.”

### Transparency & Data Rigor

“There’s nothing that’s hidden. We talk about data out loud. That lab meeting we have each week is probably one of the most important hour to two hours that we spend together because everybody has to be able to show their raw data...”

“...We have a research meeting every week and we go over all the data that were collected that week...let’s not wait until the end of the study and discover that we did something wrong...”

### Human Side of Research

“I try hard to be a human... I was a human first, and then I learn to be a scientist. So if I forget the human part then that’s a problem, and I worry about that with scientists all the time, because the pressure is on us and it’s so enormous that you forget.”

“I tell [my team] that the only mistake that can’t be fixed is the one they don’t tell me about...I want to know about it...everyone’s human...”

### Summary

Exemplars prioritized good work relationships and an open, positive environment in their labs.

They recognized the intersection of the quality of interactions in the lab with the quality of research.
### 3. P.I. Program

- Professionalism and Integrity in Research Program
- Researchers referred for lapses in research compliance or integrity
- At least 50% of cases involve failures in supervision

<table>
<thead>
<tr>
<th>Inadequate communication &amp; availability</th>
<th>Lack of meetings</th>
<th>Inadequate training of staff</th>
<th>Lack of standardized procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overworked or distracted</td>
<td>Not prioritizing details and rules</td>
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### 4. Survey of NIH-Funded PIs

NIH-Funded PIs (N = 472)
Diverse career stages and types of research

Email recruitment (41% response rate)
44-item “Practices Inventory”

<table>
<thead>
<tr>
<th>Not at all likely (1)</th>
<th>Slightly likely (2)</th>
<th>Moderately likely (3)</th>
<th>Likely (4)</th>
<th>Extremely likely (5)</th>
</tr>
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For each behavior, answer the following question: "Considering my routine, observable behavior, how likely is it that the people working in my lab would say I engage in this behavior?"

### 44-item Practices Inventory

- **Overall Score (4 or 5)**
  - On average, PIs’ gave themselves 35/44 (80%) (range = 12 – 44)

### P.I. Participant Comparison to Exemplars

- Self-reported research group practices
- Exemplars more frequently:
  - hold meetings
  - work in close proximity to their team
  - utilize standard operating procedures in their labs
  - examine raw data not just analyses or output
  - store data in a central location
  - back up research data securely

*Effect sizes are moderate to very large.*

### 5. Postdoctoral Researchers

NIH-funded postdoctoral researchers (N = 570)

Reported on:
1. PI Behaviors
2. Climate for research ethics
3. Productivity
4. Job satisfaction
PI Behavioral Inventory

"Fostering Relationships" Practices (16-items)
- Encourages lab members when they struggle
- Communicates to lab members the importance of a supportive research group
- Tells lab members when they have done a good job

"Directing Rigorous Research" Practices (12-items)
- Tells lab members that the lab must be able to trust the accuracy of findings
- Discusses research findings and interpretations with lab members
- States that following research policies and procedures is a priority

Research group practices (10-items):
The lab I work in... "holds regular meetings as a group" and "stores research data in a central location accessible to the principal investigator".

Results

<table>
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<th>Predictor Variables</th>
<th>Outcomes</th>
<th>Relationship practices (High)</th>
<th>Rigorous research practices (High)</th>
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</thead>
<tbody>
<tr>
<td>Climate for Research Ethics*</td>
<td>Buffering effect</td>
<td>Climate highest</td>
<td></td>
</tr>
<tr>
<td>Job Satisfaction</td>
<td>Job satisfaction highest</td>
<td>Buffering effect</td>
<td></td>
</tr>
<tr>
<td>Productivity</td>
<td>Productivity highest</td>
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*Group practices predicted climate perceptions above and beyond PI practices

Open-ended Comments

Theme 1: Fostering relationships (65% of comments)

Lab Themes
- Provides support and encouragement
- Fosters a team atmosphere

Illustrative quote
- "He clearly loves all aspects of research..."
- "She is insistent that we maintain an open, communicative, and pleasant environment... maintains a cohesive and open group..."

Theme 2: Directing research (52% of comments)

Lab Themes
- Facilitates regular meetings
- Is available and responsive
- Fosters independence

Illustrative quote
- "Weekly meetings to gauge progress and plan the future work."
- "Provides excellent and thorough feedback and fosters understanding of the feedback."

Key Takeaways

Be intentional about:
- Building relationships
- Providing supervision
- Establishing training and operational process
- Laboratory culture

Steps:
- One-on-one & team meetings
- Be available & approachable
- Be explicit about values and expectations
- Ask for input
- Carefully handle problems & mistakes
- Celebrate wins

What qualities do you want to characterize your team’s work environment? Don’t forget the "small" and "less fun" stuff.

Resources

- Lab Leadership & Management Checklist
- L&M Practices with Behavioral Examples
- SMART Strategies
- Nature World View
  - https://www.nature.com/articles/d41586-018-07530-7
- Molecular Cell Forum
  - https://doi.org/10.1016/j.molcel.2018.09.015

Next Steps

- Training and mentoring program to develop leadership and management skills
  - Informed by focus groups with junior faculty
  - Tools and develop personalized Lab Manual
  - Collaborative, digital learning environment

- Examine leadership and management behaviors that support diverse lab members and create inclusive work environments
Discussion
Questions?
Thoughts

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References