



Leadership and Management Practices for Responsible Research

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Introduction

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

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




Scientific expertise
Workplace dynamics

Research Motivation

Importance of leadership and management in science overlooked

Excellent leadership and management practices are necessary

Identify Practices and Establish Link to Outcomes

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Training and Development

Overview of Talk

- 1**
Interviews with Wash U investigators
(N = 32)
- 2**
Interviews with "Research Exemplars"
(N = 52)
- 3**
P.I. 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 = 570)



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
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Data collection

Exemplar nomination and peer review	1-hour semi-structured interviews	Brief research practices survey	600 pages of transcript coded for themes
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What routine practices or habits do you use to...?

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

Leadership	Management
Build relationships	Hold effective meetings
Encourage engagement	Establish rigorous research habits
Create team atmosphere	Learn from mistakes & problems
Address conflict	Prioritize compliance & integrity
Provide routine feedback	Provide oversight
Celebrate successes	Establish operational & training procedures

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.”

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

Inadequate communication & availability

Lack of meetings

Inadequate training of staff

Lack of standardized procedures

Overworked or distracted

Not prioritizing details and rules

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.

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"

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?"

Not at all likely
(1)

Slightly likely
(2)

Moderately likely
(3)

Likely
(4)

Extremely likely
(5)

44-item Practices Inventory

- formal meetings and lab procedures
- data handling practices
- supervision, feedback, & training
- building effective relationships
- communicating values & priorities

Overall Score (4 or 5)

On average, PIs' gave themselves
35/44 (80%)

(range = 12 – 44)

PIs' rated themselves higher on the relational items and lower on standard procedures and research compliance items.

Most endorsed items	Least endorsed items
...available to lab members...	...establish and follow written scientific procedures (or checklists) for projects.
Respond to mistakes...in a supportive manner.	...state that fulfilling regulatory compliance requirements is a priority .
Give lab members positive feedback ...	Hold conversations about research compliance or integrity .
Ensure new lab members receive training ...	Consult with regulatory experts to obtain guidance when facing a problem...
Explicitly express appreciation ...	Share data in a data repository ...
...state must be open to the findings we actually obtain rather than the ones we want.	Conduct checks of compliance with lab protocols or standard operating procedures...
Ask people to work collaboratively ...	Use a written meeting agenda when meeting with my research team.

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

	Predictor Variables	
	Relationship practices (High)	Rigorous research practices (High)
Outcomes		
Climate for Research Ethics*	Buffering effect	Climate highest
Job Satisfaction	Job satisfaction highest	Buffering effect
Productivity	Productivity highest	

*Group practices predicted climate perceptions above and beyond PI practices

Open-ended Comments

Theme 1: Fostering relationships (65% of comments)

Sub-themes	Illustrative quote
Provides support and encouragement	"...His unfailing support. He does everything he can to help us be successful."
Shows kindness and concern	"Fair and just and cares about each person individually."
Expresses enthusiasm	"He clearly loves all aspects of research..."
Demonstrates openness	"...she is open and appreciates input..."
Engages in social interaction	"Friendly and frequent informal interactions with lab members"
Displays positivity	"Always positive, encouraging and exceedingly optimistic."
Fosters a team atmosphere	"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)

Sub-themes	Illustrative quote
Facilitates regular meetings	"Weekly meetings to gauge progress and plan the future work."
Is available and responsive	"My PI is always available to answer questions."
Offers quality feedback and input	"Provides excellent and thorough feedback and fosters understanding of the feedback."
Fosters independence	"Allowing researchers adequate freedom to pursue their own ideas."
Provides resources	"Provides exceptional resources for our research."
Encourages collaboration	"...strongly encourages collaboration both in the lab and with outside groups to bring new perspectives and expertise..."

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>

PI. PROGRAM
PROFESSIONALISM & INTEGRITY IN RESEARCH

Lab Leadership and Management Best Practices – Checklist

Principal investigators are responsible for managing lab operations and leading research staff. This tool also enables effective professional habits to support these activities. Using this checklist, identify areas of strength and opportunities for improvement. (Note: regarding terminology: Research staff include other faculty, postdoctoral graduate students, visiting graduate students, coordinators, research technicians and anyone else conducting research in your lab or team.)

Item	Check if completed	Check if on your to-do list
Research Lab Operations		
1. Do you regularly evaluate and improve your lab?		
2. Do you have a clear lab mission statement?		
3. Do you have a clear lab vision statement?		
4. Do you have a clear lab strategy statement?		
5. Do you have a clear lab budget statement?		
6. Do you have a clear lab safety statement?		
7. Do you have a clear lab ethics statement?		
8. Do you have a clear lab data management statement?		
9. Do you have a clear lab equipment management statement?		
10. Do you have a clear lab space management statement?		
11. Do you have a clear lab recruitment statement?		
12. Do you have a clear lab retention statement?		
13. Do you have a clear lab promotion statement?		
14. Do you have a clear lab mentorship statement?		
15. Do you have a clear lab professional development statement?		
16. Do you have a clear lab community engagement statement?		
17. Do you have a clear lab industry engagement statement?		
18. Do you have a clear lab public engagement statement?		
19. Do you have a clear lab social media engagement statement?		
20. Do you have a clear lab outreach engagement statement?		
21. Do you have a clear lab communication engagement statement?		
22. Do you have a clear lab collaboration engagement statement?		
23. Do you have a clear lab partnership engagement statement?		
24. Do you have a clear lab sponsorship engagement statement?		
25. Do you have a clear lab funding engagement statement?		
26. Do you have a clear lab grant engagement statement?		
27. Do you have a clear lab contract engagement statement?		
28. Do you have a clear lab legal engagement statement?		
29. Do you have a clear lab insurance engagement statement?		
30. Do you have a clear lab risk management engagement statement?		
31. Do you have a clear lab crisis management engagement statement?		
32. Do you have a clear lab disaster management engagement statement?		
33. Do you have a clear lab emergency management engagement statement?		
34. Do you have a clear lab security management engagement statement?		
35. Do you have a clear lab safety management engagement statement?		
36. Do you have a clear lab health management engagement statement?		
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38. Do you have a clear lab sustainability management engagement statement?		
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40. Do you have a clear lab corporate citizenship management engagement statement?		
41. Do you have a clear lab stakeholder management engagement statement?		
42. Do you have a clear lab relationship management engagement statement?		
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100. Do you have a clear lab community management engagement statement?		

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

1. Antes AL, Mart A, DuBois JM. Are leadership and management essential for good research? An interview study of genetic researchers. *J Empir Res on Hum Res.* 2016;11(5):408-423.
2. DuBois JM, Antes AL. Five dimensions of research ethics: A stakeholder framework for creating a climate of research integrity. *Acad Med.* 2017;93(4):550-555.
3. Antes AL, Kuykendall A, DuBois JM. The lab management practices of "research exemplars" that foster research rigor and regulatory compliance: A qualitative study of successful principal investigators. *PLOS One.* 2019;14(4):e0214595.
4. Antes AL, Kuykendall A, DuBois JM. Leading for research excellence and integrity: A qualitative investigation of the relationship-building practices of exemplary principal investigators. *Account Res.* 2019;26(3):198-226.
5. Antes AL, DuBois JM. Cultivating the human dimension in research. *Mol Cell.* 2018;72(2):207-210.
6. Antes AL. First law of leadership: Be a human first, scientist second. *Nature.* 2018;563:601.