

# You and Me as Researchers: Perspective

Essay

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## The importance of stupidity in scientific research

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- Martin A. Schwartz, PhD, is the Robert W. Berliner Professor of Medicine (Cardiology), Cell Biology & Biomedical Engineering at Yale University (h-index 124).
  - At some point in our PhD programs, we realize that no one actually knows the answer to our research question, and we need to find a solution
  - When we do science right, we realize that the amount we don't know is vast, basically infinite
  - We need to do better mentoring our students on how to be “productively stupid” (recognizing, embracing and working with what we don't know), in other words, “if we don't feel stupid it means we're not really trying.”

# The Role of Insecurity and Confidence

- We need to be aware of what we don't know and areas of difficulty for us (our weaknesses) as researchers
- We need to be aware of our strengths
- Insecurity: we emphasize our weaknesses
- Confidence: we emphasize our strengths
- Success requires balance between these extremes and the ability to not take either of them personally
- Some of the best theoretical researchers struggle with at least some areas of knowledge that they eventually become expert at

# Managing Ups and Downs in Research

- If we are doing research right, we will have ups and downs
- If we have no ups, then we need mentoring guidance or need to go into another research area
- If we have no downs, then we are not taking enough risks or we are not asking meaningful enough questions
- We need to be careful to not take either personally
- We need to learn from our ups and downs, including how to progress in both situations
- We need to encourage others through this process

# Responding to Criticism & Complements

- Learn which feedback to listen to or ignore
- Need both humility (not = insecurity) and confidence
- We should learn from critical feedback when possible but not take it personally (same for complements)
- Learn how to give useful feedback in our review processes: don't make it personal
- Example: Jean Sibelius, Arnold Schoenberg, and the 8th Symphony
- Find ways to have fun and continually improve



Jean Sibelius, 1913

# The Role of Critical Thinking

■ Steps of critical thinking:

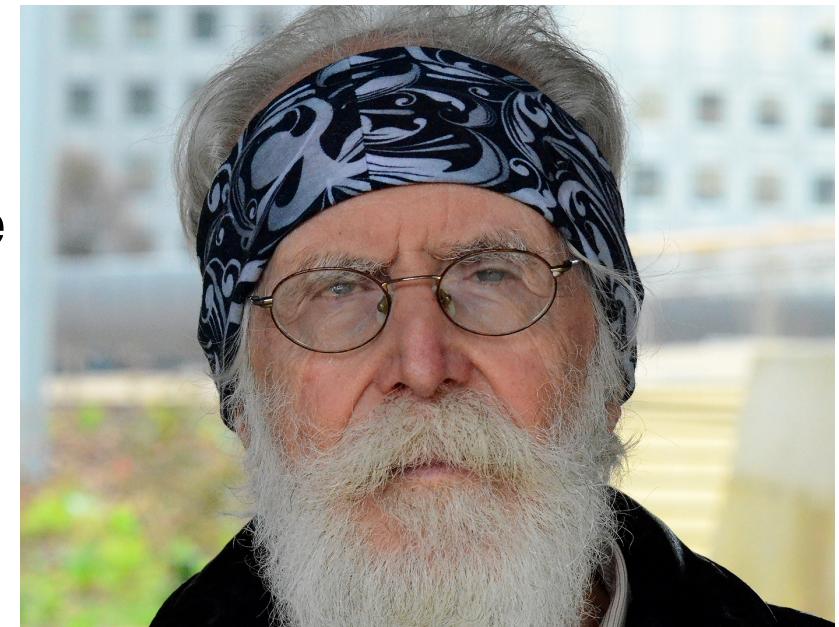
- Identify question, problem, or goal
- Identify gaps in knowledge to be filled
- Gather the needed information and data
  - Ensure appropriate representativeness and diversity of perspectives
  - Avoid bias, check errors (rigor)
- Analyze and evaluate, repeating above as needed
- Distill conclusions and disseminate results

# The Role of Critical Thinking, cont.

- Our role in critical thinking
  - Ensure rigorous critical thinking in our own fields
  - Assist collaborators in other fields in the appropriate use of our results and tools
- Statistics and the Scientific Method
  - Statistics is the science of the scientific method
  - The scientific method is a form of critical thinking
- Critical thinking in society
  - We should advocate for universal critical thinking skills and training in every sector of society

# Who Decides the Important Questions?

- Michel Talagrand received the 2024 Abel Prize
- His advice on this question: Sincerely work on the basic problem you can see right now, the problem you think matters. Don't worry about following the flock to the newest trend in the town. Ask important and relevant questions. Be open to collaborations and mentoring. Humility is the juice of life. (<https://medium.com/@nimritakoul01/from-challenges-to-triumph-how-michel-talagrands-mindset-can-inspire-you-d37320237edc>)
- Curiosity, humility, collaboration, mentoring.



## Description

Michel Talagrand - Abel Prize Laureate  
2024 - Color portrait

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Nobel Prize ✅

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"We compete against problems, not against people."

John B. Goodenough is the oldest person ever to receive a [#NobelPrize](#). He was 97 at the time of the award.

Watch our interview with Goodenough. We talked to the extraordinary chemistry laureate about life, science and love: <https://bit.ly/3SY2nE2>

