Research Mentor Training

The selections you have chosen for your customized curricula are drawn from materials based on *Entering Mentoring* (Pfund, Branchaw, and Handelsman, 2014).
The Entering Mentoring-based materials have been developed and tested by many partners across the country. Individual acknowledgements can be found in footers of each page.
A full listing of partners and funders can be found at CIMERProject.org.

Self-efficacy

1. Anatomy of a Research Success Experience
2. Improving Self-Efficacy
3. Building Mentees' Self-Efficacy
4. Promoting Research Self-Efficacy Full Session

Learning Objective:

Mentors will learn to define and articulate what self-efficacy is and its four sources

Activity

Anatomy of a Research Success Experience (10 minutes)

- Tell: Think of one "magical research moment" in your career thus far, a time when you had an outstanding experience or achievement in research you conducted. Then in pairs or triads, discuss some of the questions below. (5 min)

    1. How did that magical moment happen? What were the events, people, and experiences that contributed to the success?

    2. How do the factors that led to that success fit into the four sources of self-efficacy?

    3. Were some efficacy sources more common than others in your success story? If so, what are they?

    4. How do you think your own experiences with sources of research self-efficacy affect the approaches you use with your mentees, or do not use with your mentees, to build or support their research self-efficacy?

- DISCUSS (5 min) with the entire group themes that arose in pairs/triads.

Learning Objective:

Mentors will learn to identify signs of self-efficacy in relation to research related tasks and articulate their role in fostering mentees' research self-efficacy

Activity

Improving Self-Efficacy (15 minutes)

Distribute the Self-Efficacy Tool Box

- TELL: Think of one of your own mentees who currently or in the past has shown signs of lower self-efficacy around research. If you have not yet mentored someone, think of a time when you yourself were feeling challenges to your research self-efficacy.

- TELL: Look at the Self-Efficacy Tool Box in Handout #1, and spend a few minutes thinking and then talk with your partner (use previous pair/triad from Activity #1) about the following questions):
    1. Briefly, describe to your partner what is/was the situation or sign of low research selfefficacy.
    2. Which of the approaches could you use with this mentee? Or, if it was a past situation, what approach did you use? Do you think it helped? What else could you have tried?
    3. Does your workshop partner have suggestions about other approaches you could or could have tried?
    4. Which approaches on the handout feel most natural to you and which do not? Why?
    5. Are there some approaches that you think you would like to try moving forward?

The Self-Efficacy Tool Box – What Can You Do?
Research Mentors Matter!
You can make a difference in building your mentees' self-efficacy

Self-efficacy: belief in one's ability to achieve a specific goal or task. Self-efficacy is situation-specific self-confidence. Simply put, *"I believe I can do this."*

When a trainee's research self-efficacy falters, you can support them in four ways:

Mastery Experience

Ask yourself: *What are your mentees doing?* Are they doing well, but still lack self-efficacy for research? Are they taking on projects that might be too complex for them at this stage in their training?

What you can do:

- Reinforce your mentees' past successes (have them recall and highlight a personal "significant research moment", or other specific successes in other domains, to understand what contributed to their success in the past and recreate that in the present).
- Encourage mentees to reference past successes during the research experience or, if they are new to research, past successes in academics (e.g., "you did it before you can do it now"). Help mentees adopt success strategies (match strategies to situation—e.g., reinforce effective behaviors that contributed to their past success).

Social Modeling

Ask yourself: *What are mentees observing?* Do they have any role models in the lab or in their network of peers? Can they "see" themselves reflected in the students, faculty, staff, and policies in your STEM programs? Are students from historically underrepresented groups able to see themselves in STEM at your institution? Why or why not?

What you can do:

- Talk about your own research experience: How do you know when you are doing a good job as a researcher? What are the things that increase your confidence in your field?
- Consider who your mentees' role models are and what research skills (and attitudes) are being modeled for them by you and others.
- Be aware of what skills and behavior mentees are observing about coping with research challenges and setbacks; share strategies for what you do when you hit a wall and how you encourage yourself to get over challenges/setbacks in research.
- Offer time to practice skills that are strong as well as ones that need more development
- Encourage your department to run a session where advanced mentees or faculty talk about setbacks, challenges, and how they overcame them.

Adapted from the W.H. Freeman Entering Mentoring Series, 2017.

For additional resources and complete curriculum—including information on competencies and facilitator notes—visit: CIMERProject.org

Social Persuasion

Ask yourself: *What are they hearing?* Are they hearing that they have what it takes? Are they receiving specific feedback relating to their effort or capabilities? Is that feedback constructive? Is the message that you are sending the same as what is being received by the student?

What you can do:

- Foster a "you can do it" attitude.
- Be attuned to ways that you can acknowledge mentees' current successes.
- Reinforce mentee's research abilities by giving specific, credible feedback about technique and less evaluation of the outcome or general feedback.
- Let them know that they belong in research/the program.
- Be aware of signs that mentees may feel that they do not fit in research/training program ("I don't belong here").
- Talk about both the positive things mentees are doing while giving clear steps for how they can improve in areas that are challenging to them.

Emotional/Physiological State

Ask yourself: *What are they feeling?* How can you help students feel at home in your lab/classroom/university? What can you do regarding the environment (e.g., office hours, program policies, etc.) that can help reduce students' stress and anxiety relating to STEM?

What you can do:

- Be aware of positive (enjoyment) or negative moods (anxiety) mentees may have related to research/training program.
- Attend to negative, anxiety-related feelings (e.g. negative self-talk that they are not as smart as other mentees).
- Acknowledge and normalize when things are difficult; "It's supposed to be hard, new things usually are."
- Give examples of mentees who struggled but made it (successful in research)

Source: http://psychology.about.com/od/theoriesofpersonality/a/self_efficacy.htm?p=1

Learning Objective:

Mentors will learn to practice strategies for building mentees' research self-efficacy

Activity

Building Mentees' Self-Efficacy (15 minutes)

- DISCUSS (15 min): In the large group brainstorm particular examples of ways to improve self-efficacy. What additional approaches could be used?

Mentor Training for Social Science Researchers

Promoting Research Self-Efficacy

Stephanie A. Robert and Pamela S. Asquith

Adapted from the
W.H. Freeman *Entering Mentoring* Series 2017

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Promoting Mentee Research Self–Efficacy

Introduction

Self-efficacy is the perceived confidence people have in their ability to perform a given task or skill. Research consistently shows that self-efficacy has a tremendous impact on behavior; people who lack self-efficacy in relation to a certain skill are less likely to perform tasks relating to that skill set. Mentors play a critical role in shaping the research experience to increase mentees' self-efficacy in relation to their research skills. Making explicit efforts to strengthen mentees' research self-efficacy, like being explicit about how they are making important contributions to the team or telling them you believe they can successfully pursue a research career, can increase the likelihood that they will effectively perform the tasks that lead to these outcomes. There are four factors that build self-efficacy: past accomplishments, vicarious modeling, social persuasion, and positive affective states. These factors, or sources, provide mentors direction for strategies to enhance and sustain mentees' research self-efficacy.

Learning Objectives

Mentors will have the knowledge and skills to:

1. Define and articulate what self-efficacy is and its four sources
2. Identify signs of self-efficacy in relation to research related tasks
3. Articulate their role in fostering mentees' research self-efficacy
4. Practice strategies for building mentees' research self-efficacy

Self-efficacy curriculum developed by Byars-Winston, Angela, Leverett, Patrice, Branchaw, Janet, and Pfund, Christine (2013). University of Wisconsin-Madison. Supported by NIH grant # R01 GM094573 (Byars-Winston, PI).

Overview of Activities for the Self-Efficacy session: Please note that the core activity is listed for each learning objective. We encourage you to engage the mentors in your group in this activity. There is a list of additional activities that can be used if there is extra time in the session or the core activity is not working well for your group.

	Learning Objectives	**Core Activities**	**Additional Activities**
1	Define self-efficacy and its four sources.	Anatomy of a successful research experience (Activity #1)	
2	Identify signs of selfefficacy in relation to research-related tasks	Approaches to improving research self-efficacy with a specific mentee (Activity #2)	Case #1: The Struggling Graduate Student. How to build and support research self-efficacy . (Activity #4)
3	Articulate their role in fostering mentees' research self-efficacy	Approaches to improving research self-efficacy with a specific mentee (Activity #2)	Case #1: The Struggling Graduate Student. How to build and support research self-efficacy. (Activity #4)
4	Practice strategies for building mentees' selfefficacy in research	Discuss particular examples further, and brainstorm additional strategies that could be used (Activity #3)	Case #1: The Struggling Graduate Student. How to build and support research self-efficacy. (Activity #4)

Facilitation Guide

Recommended Session on Improving Mentee Research Self-Efficacy (45 minutes)

- **Materials Needed for the Session:**
  - Table tents and markers
  - Chalkboard, whiteboard, or flip chart
  - Handouts:
    - Copies of introduction and learning objectives for *Promoting Mentee Self-Efficacy* (page 87)
    - Copies of What is Self-Efficacy handout (at beginning or prior as a homework assignment) (page 90)
    - Copies of Sources of Self-Efficacy handout (page 91)
    - Copies of Self-efficacy toolbox (pages 92-93)
    - Copies of the additional case if desired (page 94)

- **Overview (5 min)**
  - TELL: Introduce the session, review the introduction and learning objectives, and provide brief overview of the concept of self-efficacy.

This module was developed by Byars-Winston et al. (2013). See page 87.

- **Objective 1: What Is Research Self-Efficacy and How Do You Improve It? (10 min)**
  - ACTIVITY #1: Anatomy of a Research Success Experience

    - Tell: Think of one "magical research moment" in your career thus far, a time when you had an outstanding experience or achievement in research you conducted. Then in pairs or triads, discuss some of the questions below. (5 min)

      1. How did that magical moment happen? What were the events, people, and experiences that contributed to the success?
      2. How do the factors that led to that success fit into the four sources of self-efficacy?
      3. Were some efficacy sources more common than others in your success story? If so, what are they?
      4. How do you think your own experiences with sources of research self-efficacy affect the approaches you use with your mentees, or do not use with your mentees, to build or support their research self-efficacy?

    - DISCUSS (5 min) with the entire group themes that arose in pairs/triads.

- **Objective 2 and 3: Identify signs of self-efficacy in relation to research related tasks and articulate their role in fostering mentees' research self-efficacy (15 min)**

  - ACTIVITY #2: Approaches to improving research self-efficacy with a specific mentee. Distribute the Self-Efficacy Tool Box

    - NOTE: If this session is not with experienced mentors, consider replacing Activities #2 and #3 with Activity #4 under Additional Activities.

    - Tell: Think of <u>one of your own mentees</u> who currently or in the past has shown signs of lower self-efficacy around research. If you have not yet mentored someone, think of a time when you yourself were feeling challenges to your research self-efficacy.

    - TELL: Look at the Self-Efficacy Tool Box in Handout #1, and spend a few minutes thinking and then talk with your partner (use previous pair/triad from Activity #1) about the following questions):

      1. Briefly, describe to your partner what is/was the situation or sign of low research selfefficacy.

      2. Which of the approaches could you use with this mentee? Or, if it was a past situation, what approach <u>did</u> you use? Do you think it helped? What else could you have tried?

      3. Does your workshop partner have suggestions about other approaches you could or could have tried?

      4. Which approaches on the handout feel most natural to you and which do not? Why?

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- **Objective 4: Practice strategies for building mentees' self-efficacy in research (15 min)**
  - ACTIVITY #3: DISCUSS: In the large group brainstorm particular examples from the pairs activity further. What additional approaches could be used? (15 min)

What Is Self-Efficacy?

The concept of self-efficacy is central to psychologist Albert Bandura's social cognitive theory, which emphasizes the role of observational learning, social experience, and reciprocal determinism in the development of personality. According to Bandura, a person's attitudes, abilities, and cognitive skills comprise what is known as the self-system. This system plays a major role in how we perceive situations and how we behave in response to different situations. Self-efficacy plays an essential part of this self-system.

According to Albert Bandura, self-efficacy is "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations." In other words, self-efficacy is a person's belief in his or her ability to succeed in a particular situation. Bandura described these beliefs as determinants of how people think, behave, and feel (1994). Since Bandura published his seminal 1977 paper, "Self-Efficacy: Toward a Unifying Theory of Behavioral Change," the subject has become one of the most studied topics in psychology. Why has self-efficacy become such an important topic among psychologists and educators? As Bandura and other researchers have demonstrated, selfefficacy can have an impact on everything from psychological states to behavior to motivation.

The Role of Self-Efficacy

Virtually all people can identify goals they want to accomplish, things they would like to change, and things they would like to achieve. However, most people also realize that putting these plans into action is not quite so simple. Bandura and others have found that an individual's self-efficacy plays a major role in how goals, tasks, and challenges are approached.

People with a strong sense of self-efficacy:

- View challenging problems as tasks to be mastered
- Develop deeper interest in the activities in which they participate
- Form a stronger sense of commitment to their interests and activities
- Recover quickly from setbacks and disappointments *People with a weak sense of*

self-efficacy:

- Avoid challenging tasks
- Believe that difficult tasks and situations are beyond their capabilities
- Focus on personal failings and negative outcomes
- Quickly lose confidence in personal abilities

Sources of Self-Efficacy

How does self-efficacy develop? These beliefs begin to form in early childhood as children deal with a wide variety of experiences, tasks, and situations. However, the growth of self-efficacy does not end during youth, but continues to evolve throughout life as people acquire new skills, experiences, and understanding.

According to Bandura, there are four major sources of self-efficacy.

1. Mastery Experiences

"The most effective way of developing a strong sense of efficacy is through mastery experiences," Bandura explained. Performing a task successfully strengthens our sense of self-efficacy. However, failing to adequately deal with a task or challenge can undermine and weaken self-efficacy.

2. Social Modeling

Witnessing other people successfully completing a task is another important source of self-efficacy. According to Bandura, "Seeing people similar to oneself succeed by sustained effort raises observers' beliefs that they too possess the capabilities master comparable activities to succeed."

3. Social Persuasion

Bandura also asserted that people could be persuaded to believe that they have the skills and capabilities to succeed. Consider a time when someone said something positive and encouraging that helped you achieve a goal. Getting verbal encouragement from others helps people overcome selfdoubt and instead focus on giving their best effort to the task at hand.

4. Emotional and Physiological Responses

Our own responses and emotional reactions to situations also play an important role in self-efficacy. Moods, emotional states, physical reactions, and stress levels can all impact how a person feels about their personal abilities in a particular situation. A person who becomes extremely nervous before speaking in public may develop a weak sense of self-efficacy in these situations.

However, Bandura also notes "it is not the sheer intensity of emotional and physical reactions that is important but rather how they are perceived and interpreted." By learning how to minimize stress and elevate mood when facing difficult or challenging tasks, people can improve their sense of selfefficacy.

References

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191215.

Bandura, A. (1992) Exercise of personal agency through the self-efficacy mechanisms. In R. Schwarzer (Ed.), *Selfefficacy: Thought control of action.* Washington, DC: Hemisphere.

Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior*, 4. New York:

Academic Press, pp. 71-81.

Bandura, A. (1995). *Self-Efficacy in Changing Societies.* Cambridge University Press.

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Source: http://psychology.about.com/od/theoriesofpersonality/a/self_efficacy.htm?p=1

Additional Activity (if time allows):

Objectives 3, 4, and 5; Activity #4:
This case study is an alternative activity to address fostering self-efficacy in a research group. (30 min total: 3 min for participants to read the case and questions, 12 min for paired or small group discussion, and 15 minutes for large group discussion.)

Case #1: ***The Struggling Graduate Student*** One of your colleagues, Dr. Cooper, comes to talk with you about a situation with her mentee, Al, a second year graduate student. Al arrived at a recent meeting with Dr. Cooper seeming down and nervous as he told Dr. Cooper that he was not sure that he was going to be successful working with Dr. Cooper and her research group. For six months, Al has been coming to weekly meetings that Dr. Cooper holds with her research team consisting of Al, two other graduate students, and one postdoc. When Dr. Cooper asked Al why he thinks he won't be successful, he said that in the weekly meetings he observes that the others all know a lot more about the topic than he does, they all seem to grasp advanced research methods, and they are all moving their research agenda forward while he doesn't even have his own topic yet. He said he recognizes that the other two graduate students are ahead of him – that they have completed their coursework, and that one is a postdoc, but still he can't imagine himself being able to get to where they are so quickly. He worries that he doesn't have the preparation needed to work with Dr. Cooper and her group.
Dr. Cooper feels bad that she probably didn't spend enough time with Al when she invited him to join her research group. She thought that Al could start learning by watching the others in the research group first, and pick up information there. She also wonders if Al might feel like he doesn't belong because the others are funded from Dr. Cooper's research grant while Al is funded by a minority fellowship from the graduate school. Dr. Cooper thinks Al has a lot of promise, but it's true that she hasn't given him many opportunities to contribute to the progress of the research.

Guiding Questions for Discussion:

1. What might Dr. Cooper say to Al?
2. What might she do?
3. How can she draw from all four sources of self-efficacy in considering what to say or do?
4. How might your own unconscious biases affect your assumptions about how to approach building or supporting research self-efficacy in your mentees?