Research assistants! Making the most of your summer

Contents

What makes an effective RA?

Workshop participants should do this now.

Group discussion in zoom: Which of the following is a research lab in psychology most similar to??? What implications do these differences have for what an RA must do in order to be successful?

Groups of 2/3 students

- **Share** –
  - *A research lab is like a first class flight on an airplane.*

  - *A research lab is like an orbiting space ship.*

  - *A research lab is like a new store in a mall.*

10 minutes

(You will not see this slide in the zoom room so please jot down what we want you to share)

Workshop participants should do this now.

Group discussion in zoom: Which of the following is a research lab in psychology most similar to??? What implications do these differences have for what an RA must do in order to be successful?

Groups of 2/3 students

- **Share** –
  - *A research lab is like a first class flight on an airplane. The professor in charge is like a passenger. The university is the pilot and also the crew. The university provides everything the professor and the lab needs to be successful. That includes equipment, supplies and even a plan for research. The professor conducting the research is like a first class passenger who can work hard in his/her/their seat while everyone around is working to help the professor. An RA is part of the crew. The RA has a clear job and guidelines about what to do on the flight.*

- *A research lab is like an orbiting space ship. The university is mission control guiding the rocket ship (the lab) and the crew (the professor and the lab members). Mission control tells the professor what to do and how to navigate research. Mission control (the university) buys supplies and equipment and resources. The mission control is the university that makes the major decisions for the lab including how to hire staff and what kind of research to do. The Professor is like the lead astronaut and the RAs are like new assistant astronaut on this mission. The new RA has a very difficult job because there are many uncertainties in space but there are also clear guidelines about what to do.*

- *A research lab is like a new store in a mall. The professor is an independent store owner who does everything from choose what the store will sell to how the store will market its products. The professor has to staff up the store. The things in the store that people buy is essentially the research. The professor has to staff up the store with lab members. The mall is the broad umbrella and provides a little bit of infrastructure but every single decision in that store is up to the store owner, the professor. The Professor is like the store owner and the RAs are like brand new store managers. The RA has to help make the store a success and it is really unclear how to make the store successful.*

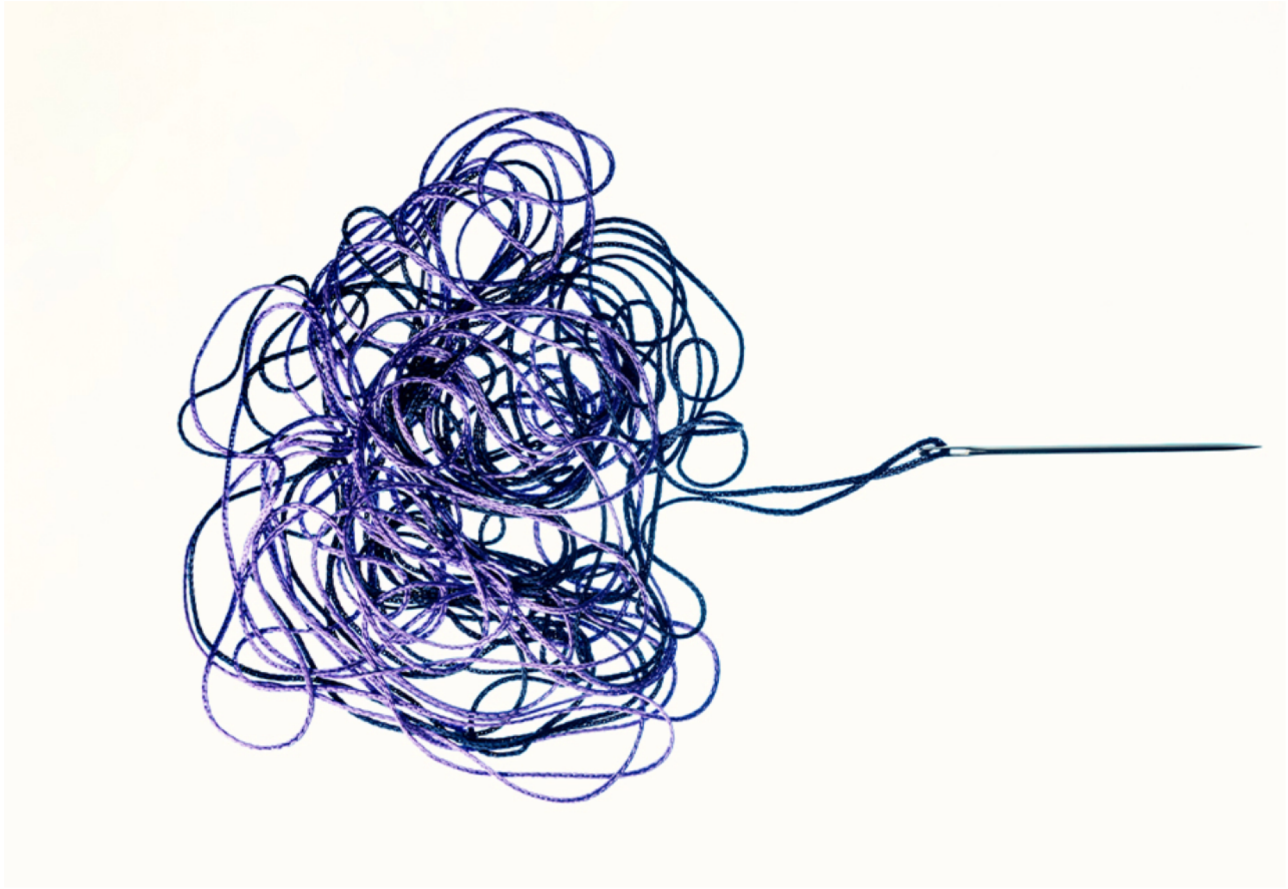
10 minutes

(You will not see this slide in the zoom room so please jot down what we want you to share)

Skills of an effective research assistant

My journey from an RA in Geraldine Downey's lab 25 years ago to now…

Skills of an effective research assistant



Tools

Manage yourself

Be intellectual around the lab

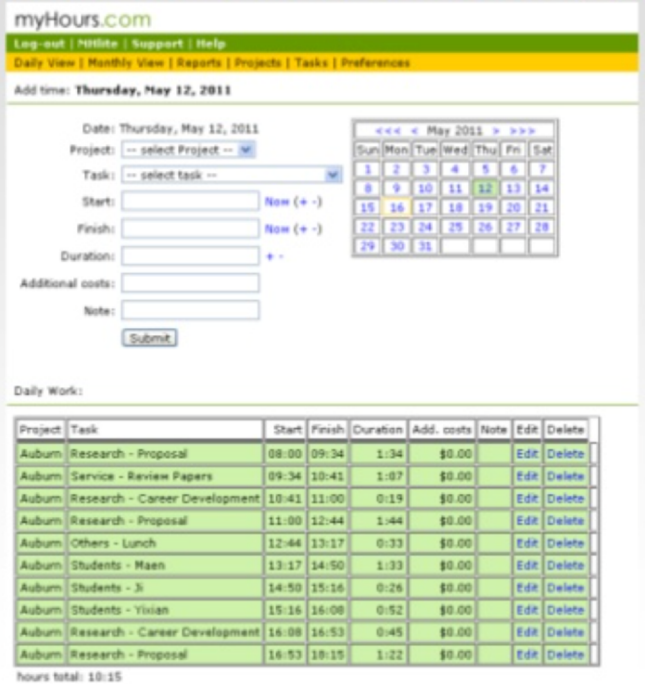
Be proactive

If doing research pick a “doable” research question

1. Manage yourself

- Goals, priorities, and planning
  - Set goals, and keep them updated
  - Make a plan for each day, week, month, quarter
    - "Failing to plan means planning to fail"
  - Prioritize – do important things first
  - Don't waste time – kill your TV, xBox
    - Keep track of how you spend your time
    - "Is this activity helping me to achieve my REU goal?"
  - Keep a notebook, write these things down

Keep Track of Your Time: a better approach



2. Develop the discipline of being intellectual around lab research

- Think!
  - Set aside time for thinking. Really.
- Read! (To be covered in another training session)
  - Get to know the literature in your area intimately (not superficially)
- Act!
  - Don't feel like you have to know everything first
  - Don't worry about being wrong
- Evaluate!
  - Solicit feedback – most ideas aren't so good…

3. Be proactive

- Don't wait to be told what to do
  - Don't be passive; in fact, be aggressive!
  - Make things happen
- You will not be spoon-fed
  - What you get out of the research program is a non-linear function of what effort you put into it.
- Research activities can be very unstructured
  - Unlike undergraduate studies
  - So it's up to you (not your advisor)

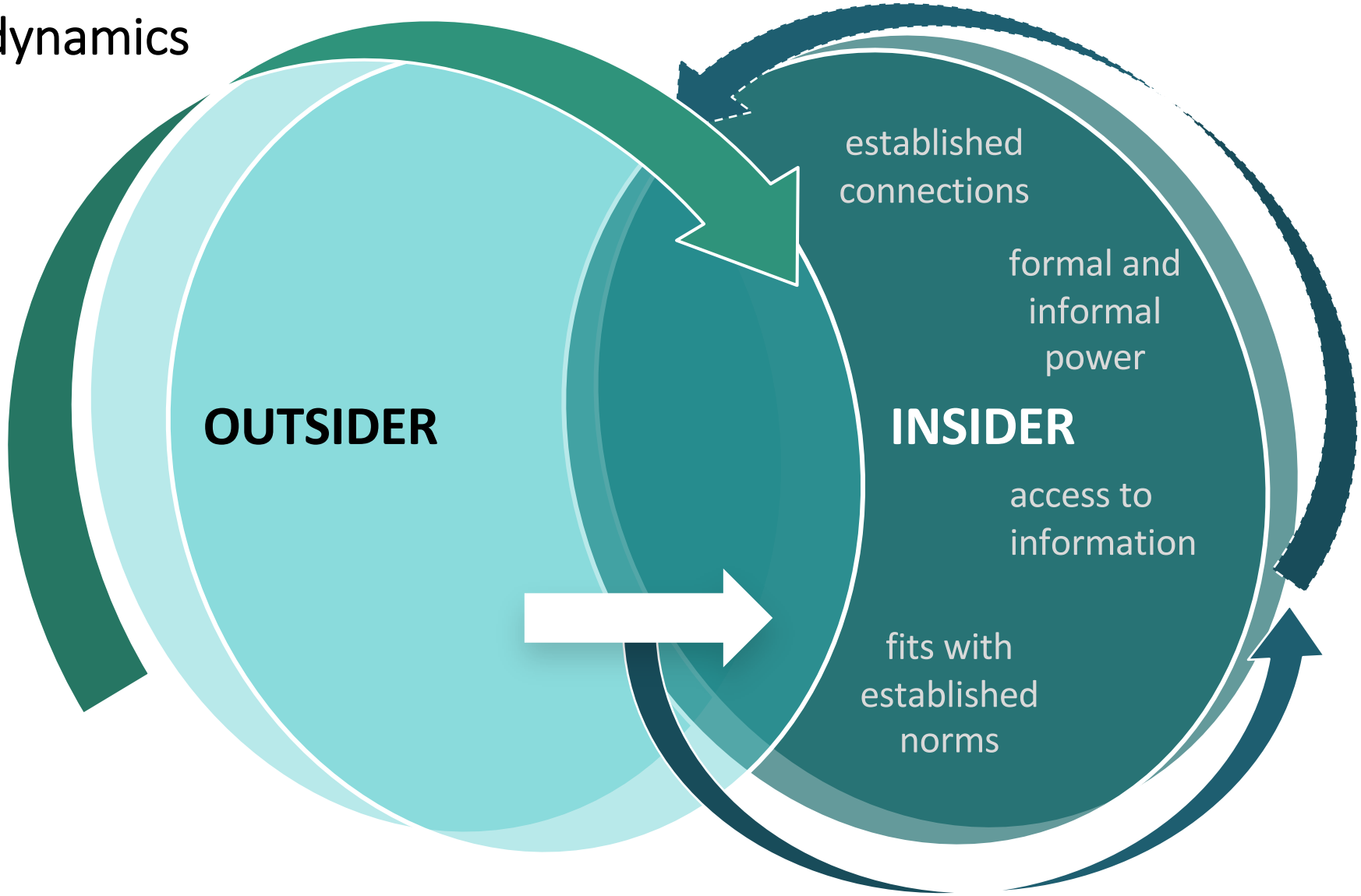
AUBU

4. If you are choosing your own research problem, choose wisely

- This is the hardest, and most important, part of research!
- The Goldilocks problem:
  - Not too hard, not too soft, not too hot, not too cold, not too big, not too small
- Think, read, act, evaluate
  - And talk to everyone – not only your advisor
- Passion or duty?

Key insights related to insider/outsider dynamics in the lab

Insider/outsider dynamics



1

Belonging uncertainty has frequently been defined as concern about the quality of one's social ties or about whether one would be fully included in positive social relationships (e.g., Walton and Cohen, 2007, 2011)

Examples of how "uncertainty belonging" might present itself

- **MINDSET:** "I am not sure that science is for me or is consistent with my identity"
  - Sometimes students' commitment appears to waver. You might notice real highs for accomplishments and real lows when things do not go well.

- **INTERACTIONS WITH LAB SUPERVISOR:** "Everything I do in the lab should have a clear purpose and I should understand the end goal before starting."
  - Sometimes science requires we read, try or work on things and the end goal is not clear.

- **WORKSHOP/CLASS:** Student is likely to start off excited but then drop out (higher rates of drop out intentions) or appear to be low in motivation (not try as hard as others).

2

Utility value mindset is a term Alfredo and Valerie invented today. It is based on utility value writing interventions that have been designed to help students find the personal relevance of science material in their daily lives.

Examples of how "utility value" might present itself

- **MINDSET:** "I want my science to make a difference in the world today and be applied to real world problems"
  - The reality is if you are too "high" in utility value mindset, you may lose interest in exploring science for its own sake.
- **INTERACTIONS WITH LAB SUPERVISOR: Students may underestimate how tedious, boring but SUPER IMPORTANT most lab tasks are. They want "the good assignments."**
- **WORKSHOP/CLASS:** Students will do better on assignments that are tied to issues of social relevance to them.
- **IDENTITY BASED:** Students may presume that because an issue is of social relevance to them it is the perfect research problem. Recognize that you may have to dig deeper to find a solid research problem.

https://www.cambridge.org/core/books/cambridge-handbook-of-motivation-and-learning/utility-value-and-intervention-framing/59EE3FE8FE7405686AFDB7A3F60FAB40

4

A fixed mindset means that you believe intelligence is fixed—so if you're not good at something, you might believe you'll never be good at it. Students may lean towards this mindset rather than a growth mindset, which means that you believe your intelligence and talents can be developed over time.

Examples of how “fixed mindset” might present itself

- **MINDSET:** “I am being judged by how smart I am.” “If I struggle I am not smart.” “This is so easy for my mentor and so hard for me!” “This blah blah blah I am bad at and I will never get better.”
- **INTERACTIONS WITH LAB SUPERVISOR:** Students will primarily work hard on projects that they already believe they can do well.
- **WORKSHOP/CLASS:** Students will not ask for help believing that “the smart” people in the class already know the answer.

https://fs.blog/2015/03/carol-dweck-mindset/

3

Stereotype threat refers to the risk of confirming negative stereotypes about an individual's racial, ethnic, gender, or cultural group which can create high cognitive load and undermine academic focus and performance.

Examples of how "utility value" might present itself

- **MINDSET:** "I am being judged by others based on the behaviors of my racial/ethnic group" "Everything must be perfect."
- **INTERACTIONS WITH LAB SUPERVISOR:** Students may work for extremely long hours on a task without asking fort help. Students may devalue the iterative and incremental nature of the mentor-mentee relationship.
- **WORKSHOP/CLASS:** Students will not ask for help on assignments (suffer in silence). Work on assignments alone.

https://www.colorado.edu/center/teaching-learning/inclusivity/stereotype-threat

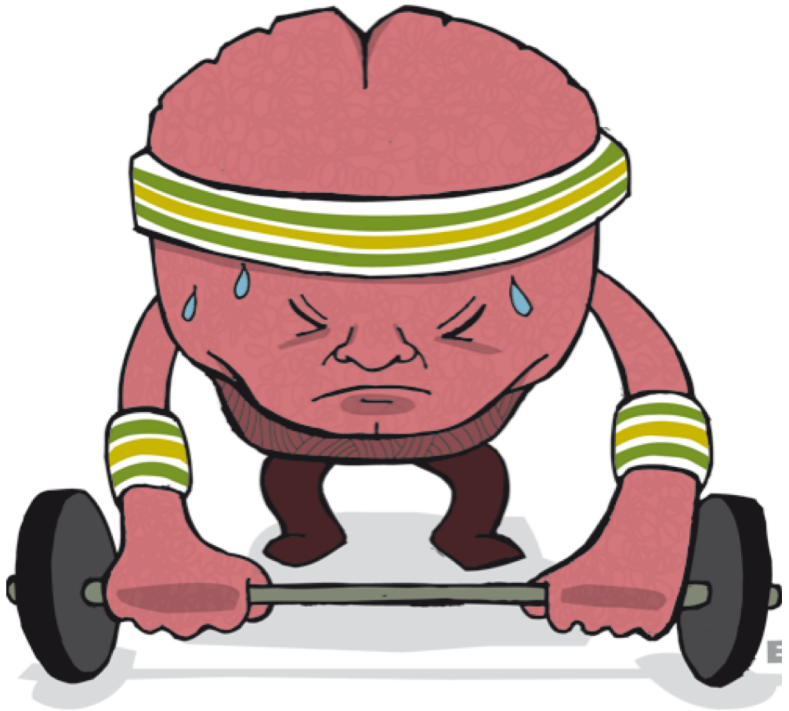
Writing Reflection. What two concepts did you just learn related to insider/outsider dynamics that can help you make the most out of your summer?

10 minutes

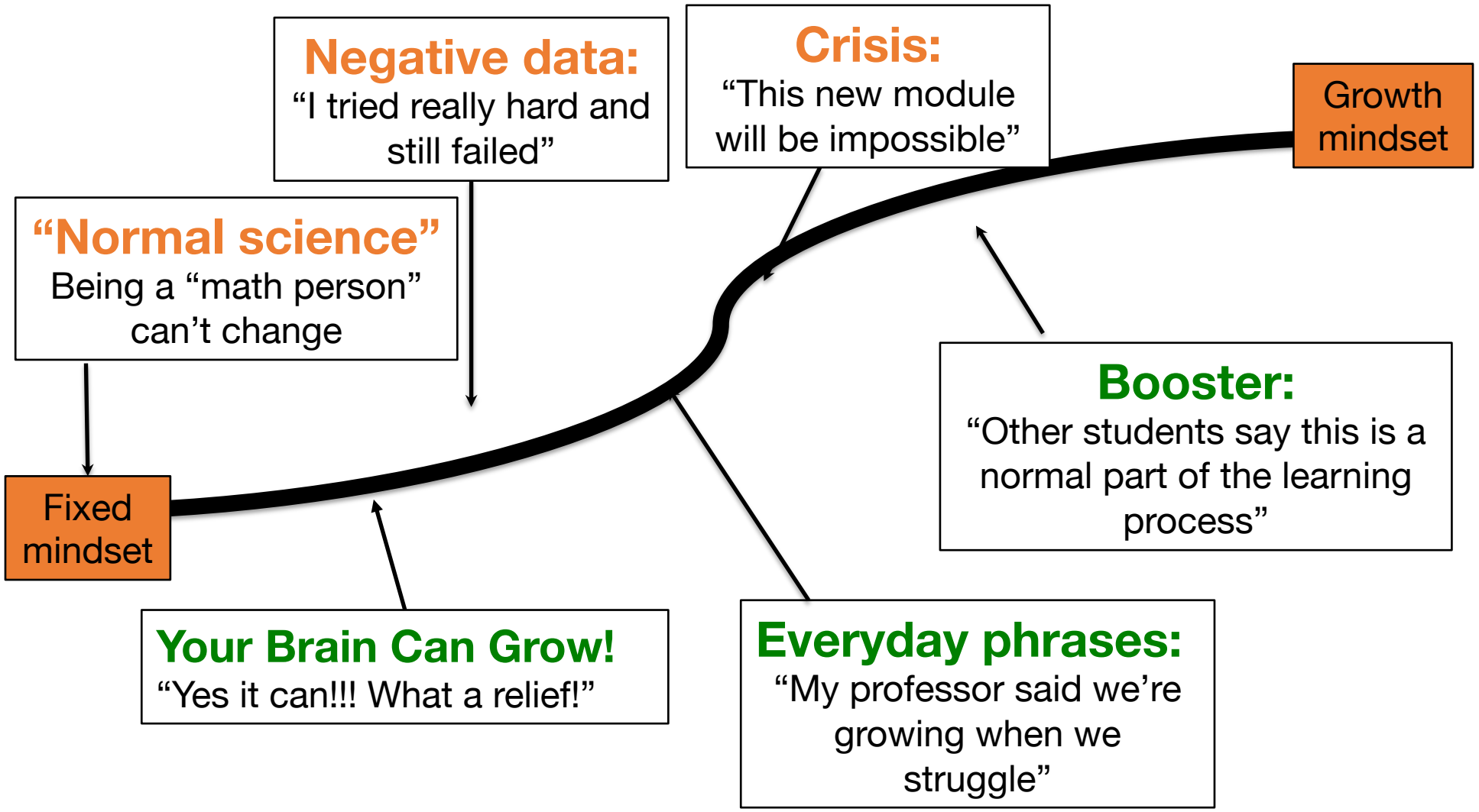
If we have time left.....!

How we turned your middle school math teacher into a stellar researcher over one summer!!!

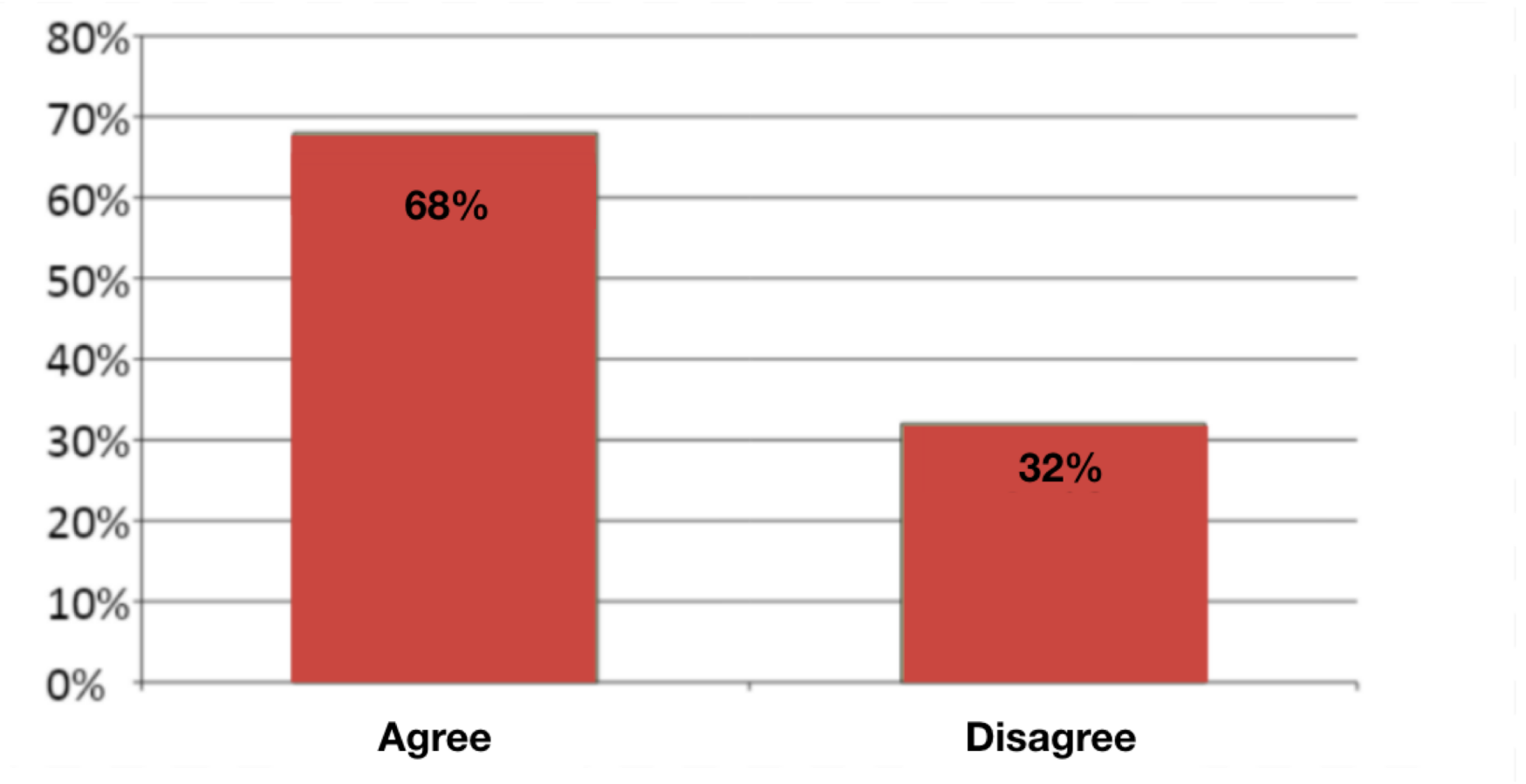
Growth and fixed mindsets



Fixed and growth mindsets over the course of a semester



“Being a 'math person' or not is something about you that you really can't change. Some people are good at math and other people aren't."



Survey data from Fall 2011 Carnegie Foundation Statway, N ~ 1,100

“I am embarrassed by how stupid I am and suddenly feeling very discouraged … I can't even tell which fraction is bigger than another, or where they should fall on the number line. I feel like crying.”

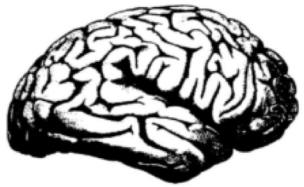
You Can Grow Your Brain

New Research Shows the Brain Can Be Developed Like a Muscle

By: Lisa S. Blackwell and David S. Yeager

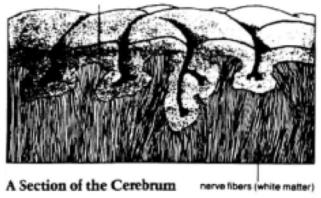
Many people think of the brain as a mystery. We don't often think about what intelligence is or how it works. And when you do think about what intelligence is, you might think that a person is born either smart, average, or dumb—either a "math person" or not—and stays that way for life.

But new research shows that the brain is more like a muscle—it changes and gets stronger when you use it. Scientists have been able to show just how the brain grows and gets stronger when you learn.



Everyone knows that when you lift weights, your muscles get bigger and you get stronger. A person who can't lift 20 pounds when they start exercising can get strong enough to lift 100 pounds after working out for a long time. That's because muscles become larger and stronger with exercise. And when you stop exercising, the muscles shrink and you get weaker. That's why people say "Use it or lose it!"

But most people don't know that when they practice and learn new things, parts of their brain change and get larger, a lot like the muscles do. This is true even for adults. So it's not true that some people are stuck being "not smart" or "not math people." You can improve your abilities a lot, as long as you practice and use good strategies.



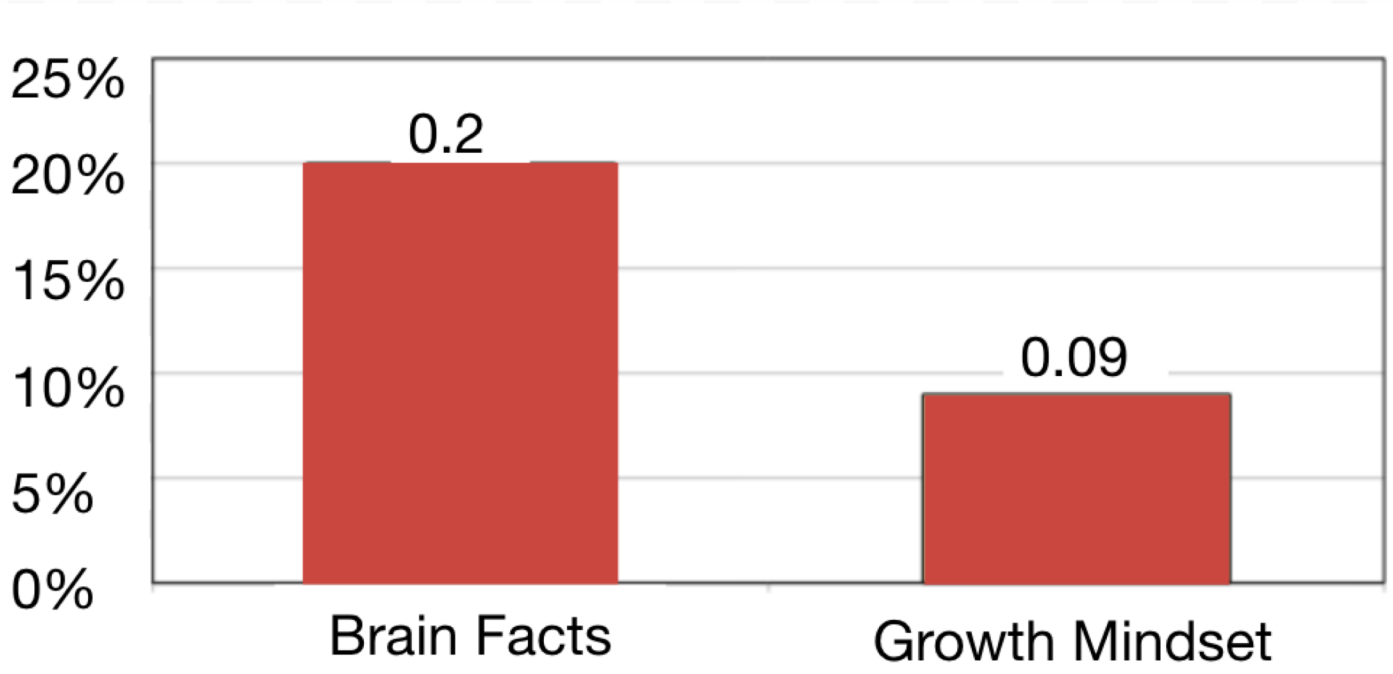
Inside the outside layer of the brain—called the cortex—are billions of tiny nerve cells, called neurons. The nerve cells have branches connecting them to other cells in a complicated network. Communication between these brain cells is what allows us to think and solve problems.

Mindsets about academic potential

"Most people don't know that when they practice and learn new things, parts of ***their brain change*** and get larger, a lot like the ***muscles*** do. This is true even for adults. So it's not true that some people are stuck being "not smart" or "not math people." ***You can improve*** your abilities a lot, as long as you ***practice*** and ***use good strategies***."

Course Dropout
Students Who Withdrew From Developmental Math

Mindsets about academic potential



Yeager et al. (in prep)

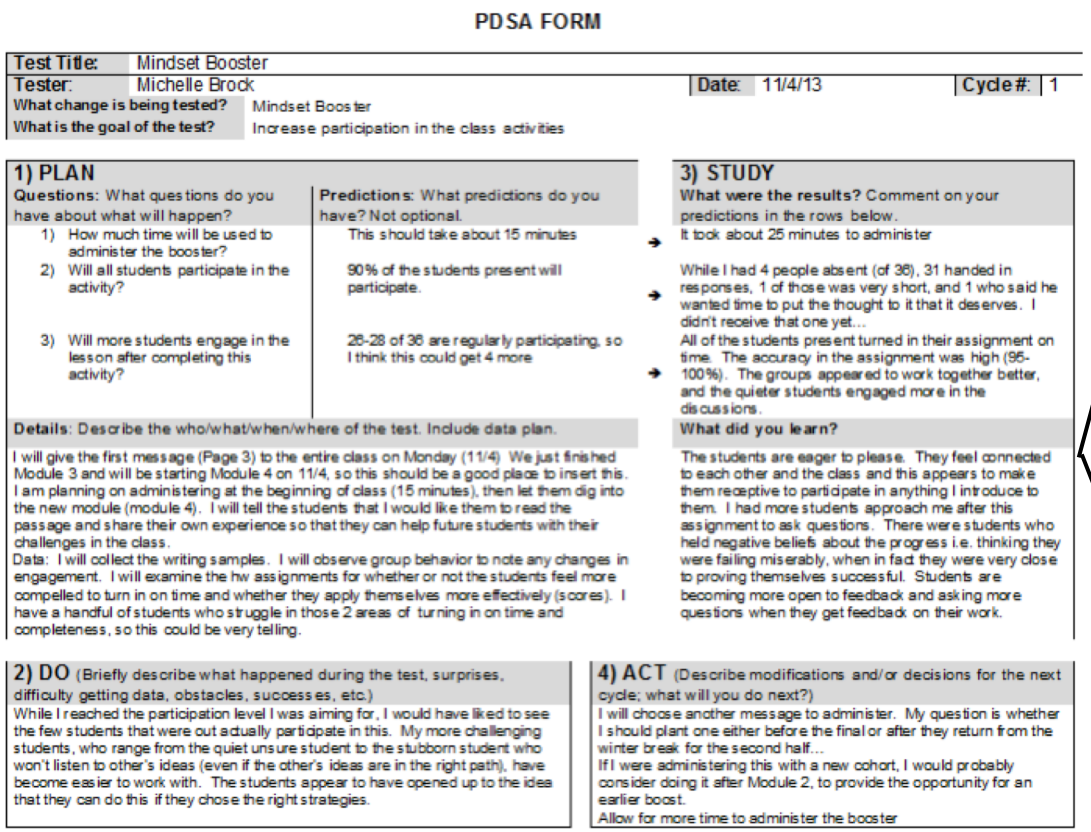
N = 288, Z = 2.87, p = .004

Student Mindsets: Co-development and Piloting

- **Co-development**
  - Researcher + Practitioner
  - Adapted to developmental math student construals
  - Not just “effort,” also strategy and help from others
  - Article + letter to future student
- **Piloting**
  - Double-blind randomized trial
  - Summer school Algebra 1 course

Roberta Carew
Valencia College

PDSA (Plan-Do-Study-Act) Cycles



PDSA FORM

Test Title:	Mindset Booster				
Tester:	Michelle Brock	**Date:**	11/4/13	**Cycle #:**	1
What change is being tested?	Mindset Booster				
What is the goal of the test?	Increase participation in the class activities				

1) PLAN

Questions: What questions do you have about what will happen?	**Predictions:** What predictions do you have? Not optional.
1) How much time will be used to administer the booster?	This should take about 15 minutes
2) Will all students participate in the activity?	90% of the students present will participate.
3) Will more students engage in the lesson after completing this activity?	26-28 of 36 are regularly participating, so I think this could get 4 more

Details: Describe the who/what/when/where of the test. Include data plan.

I will give the first message (Page 3) to the entire class on Monday (11/4) We just finished Module 3 and will be starting Module 4 on 11/4, so this should be a good place to insert this. I am planning on administering at the beginning of class (15 minutes), then let them dig into the new module (module 4). I will tell the students that I would like them to read the passage and share their own experience so that they can help future students with their challenges in the class.
Data: I will collect the writing samples. I will observe group behavior to note any changes in engagement. I will examine the hw assignments for whether or not the students feel more compelled to turn in on time and whether they apply themselves more effectively (scores). I have a handful of students who struggle in those 2 areas of turning in on time and completeness, so this could be very telling.

3) STUDY

What were the results? Comment on your predictions in the rows below.	**What did you learn?**
→ It took about 25 minutes to administer	The students are eager to please. They feel connected to each other and the class and this appears to make them receptive to participate in anything I introduce to them. I had more students approach me after this assignment to ask questions. There were students who held negative beliefs about the progress i.e. thinking they were failing miserably, when in fact they were very close to proving themselves successful. Students are becoming more open to feedback and asking more questions when they get feedback on their work.
→ While I had 4 people absent (of 36), 31 handed in responses, 1 of those was very short, and 1 who said he wanted time to put the thought to it that it deserves. I didn't receive that one yet...	
→ All of the students present turned in their assignment on time. The accuracy in the assignment was high (95-100%). The groups appeared to work together better, and the quieter students engaged more in the discussions.	

2) DO (Briefly describe what happened during the test, surprises, difficulty getting data, obstacles, successes, etc.)

While I reached the participation level I was aiming for, I would have liked to see the few students that were out actually participate in this. My more challenging students, who range from the quiet unsure student to the stubborn student who won't listen to other's ideas (even if the other's ideas are in the right path), have become easier to work with. The students appear to have opened up to the idea that they can do this if they chose the right strategies.

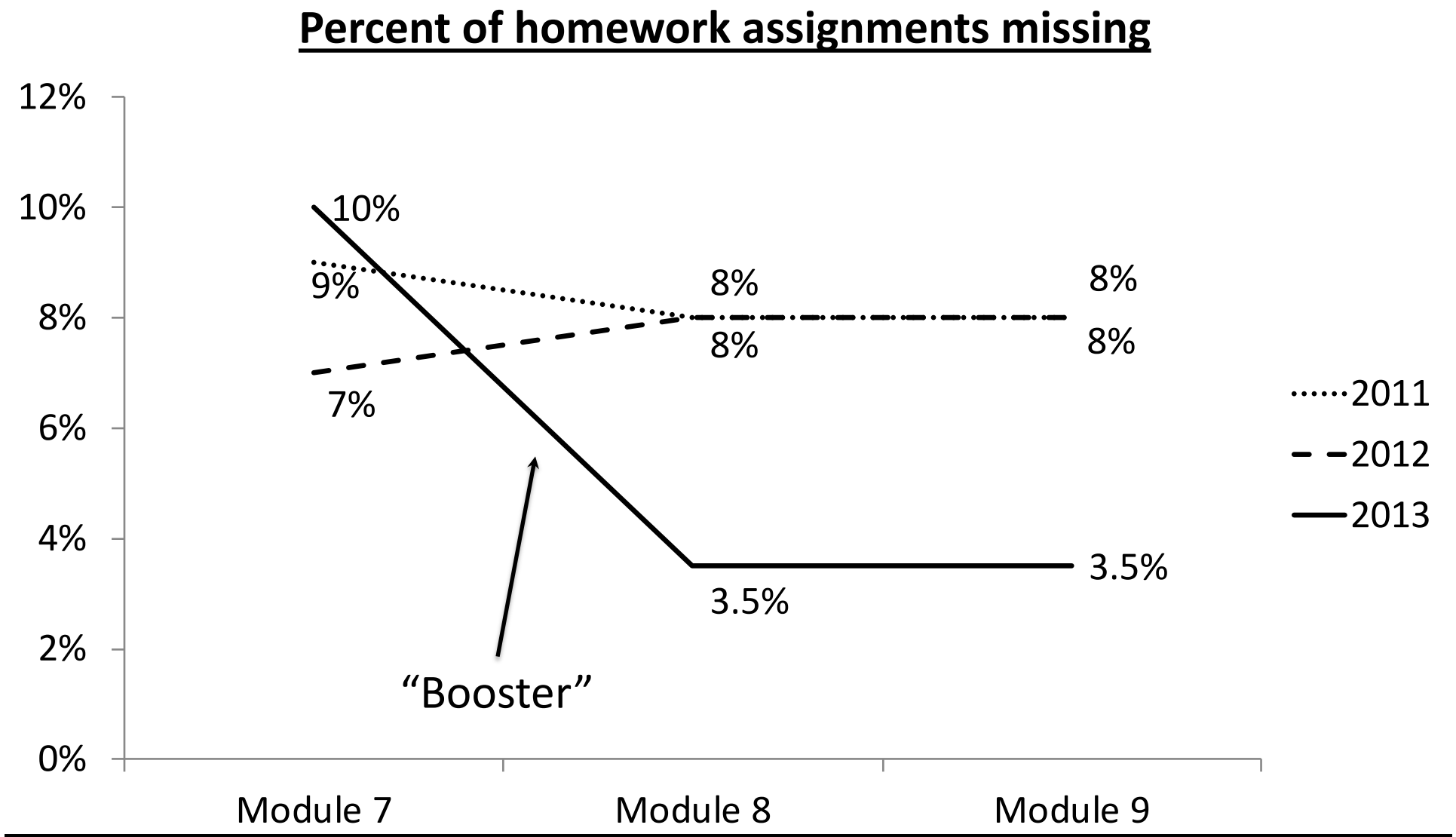
4) ACT (Describe modifications and/or decisions for the next cycle; what will you do next?)

I will choose another message to administer. My question is whether I should plant one either before the final or after they return from the winter break for the second half...
If I were administering this with a new cohort, I would probably consider doing it after Module 2, to provide the opportunity for an earlier boost.
Allow for more time to administer the booster

The students are eager to please. They feel connected to each other and the class and this appears to make them receptive to participate in anything I introduce to them. I had more students approach me after this assignment to ask questions. There were students who hold negative beliefs about their progress i.e. thinking they were failing miserably when in fact they were very close to proving themselves successful. Students are becoming more open to feedback and asking more questions when they get their feedback on their work.

Effect of “Booster” in 2013

(Michelle Brock)



Thank you