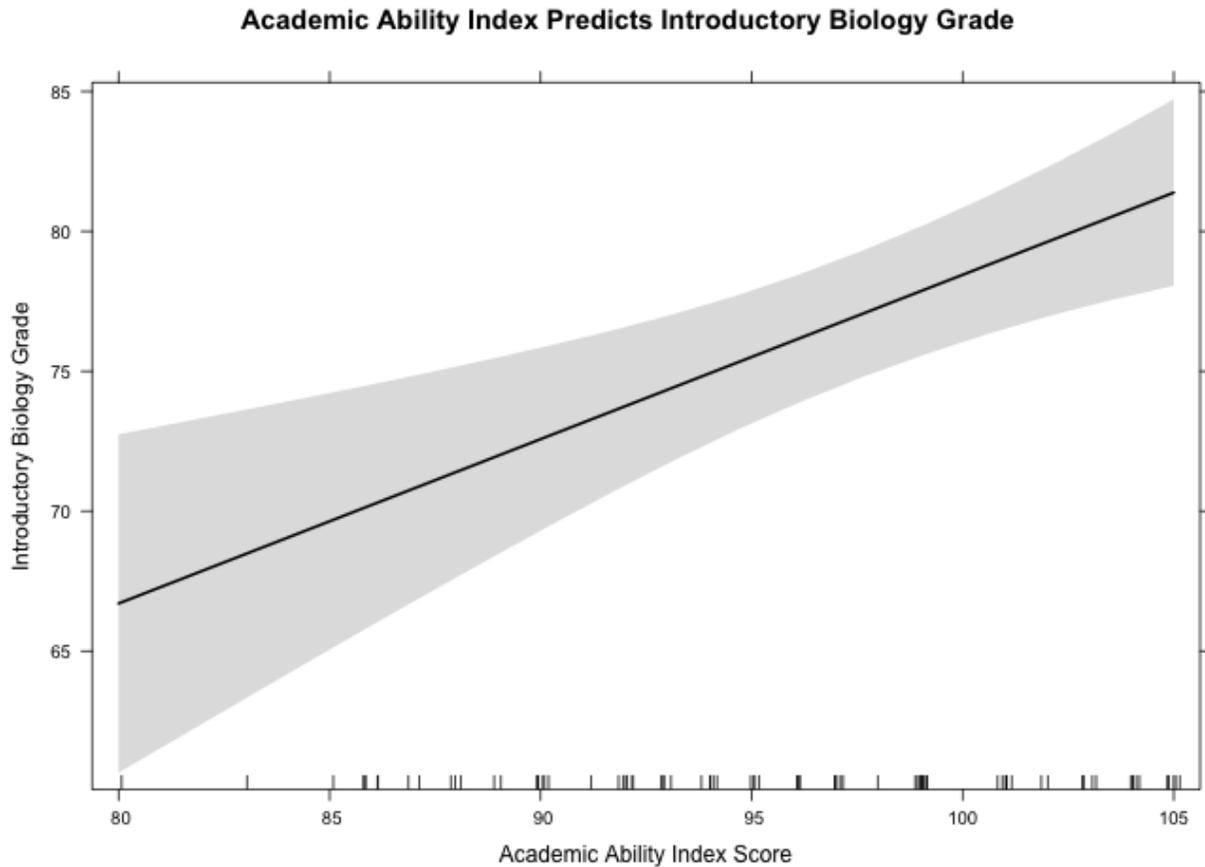


# Supplemental Material

*CBE—Life Sciences Education*

Cooper *et al.*



**Supplemental Figure 1. Academic ability index score predicts student performance in introductory biology course.** Using linear regression, student academic ability index score significantly ( $p < .0005$ ) predicts performance in the refresher introductory biology course. Model =  $\text{lm}(\text{total.course.percent} \sim \text{index.score})$ . The average academic ability index scores for Bridge students and non-Bridge students were 99 and 101, respectively. Students whose academic ability index scores are in the lowest quartile are placed into the refresher introductory biology course. Students with higher scores are placed in the traditional biology course. The academic ability index scores of the students in the traditional biology course are not reflected in this figure.

### **Example schedule of Bridge program**

7:30am - 8:45am	Breakfast
9:00am - 10:45am	Biology active learning session
10:50am - 11:45am	Tour faculty research labs
11:50pm - 1:00pm	Lunch
1:05pm - 1:25pm	Free time
1:30pm - 4:30pm	Biology active learning session
4:35pm - 5:30pm	Exploring career options in biology
5:35pm - 6:30pm	Dinner in the dorms

## **Exploratory Bridge student interview script**

Can you tell me why you joined the Bridge program?

What specifically did you want to get out of the program?

Do you feel like you got that out of the program?

- Please explain
- Can you give me a specific example?

### **Community**

During Bridge, we asked you to work in a lot of different groups, with a lot of different people.

Can you tell me what you learned about collaboration in Bridge?

Can you describe how you collaborate with others in introductory biology, and how it is similar or different than how you collaborated with students in Bridge?

To what extent, if any, did what you learned about collaboration help you in introductory biology?

- Please explain?
- Can you give me a specific example of how what you learned in Bridge helped you in introductory biology?

Do you think your experience in introductory biology would be different if you didn't collaborate with other students in Bridge before starting college?

- Please explain.

How confident do you feel working with other people in introductory biology? How does this compare to how confident do you feel working with Bridge students?

- Please explain.

Do you work with others on introductory biology outside of class?

- If so, who are they?

Are you completing the readings and assignments on time in introductory biology?

- Why or why not?

What connections did you make in Bridge that have been helpful to you in college? Other students? Mentors? Instructors?

To what extent, if at all, have your relationships with other Bridge students been helpful to you in college?

- Can you give me a specific example?

To what extent, if at all, have your relationships with the teaching assistants been helpful to you in college?

- Can you give me a specific example?

To what extent, if at all, have your relationships with the instructors of Bridge been helpful to you in college?

- Can you give me a specific example?

Do you feel like your experience in college has been different than other introductory biology students who did not do Bridge because of these connections?

- Please explain
- Can you give me an example?

### **Scientific thinking**

How do you think your thinking has changed since beginning Bridge?

- Can you give me a specific example of how your thinking has changed?

How do you think your *scientific* thinking has changed since beginning Bridge?

Do you think your thinking would have changed without the Bridge program?

Do you feel like you think similarly or differently than the majority of students in introductory biology?

- Why or why not?

Do you feel like you think like a scientist?

- Why or why not?

### **Self efficacy**

How confident were you about your ability to succeed in biology when you arrived at Bridge?

- Please explain.

How did your confidence change over the course of the Bridge summer program?

- Please explain
- Can you give me an example when you have displayed (more/less) confidence?

In the last five weeks of introductory biology, how has your confidence changed?

- Can you give me an example?

Do you think that would be different if you had not gone through Bridge?

### **Sense of belonging**

When you were in the Bridge summer program, to what extent, if at all, did you feel like you belong, in the Bridge community?

- Please explain

To what extent do you feel like you belong in the introductory biology community?

- Please explain
- To what extent, if at all, did participating in Bridge affect your belonging in introductory biology?

To what extent do you feel like you belong in the School of Life Sciences community?

- Please explain
- To what extent, if at all, did participating in Bridge affect your belonging in School of Life Sciences?

To what extent do you feel like you belong in the community of biologists?

- Please explain
- To what extent, if at all, did participating in Bridge affect your belonging to the greater community of biologists?

## **Bridge student interview script**

### **Group work**

*For this first set of questions I'm going to ask about your thoughts on group work. When I say group work I am talking about working with at least one other student in a biology classroom.*

If you had a choice to work with a group in introductory biology or alone, what would you choose and why?

What is your opinion regarding group work?

During Bridge we asked you to work in a lot of different groups, with a lot of different people. What did you learn about group work during the summer Bridge program?

How, if at all, has what you learned about group work in Bridge impacted your experience in introductory biology?

Do you believe that you think differently about group work than other first-year students who did not complete the Bridge program? Why or why not?

Do you think you get more out of group work than other first-year students who did not complete the Bridge program? Why or why not?

What specific actions do you take, if any, to make group work more effective in introductory biology?

How resistant were you to group work when you started Bridge? Please explain. Why were you resistant?

How, if at all, did your resistance to group work change, either way, during the summer Bridge program?

How, if at all, has your resistance to group work changed, either way, since you started introductory biology?

On the first day of introductory biology, how confident were you in your ability to participate in group work?

Talk to me about your level of participation in group work in introductory biology.

What benefits do you see to group work?

What drawbacks do you see to group work?

## **Active learning**

*For the second set of questions I'm going to ask you about your thoughts on active learning. When I say active learning, I'm referring to in-class activities like clicker questions and worksheets that you do independently or in a group. I'm also referring to activities outside of class for example, when you read or watch videos before coming to class.*

What is your opinion regarding active learning?

During Bridge, you experienced a lot of different active learning activities like clicker questions, working in groups on worksheets, and doing activities outside of class like watching videos or reading. What did you learn about active learning during the summer Bridge program?

How, if at all, has what you learned about active learning in Bridge impacted your experience in introductory biology?

Do you believe that you think differently about active learning than other first-year students who did not complete the Bridge program? Why or why not?

Do you think you get more out of active learning than other first-year students who did not complete the Bridge program? Why or why not?

What specific actions do you take, if any, to make active learning more effective in introductory biology?

How resistant were you to active learning when you started Bridge? Please explain. Why were you resistant?

How, if at all, did your resistance to active learning change, either way, during the summer Bridge program?

How, if at all, has your resistance to active learning changed, either way, since you started introductory biology?

On the first day of introductory biology, how confident were you in your ability to participate in active learning?

Talk to me about your level of participation in active learning activities in introductory biology.

What benefits do you see to active learning?

What drawbacks do you see to active learning?

## **Non-Bridge student interview script**

### **Group work**

*For this first set of questions I'm going to ask about your thoughts on group work. When I say group work I am talking about working with at least one other student in a biology classroom. When I ask you these questions I want you to specifically think about the group work you did in introductory biology.*

If you had a choice to work with a group in introductory biology or alone, what would you choose and why?

What is your opinion regarding group work?

Do you think you get more out of group work than other students in introductory biology? Why or why not?

What specific actions did you take, if any, to make group work more effective in introductory biology?

How did you feel about group work at the beginning of introductory biology?

How, if at all, has your resistance to group work changed, either way, since you started introductory biology?

On the first day of introductory biology, how confident were you in your ability to participate in group work?

Talk to me about your level of participation in group work in introductory biology.

What benefits do you see to group work?

What drawbacks do you see to group work?

### **Active learning**

*For the second set of questions I'm going to ask you about your thoughts on active learning. When I say active learning I'm referring to in-class activities like clicker questions and worksheets that you do independently or in a group. I'm also referring to activities outside of class for example, when you read or watch videos before coming to class. When I ask you these questions I want you to specifically think about the active learning you did in introductory biology.*

What is your opinion regarding active learning?

Do you think you get more out of active learning than other students in introductory biology? Why or why not?

What specific actions did you take, if any, to make active learning more effective in introductory biology?

How did you feel about active learning at the beginning of introductory biology?

How, if at all, has your resistance to active learning changed, either way, since you started introductory biology?

On the first day of introductory biology, how confident were you in your ability to participate in active learning?

Talk to me about your level of participation in active learning in introductory biology.

If you had a choice to be in a biology course that was taught in a traditional lecture style, or be in an active learning class, what would you choose and why?

What benefits do you see to active learning?

What drawbacks do you see to active learning?

**Supplemental Table 1. Percentage of Bridge and Non-Bridge students who mentioned using each active learning strategy.** The active learning strategy/strategies that each student reported out during their interview and the overall percentage of Bridge and Non-Bridge students who mentioned using each active learning strategy.

Pseudonym	Asking questions for clarification or superficial understanding	Leading or delegating during group work	Encouraging students to participate to benefit oneself	Being open minded/ optimistic	Intentionally sharing thoughts with others	Deeply engaging in active learning	Encouraging students to participate to benefit the other student	Total strategies reported by student
<b>Bridge students</b>								
Aisha	x	x	-	-	x	-	x	3
Amy	x	-	x	-	x	x	x	5
Anthony	x	-	-	-	x	x	x	4
Ashley	-	x	x	x	x	x	x	6
Blake	-	x	x	-	-	-	-	2
Brian	x	-	x	-	-	x	x	4
Daniella	x	x	x	x	x	x	x	7
Desiree	-	-	x	x	-	x	-	3
Gabriela	-	-	-	x	x	x	x	4
Gloria	x	-	x	-	-	x	x	4
Isabella	-	-	x	-	x	-	-	2
Jamie	x	x	x	-	-	x	x	5
Jasmine	x	x	x	-	x	x	-	5
Jeremiah	-	x	x	x	-	x	x	5
Jordan	x	-	x	x	x	x	x	6
Kristin	x	x	x	-	-	x	-	4
Lauren	-	x	x	x	x	x	x	6
Liam	x	x	x	x	-	x	x	6
Lindsay	-	x	x	x	x	x	-	5
Lisa	-	x	x	x	x	x	x	6
Luke	-	-	x	-	x	x	x	4
Malik	-	-	-	-	-	-	x	1
Mariana	-	x	-	x	-	x	-	3
Samantha	x	x	x	x	x	x	-	6
Tiana	x	x	-	-	-	x	x	4
William	-	-	x	x	-	-	-	2
% Bridge students reporting a strategy	50%	58%	77%	50%	54%	81%	65%	
<b>Non-Bridge students</b>								
Chloe	x	x	-	-	-	-	-	2
Christine	-	x	x	-	-	x	-	3
Emma	x	x	x	-	-	x	-	4
Jayla	-	-	-	-	x	-	-	1
Luciana	x	x	x	-	-	-	-	3
Madison	x	x	x	x	-	-	-	4
Mia	-	-	-	-	x	-	-	1
Olivia	x	-	x	-	-	-	-	2
% Non-bridge students reporting a strategy	63%	63%	63%	13%	25%	25%	0%	