

Supplemental Material

CBE—Life Sciences Education

Stanton et al.

Supplemental Material Appendix A

Demographic Survey

Please complete the demographic survey below. Please feel free to leave any questions blank you do not feel comfortable answering.

Hometown: _____

High School Name: _____

Academic Year: _____

Major: _____

Ethnicity: _____

Gender: _____

Do you receive the Pell Grant (circle one response):

Yes No Don't Know Prefer not to Answer

Are you a first-generation college student (meaning your parents or guardians do not have a bachelor's degree)?

Yes No Don't Know Prefer not to Answer

Were you involved in any science or non-science organizations in high school. If so, please list them below.

Are you currently involved in any student organizations or clubs at your university? If so, please list them below.

Supplemental Material Appendix B

First Interview Protocol

PRIOR TO INTERVIEW (before recording)

- 1) Go over the consent form with participant. Ask the participant if they have any questions about the consent form.
- 2) Ask the participant to fill out the demographic survey.

START OF INTERVIEW (begin recording)

Consent questions

- 1) Do you consent to participate in this study?
- 2) Do you have any questions before we begin?

Introductory questions (Aspirational and Familial):

- 1) Can you tell me a little bit about yourself?
- 2) What is your major?
 - a. How did you become interested in this major?
- 3) What is your career goal?
 - a. How did you become interested in this career goal?
- 4) How did your pre-college experience influence choice of careers?
 - a. How did your community influence your choice of careers?

Rating Your Success (Multiple)

- 1) On a scale between 1 and 10 (1 being the lowest and 10 being the highest), how well would you rate your success at UGA?
 - a. What are your reasons for this rating?
- 2) We are interested in understanding your success in science. What has allowed you to be successful as a science major?
 - a. Ask them to elaborate on each thing.
- 3) Are there people who have been important to your success in science?
 - a. Ask about each person.
 - b. How have you utilized your connection to each person during your time at UGA?

Academics (Aspirational, Navigational, and Social)

- 1) What are some academic challenges (such as tough courses) you have overcome in your science major?
 - a. How did you overcome these challenges?
- 2) Have you encountered any setbacks in reaching your career goals?
 - a. If yes, what kept you focused on your career goals?

Experience (Resistant)

- 1) What has been your experience as a Black or African American student pursuing an undergraduate science major at UGA?
- 2) Have you experienced any overt or subtle racism or other types of discrimination?
 - a. If yes, can you share an example with me?
 - b. If yes, how have you responded to the racism or discrimination you've experienced (such as stereotypes or racial biases)?
 - c. What have you learned from these experiences?
 - d. Have you been able to apply what you learned from these experiences as an undergraduate science major?

Communication Styles (Linguistic)

- 1) Do you find yourself communicating in different styles in different settings?
 - a. If yes, how do you change your communication style?
 - b. If yes, why do you change your communication style?
 - c. If yes, what advantages, if any, are there to being able to communicate in more than one style?
 - d. How has your communication in a different style played a role, if at all, as you have pursued your career goals?
- 2) Do you communicate in more than one language?
 - a. If yes, please explain.
 - b. How has being bilingual or multilingual played a role, if at all, as you have pursued your career goals?
- 3) Do you express yourself via poetry, art, music, performance, or storytelling?
 - a. If yes, please explain.
 - b. How has your expression through the arts played a role, if at all, as you have pursued your career goals?

Organizations and Research Experiences

- 1) Are you part of any science-related groups on campus?
 - a. If yes, tell me how each group has affected your UGA experience?
- 2) Are you part of any research at UGA?
 - a. If yes, tell me how research has affected your UGA experience?

Family (Familial)

- 1) When you think of family, who do you think of?
- 2) What role, if any, has your family (based on your definition from the previous response) played, if at all, in your success as a science major?
 - a. Could you share a specific example?
- 3) What role, if any, has your (hometown) community played, if at all, in your success as a science major?
 - a. Could you share a specific example?
- 4) What role, if any, has your social circle played, if at all, in your success as a science major?

- a. Could you share a specific example?

Mentorship (Social and Navigational)

- 1) Are you involved in mentorship programs as a mentor or a mentee?
 - a. If yes, what are some of the outcomes of being a part of a mentoring relationship?
- 2) Do you have any role models, mentors, or mentees that are in the field you aspire to be in?
 - a. If yes, how have they impacted you?
- 3) If you were mentoring a younger student who is also a science major, how would you tell them to get answers to questions they have (or help with issues) in their science major?

Closing questions

- 1) What overall advice would you give to a black undergraduate science major?
- 2) What are your plans after college?
 - a. What do you think will be important to your success after college?
- 3) Is there anything else you'd like to share with me?

"Thank you so much for participating in our study."

END OF RECORDING (stop recording)

Supplemental Material Appendix C

Second Interview Protocol

START RECORDING

Interviewer: “I just want to remind you that you gave consent to participate in this study. Do you have any questions before we begin?”

Opening Question

1) How is the spring semester going for you so far?

Interviewer: As you know, we are interested in learning about your success as a Black or African American science major. Other researchers have found that people of color possess unique strengths and abilities that they can use to succeed in their education. The first thing we are going to do is an activity related to those unique strengths and abilities, then after that I will ask you some questions about the photos you shared with me.

Part A: Card-Elicitation Activity

Interviewer: I am going to show you sets of about five cards. In each set I will ask you to sort the cards into two piles: cards that represent ideas you see in your own success as a science major and cards that don't. Place cards that resonated with you that contribute to your success in science to the left and cards that don't resonate with you on the right.

1) Can you walk me through the cards that resonated with them? For each card, can you give me an example or share a story?

Repeat with each set: in the order shown below.

- Aspirational capital
- Navigational capital
- Resistant capital
- Linguistic capital
- Familial/Social capital

At the end, show them all the cards they said resonate with them.

- 2) From all the cards you have seen here, are there any ideas missing? Would you like to add this ideas on a card?
- 3) Please choose up to 5 cards (or more if needed) that have been most important to your success in science. Why are the cards you are holding right now more important to your success in science than the other cards that also resonated with you?

Part B: Photo-elicitation

Give participants a chance to review their photographs before asking questions as it has been a while since they've looked at them.

- Ask participants to choose two or three photographs to discuss
- For each photograph, ask the following questions: (go 1 by 1 for photos/videos with the participant).
 - 1) Tell me what is happening in the photograph.
 - 2) Tell me about why you decided to take (or select if taken by a professional) this photograph.
 - 3) What does it mean to you?
 - 4) How does it reflect your success as a science major? (important)
- Based on your collective photographs, what would you want faculty and administrators at UGA to know about your experiences as a Black student pursuing a science degree?

Part C: Internal Strengths

- 1) Many students start college as science majors but wind up leaving science for a variety of reasons. What characteristics do you possess that have allowed you to be successful in a science major?
- 2) How do you think you developed the characteristics you talked about?
- 3) Scenario: Imagine you are at a celebration for your graduation from UGA and three people will be giving a toast. Perhaps one is a family member, one is a peer or friend, and one is a mentor. What would each person say about you and your success in science?

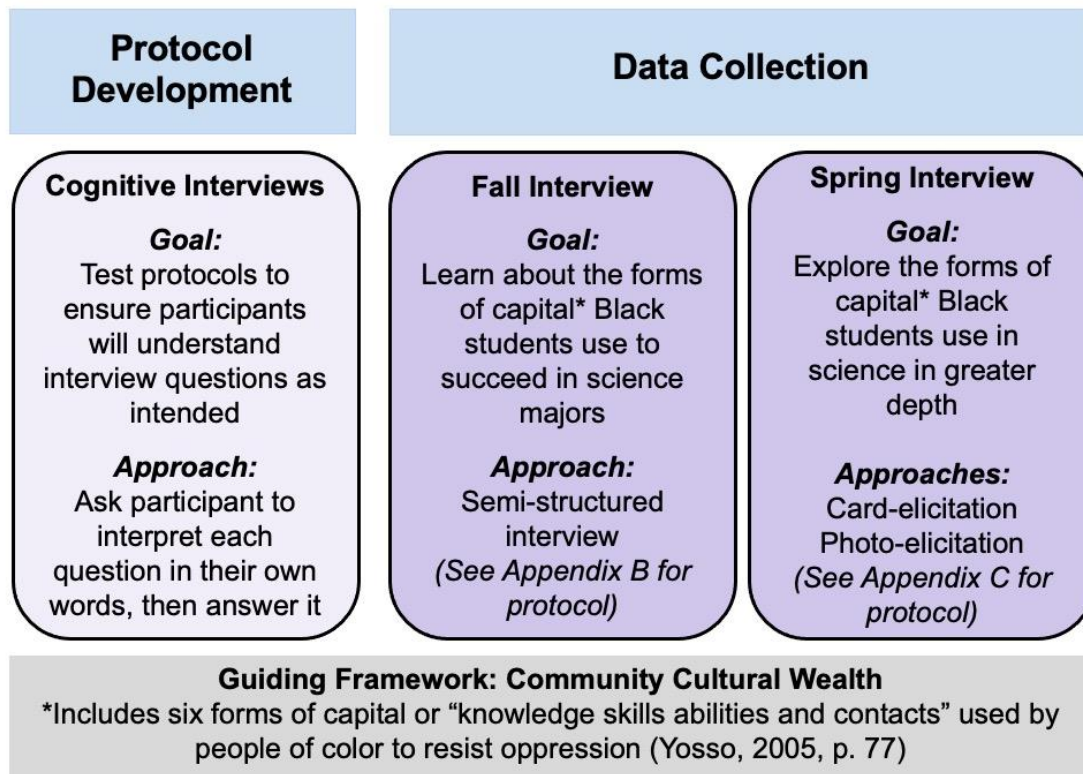
Closing Questions

- 1) Last time we met for an interview, you mentioned that you are doing [*whatever they said in the last interview*] next year. How have your plans progressed since we last spoke?
- 2) Are you looking forward to anything in particular before graduation?

“Thank you so much for participating in our study.”

END RECORDING

Appendix D



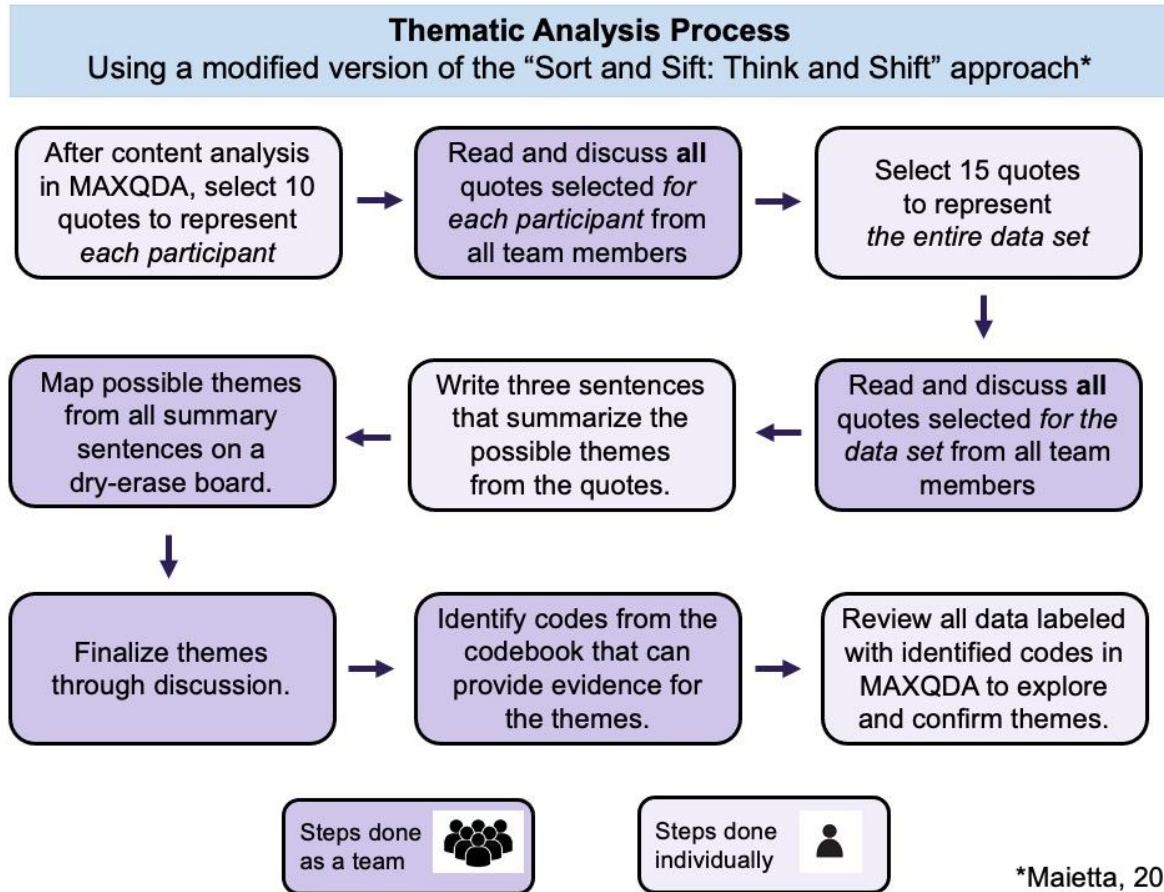
Types of interviews in this study. Cognitive interviews were conducted to ensure participants would understand interview questions from our Fall and Spring Interview protocols as intended. Question wording was refined based on cognitive interview data (Willis & Artino Jr, 2013). The Fall Interview consisted of a semi-structured interview focused on learning about the forms of capital (from the Community Cultural Wealth framework) that Black science majors use to succeed. The Spring Interview included card-elicitation (Trotter & Potter, 1993) and photo-elicitation activities (Harper, 2002), which were designed to invite Black science majors to describe the forms of capital they use in more depth. Elicitation methods were important to this study because the forms of capital are not always recognized in predominant culture, including by the students themselves. For a detailed description of these interviews, please see the Methods section of the paper.

References

- Harper, D. (2002). Talking about pictures: A case for photo elicitation. *Visual studies*, 17(1), 13-26.
- Trotter, R. T., & Potter, J. M. (1993). Pile sorts, a cognitive anthropological model of drug and AIDS risks for Navajo teenagers: Assessment of a new evaluation tool. *Drugs & Society*, 7(3-4), 23-39.

Willis, G. B., & Artino Jr, A. R. (2013). What Do Our Respondents Think We're Asking? Using Cognitive Interviewing to Improve Medical Education Surveys. *Journal of graduate medical education*, 5(3), 353-356.

Appendix E



Thematic Analysis Process. Thematic analysis was done using a modified version of the “Sort and Sift: Think and Shift” approach (Maietta, 2006). This process involved steps done as a research team (dark purple) and steps done individually (light purple) to uncover potential themes in the data. The analysis focused on identification and discussion of powerful quotes that tell the stories of the participants. In the final step, themes revealed from quote data were verified using codes from content analysis. For a detailed description of this process, please see the Methods section of the paper.

Reference

Maietta, R. (2006). State of the art: Integrating software with qualitative analysis. In L. Curry, R. Shield, & T. Wetle (Eds.), *Improving aging and public health research: Qualitative and mixed methods* (pp. 117-139). American Public Health Association and the Gerontological Society of America.