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Child Science Identity Interview Guide and Protocol

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For understanding youth STEM definitions and identity

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Child Science Identity Interview Guide and Protocol: Use Guide

Introduction to the Guide and Protocol

Youth experience STEM in a variety of contexts, yet it is not always clear the extent to which youth recognize the STEM aspects of their experiences. This is important because youth's perceptions of themselves and others as STEM people is closely tied to the activities that they associate with STEM. Understanding how youth define STEM and see themselves and their social contexts in relation to STEM could provide insight to cultures of power in STEM and their marginalizing effects, while also pointing to the progressive outcomes of more inclusive STEM learning interventions[1].

How our protocol is different:
While many data collection tools exist to elicit how individuals think about prototypical STEM persons (e.g., the *Draw-a-Scientist* assessment), such tools fail to capture the nuance of how individuals think about STEM and STEM personhood and how those perceptions change according to context and "in real life". We designed the *Child Science Identity Interview Guide and Protocol* to learn about how youth see everyday experiences as "STEM" (or a particular subfield) and think of themselves and those in their social orbits as STEM persons.

A note on the terms "science", "math", and others related to "STEM":
Our operational definition of STEM identity takes on a broad perspective such that we typically avoid using these terms, particularly in academic contexts, when trying to understand children's "STEM related" interests outside of school that they may not label as "STEM" (but can be categorized as falling within that sphere, e.g., Archer et al., 2010). In our experience, the use of these terms almost always focuses the child's attention on academic forms of STEM grounded in their classroom experiences. That said, these terms may be appropriate for use when examining classroom-based interventions.

Intended Population

This interview protocol was designed to be used with youth aged 6-12. The protocol may be useful for learners outside of this age range with some developmentally appropriate modifications.

Intended Uses

The *Protocol* assumes that parental consent has been obtained prior to the interview. The *Protocol* does not provide guidance for obtaining parental consent, acknowledging that the expectations for such documentation will depend on the researchers' institutional context.

The *Protocol* has been used predominantly for virtual interviews in which the interview participant and youth are engaged in a video conference call. However, it was designed to be adaptable to a variety of interview formats, including face-to-face.

[1] For more information about our work see "References".

While the *Protocol* in this document contains several sections, it is important to note that we rarely asked a youth participant all the questions listed, and often asked follow-up questions not listed. Prior to the interview, the researchers should consider which questions are most relevant to their purpose and eliminate others to reduce participant fatigue, especially for younger youth.

Although the interview questions in this guide use the word "science", the interviewers have also modified the *Protocol* to ask about math with similar success. Replacement terms such as "engineering" have not been purposefully tested by the interviewers, but our work suggests that the protocol may still be valid with such modifications.

Given that the interview questions are about personal feelings and perceptions of oneself, this protocol was not designed to be used in a focus group setting.

Protocol Organization

The *Child Science Identity Interview Guide and Protocol* is divided into three main sections, each reflecting questions and prompts that the *Protocol* developers have refined over several years and dozens of youth and family interviews:

- **At the Start of the Interview** describes steps that the Interviewer should take to begin the interview, including a recommended script.
- **Interview Content** contains questions and activities that were designed to elicit youth reflection on STEM and themselves as STEM people. It is sub-divided into four sections:
    - *Introductions* to prompt the youth to talk about themselves generally and become more comfortable with the interviewer and the interview context.
    - *What is Science to You* engages the youth in a card sort activity to categorize activities as "science" or "not science".
    - *Present-Self Interview* asks the youth to think about themselves and others they know as someone who does science, is interested in science, and is good at science.
    - *Potential-Self Interview* asks the youth to think about the kind of person they might become. The questions begin generally to stimulate thinking, but they home in on the youth's vision of their future self in science.
- **Wrapping Up** guides the Interviewer to engage in concluding activities for the interview.

Each section is formatted so that interviewer instructions are in red text and questions for the youth are in black text. Areas to consider for probing or following up on questions are indicated *in italic red text.*

Acknowledgement of Theoretical Framework

We could not have done this work without the years of discipline-based identity research and theory development led or supported by Dr. Zahra Hazari and colleagues. This protocol adheres to the framework she has espoused that posits identity as a factor of three precursors: an individual's *interest, performance-competence,* and *sense of recognition* in STEM or a STEM subfield. A reference Dr. Hazari's canonical paper (2010) is included at the end, along with relevant work led by the authors of this *Protocol* and others.

Child Science Identity Interview Guide and Protocol: Interview Content and Organization

Section I: AT THE START OF THE INTERVIEW

1. Interviewer and youth Interviewee introduce themselves to one another.
2. Ask the youth to consent to the interview and set the tone for the conversation. A possible script for setting the tone:
    - Sometimes children we talk to are a little nervous at first because they don't know what to expect. All we're going to do is ask you some questions about yourself and the things you do. All we want from you is to answer honestly, and if you don't know the answer to a question, you can say 'I don't know'.
    - We also want you to know we're trying to learn more about what children just like you are interested in and how you feel about different things. So, because of that, you're the most important person in this room. (for older youth, use the word "expert")
    - Just so that you know, because we will ask you a lot of questions, you might get tired. If you feel tired, you can ask for a break. Or if you need to use the bathroom or do anything else, just let us know. We can take breaks. If you get really tired, you can tell us to stop.
    - When we finish, we will send/give you [incentive]. (*if applicable*).
    - We are going to video (or audio) record our conversation, is that ok? After we write down what we talk about we will delete the video (or audio), and we won't show it to anyone else. But you can tell your parents or your teachers about anything we talk about, if you want to.

3. Have the Interviewee sign the assent form (at this point the Interviewer should already have a signed parental consent form)
4. Ask if they're ready to start
5. Proceed with the protocol below (approx. 40 min)

Section II: INTERVIEW CONTENT

Introductions

First, we want to get to know you more. What are the things you like? What do you like to do for fun?

Respond with praise and interest to what the youth shares, relating personally with things that the interviewer or their children enjoy.

What is Science to you?

CARD SORT (see Appendix A): images of school, sports, music, museums, reading, time with family, time with friends, playing a video game, taking pictures, cooking, etc on a Google slide that the youth will characterize as "doing science" or "not doing science"[2].

If doing a virtual interview, send the youth the link for the Google doc, have them move images to either side of "doing science" and "not doing science". Have a backup download in PowerPoint for them to tell the interviewer where to place the images in case the youth has trouble opening the link.

OR

If doing an in-person interview, have cut-outs of the pictures that the youth can manipulate by moving in the piles.

1. Ask: I want you to help me put these pictures into piles. Put the pictures that show people doing science here, and put the pictures that do not show people doing science here (indicate placement locations). If you're not sure, you can put the picture in the middle.
2. After the youth has finished grouping:
    a. What did you look at in the pictures to know if the person was doing science or not doing science?
    b. Can you talk me through an example of what you were thinking with one of the pictures? *(The Interviewer can select a specific picture of interest, can ask about more than one picture)*
    c. If a friend asked you to explain to them what science is, what would you tell them?

Present Self Interview

1. TRANSITION: Now that I know what science is, I am curious to hear about what science you do.
2. Would you describe yourself as someone who is interested in science?
    a. Do you ever feel really curious or excited about science? Can you think of examples of science that makes you feel curious or excited?
3. Do you think of yourself as a person who does science?
    a. *If yes,* What sort of things do you do that make you feel like a person who does science?
    Probe to try to get the youth to describe what they're doing when they say they're doing science, e.g.:
        i. Where are you?
        ii. Who are you with?
    b. What are some ways you do science at home/with your friends/with your family?
3. Do you know anyone who does science?
    a. *If yes*, what do they do that is science?
    b. Can you think of anyone other than (person mentioned) who you know who does science?

[2] NOTE: the Interviewer can modify or reduce the number of pictures based on what makes the most sense to the Interviewer and the youth with whom they are working.

4. What do you think it means to be good at science?
    a. Do you think of yourself as good at science?
        i. When/where do you feel like you're good at science?
        ii. Can you give me an example of a time when you felt like you were good at science?
    b. Have you ever felt like you weren't good at science?
        i. When/where do you feel this way?
        ii. Can you tell me about a particular moment you felt that way?
    c. Do you think other people might think you're good at science?
        i. Who might they be?
        ii. What makes you think that they may think you're good at science?
    d. If the youth brings up school
        i. What do you like (not like) about science class?
        ii. What do your friends in science class think about you during class? Do they go to you for help?
        iii. Do you think of any kids in your class as a science person?
            1. *If yes,* What do they do that makes you think of them like that?
            2. Do you think your teacher would agree with them? What makes you think that?
5. Do you think of yourself as a scientist?
    a. *If no,* what do you think is the difference between you and a scientist?

Potential Self Interview

1. TRANSITION: I know when I was a kid I would spend a lot of time imagining what my life would be like when I was all grown up. Do you ever do that? What do you think your life will look like when you grow up? (*ask for examples of things the kid will daydream about in the future, compliment creativity/level of detail in narrative*)
    a. If "no" or "I don't know": I'll tell you what I thought when I was a kid and maybe that will help you. I remember as a kid I thought that when I'd grow up, I'd (*bring up friends, hobbies, profession(s), etc.*). What about you? What do you think?
        i. Questions for probing:
            1. What things do you think you will do for fun?
                a. Probe to get a few ideas—not just one. Ask about how they got into the things they name.
            2. Do you think you will have the same friends you have now? What are your friends like? What things do you think you will want to do with your friends?
            3. Do you have a job in the future? What do you think you would do at work?
                a. What do you like about that?
            4. Do you think you'll be like your parents when you're grown up?
                a. In what ways? How might you be different?
        ii. Is there anyone you know (personally or in media) who is like the person you want to be when you grow up?

2. Do you think when you're a grown-up you'll be doing science?
    a. When do you imagine you'll be doing science as an adult?
    b. What kind of science stuff do you think you'll be doing?
    c. Do you think you're doing this science stuff by yourself or with other people?

Section III: WRAPPING UP

1. Ask: Do you have any questions for us?
2. Thank the youth interviewee for their answers; tell them they did great.
3. Ask for their desired pseudonym and record their answer.
4. Make a copy of the card sort (if virtual) or take a photo (if in-person). Name the file with the child's pseudonym and save in a secure folder.

References

Basis of Theoretical Framework

Hazari, Z., Sonnert, G., Sadler, P. M., & Shanahan, M.C. (2010). Connecting high school physics experiences, outcome expectations, physics identity, and physics career choice: A gender study. *Journal of Research in Science Teaching*, *47*(8), 978–1003. https://doi.org/10.1002/tea.20363

Relevant Works by the Authors

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Appendix A: Card Sort Activity

To access the file, follow this hyperlink to a view-only Google slide. To edit or share, download the view-only file to Powerpoint or make a copy to your Google Drive.