STUDENTS ARE EXPERTS IN THEIR MATHEMATICAL THINKING: POSITIONING PRINCIPLES FOR TASK-BASED INTERVIEWS

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Abstract

Task-based interviews are an established method in mathematics education research, to investigate students' mathematical thinking. While interviews are a social practice, principles for design and enactment of task-based interviews have offered limited insight into navigating power dynamics inherent in interviews. Drawing on the theorizing of positioning, we examine the role of communication acts before and during task-based interviews to position students as experts in their mathematical thinking. We offer three "positioning principles" for conducting task-based interviews: set the stage to surface interviewees' brilliance; be alert to the influence of power on interviewees' responses; and, redistribute power to interviewees. To support our claims, we provide excerpts from a videoconference interview with a college algebra student interacting with a graphing task. This work illustrates how researchers can draw on different theories to advance research methods developed in conjunction with another theoretical perspective.

Keywords: theories, interviews, methods, mathematics education, positioning

INTRODUCTION

Task-based interviews (Goldin, 1997, 2000), which have roots in clinical interview methods advanced by Piaget, are an established method in mathematics education research (Maher & Sigley, 2020). The term "task-based" means that the interviews involve not only interactions between interviewer and interviewee, but also with one or more tasks (Goldin, 2000). While interviews are a social practice, principles and techniques for design and enactment of interviews have offered little insight into navigating power dynamics inherent in them (Parks & Schmeichel, 2014). To address this problem, we turn to theory. We ask: How may the theorizing of positioning (Davies, 2023; Herbel-Eisenmann et al., 2024) offer guidance for the design and implementation of task-based interviews?

Our work to examine a relationship between theory and method is rooted in a larger dialogue among mathematics education researchers (MERs). As Silver and Herbst (2007) argued, theory can help MERs to address problems encountered in the practice of doing research. The problem we address is the navigation of power dynamics in the design and enactment of task-based interviews. Furthermore, MERs' methods-driven decisions connect to their sensitivities to their theoretical assumptions, which may be tacit or explicit (Bikner-

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Ahsbahs et al., 2019). Here, we appeal to the theorizing of positioning to develop "positioning principles" for task-based interviews, to position students as experts in their mathematical thinking.

Drawing on Goldin (2000), we characterize existing principles guiding the method of task-based interview. We intend the positioning principles to complement Goldin's principles, to make explicit guidance to address power dynamics in task-based interviews. To operationalize the principles, we provide evidence from a videoconference task-based interview conducted with a postsecondary student. We conclude with implications for the work to connect theory and method in mathematics education research.

TASK-BASED INTERVIEWS: PRINCIPLES FOR DESIGN AND ENACTMENT

As a baseline, the research method of task-based interviews involves an interviewer (typically a researcher) and an interviewee (typically a student), who interact in relation to one or more tasks (Goldin, 2000). A key purpose of task-based interviews has been to investigate students' mathematical thinking (Maher & Sigley, 2020), which is not directly observable. Accordingly, researchers conducting task-based interviews for this purpose draw inferences about students' cognition based on students' observable actions. Tasks are central to task-based interviews. When we refer to tasks, we mean something more than written problems or exercises. Like Johnson et al. (2017), we view mathematical tasks to be a social practice between designers (those developing the tasks), teachers (those enacting the tasks), and students (who may be children, adolescents, or adults):

> a mathematical task includes a designer's intended purpose for the task, a teacher's intentions in implementing a task, students' activity in undertaking a task, and artifacts (problem statement, tools and constructed objects, including student written materials) employed in and generated by the actions of teachers and students during the process of task completion (p. 814).

From this perspective, in a task-based interview, the task(s) are not only artifacts, they also include the researcher's purpose for the task(s) and students' activity to undertake the task(s) in the interview setting. Principles underlying the theoretical perspective(s) being employed (whether tacit or explicit) guide the researcher's purpose for the task(s). Students' activity when undertaking the task, along with artifacts produced during the tasks, serve as key sources of data.

The research method of task-based interview comprises a collection of strategies and techniques. For the researcher, these can include the design and/or choice of tasks for an interview, the encouragement of participants' agentic actions during an interview (even if they are inconsistent with how a researcher may approach a task), the questions a researcher plans to ask (and does ask) during an interview, and the reflection/analysis a researcher may engage in following an interview (Goldin, 2000). As suggested, these strategies and techniques include actions and intentions that are a priori, in the moment, and retrospective.

When designing task-based interview studies, Goldin (1997) urged scholars to take three broad questions into advance consideration. The first was the potential for the interviews to be a conduit for scientific investigation, to allow for replicability and generalizability of results. The second referred to the

role of theory in structuring the interviews. This included how theory influenced interview questions and techniques, informed inferences drawn in the analysis process, and guided planning for a range of contingencies. The third addressed the interview as a social and cultural practice. Goldin (1997, p. 42) asked: "How may the student's expectations, presumptions, apprehensions, and intentions interact with mathematical cognitions and affect (and with task variables) to influence the interview outcome?" (p. 42). While Goldin did not articulate potential power dynamics between a researcher and student, the last question pointed to the possibility. When students are asked to share their mathematical thinking during a task-based interview, social and cultural factors have potential to impact their responses. Hence, it is crucial for researchers to take into account such potentialities, even if social and cultural factors are not the object of study.

Further articulating the research method, Goldin (2000) put forward ten principles guiding task-based interviews, shown in Table 1. We have organized the principles into three domains: design considerations, logistical considerations, and implementation considerations. The design and logistical considerations guide researchers' planning for the interviews. These include practicalities of implementation (e.g., piloting interviews, deciding on what to record), anticipations of interviewees (e.g., making sure tasks are accessible to interviewees, planning for contingencies), and goals for research (e.g., using research questions to influence task selection). The implementation considerations guide researchers' enactment of the interviews. These include allowing interviewees to solve problems freely, offering many ways for interviewees to demonstrate their thinking, being alert for unexpected events, and being willing to compromise when needed.

Table 1.
Goldin's (2000) ten principles guiding task-based interviews

Domains	Principles
Design Considerations	● Ensure that interviews address research questions ● Check accessibility of tasks for interviewees ● Choose tasks that allow multiple modes of representation
Logistical Considerations	● Consider contingencies ● Train for and pilot interviews ● Decide what to record
Implementation Considerations	● Encourage unrestricted problem solving ● Offer range of observable ways interviewees may demonstrate their thinking ● Be alert to the unexpected ● Compromise as needed

As suggested by the principles, task-based interviews are to be a place where students can explore, question, and engage with mathematics in ways that make sense to them. Yet, experiences that students bring can influence what they view the goal of the interview to be. As Goldin (2000, p. 542) stated:

> For instance, children drawn from their regular classes to participate in interviews may see the interview as fundamentally a school activity, and respond both mathematically and emotionally as if the expectation is for them to produce "school mathematics"–correct answers through previously learned algorithms–although that is not the interviewer's intent.

While Goldin (2000) implored researchers to consider how students' expectations for the interview had potential to influence the implementation, the operationalization of such consideration remained mostly tacit in the ten principles, with a few caveats. With the principle on unrestricted problem solving, Goldin (2000) advised researchers to avoid imposing their own ideas about how students should work on the task. This included guidance for researchers to treat incorrect responses similar to correct ones, at least for some time. In addition, there was recommendation for researchers to allow students to correct themselves, rather than to redirect students, unless it was necessary to advance the researchers' goals for the interview. With the principle on being alert to the unexpected, Goldin (2000) raised the possibility that students' thinking may take researchers by surprise, especially when they listened intently and observed carefully, without imposing their own ways of working on students. To follow such guidance, there is a need for researchers to consider not only their perspectives, but also the perspectives of the students whom they are interviewing. The term "decentering" refers to one person's efforts to view a situation from the perspective of another person (Confrey, 1990).

THEORIZING POSITIONING AND TASK-BASED INTERVIEWS

Clearly, it is valuable for researchers to decenter when conducting task-based interviews. When researchers decenter, they can intently listen and observe students. This can create space for students to share their mathematical thinking, even if it is unconventional. However, the act of decentering does not require researchers to examine the power and status that they bring to an interview, in relationship to the student(s) whom they are interviewing. By power, we mean not only something bestowed on people based on characteristics including gender, race, social class, or education level. Power also is something that people enact, to influence their lives and the lives of others (Garza, 2020). By turning to the theorizing of positioning (Davies, 2023; Herbel-Eisenmann et al., 2024), we can explain how power dynamics between researchers and students may operate during task-based interviews.

In the 1990s, the construct of positioning came into being via a collaboration between scholars with an imbalance in power (Davies, 2023). Elaborating on the construct, Davies (2023, p. 473) stated: "Positioning is relational, not just the immediate relation with one's interlocutor, but relations with/in the assemblages of power/knowledge that make up academic/intellectual and everyday life." Hence, positioning is an action, and not just something that happens in the moment when a person is engaged in a communication act with another. It also comprises how communication acts are situated within broader systems to which people relate. For example, even if a researcher encourages students to express their thinking in a task-based interview, students may not view the interview as a place where they are free to express their thinking. If that is the case, the students' responses likely will be impacted, and it is necessary for the researcher to recognize

that students' mathematical knowledge may not be the only influence on their responses. While any interaction involves power dynamics between those involved, in task-based interviews, there is an imbalance of power tilted toward the researcher "baked in" to the method (see also Parks & Schmeichel, 2014). The structure of the interviews themselves can contribute to the imbalance; researchers develop tasks to address research questions and students are to work on those tasks.

Herbel-Eisenmann et al. (2024) characterize the theorization of positioning as something ongoing and evolving, with feminist roots. Embracing this view, we use the phrase "theorizing of positioning" rather than the more common "positioning theory" (see also Johnson et al., 2025). We do so to emphasize that our theorizing puts power dynamics at the forefront. From this perspective, there is a reciprocity between theory and practice. Theorizing positioning informs the practice of positioning, and in turn, the practice of positioning informs the theorizing. Embodying the synergy between theory and practice, principles underlying the theorizing of positioning are framed as commitments on the part of researchers (Herbel-Eisenmann et al., 2024). These commitments include learning how histories shape people's experiences, reflecting on our positionalities as researchers, valuing participants' experiences or interpretations of positioning, welcoming and navigating tensions, and acknowledging participants' hopes and fears. In a task-based interview, these commitments can surface when researchers notice how a student's body language can communicate their continued willingness and interest to participate in the interview (see Parks & Schmeichel, 2014).

The development of storylines is one analytic technique connected to the theorizing of positioning. Storylines are "the ongoing repertoires that are already shared culturally or they can be invented as participants interact" (Herbel-Eisenmann et al., 2015, p. 188). Any episode has multiple storylines, which emerge from the perspectives of those involved. Researchers' positionings can have implications for how power dynamics play out during interviews (Parks & Schmeichel, 2014). For example, different researcher positionings can include being experts in content, questioners of students, and listeners to students. Each positioning affords different storylines. One is "expert–novice;" here the researcher is the expert, and the student is the novice. Another is "questioner-answerer;" here the researcher asks the questions, and the student gives the answers. "Listener-expert" turns the first two storylines on their heads; here the researcher is the listener, and the student is the expert in their mathematical thinking. While we have characterized these storylines as researcher-student, they can be reversed; for instance, the student can be the questioner and the researcher can be the answerer. Although the "expert-novice," "questioner-answerer," and "listener-expert" storylines may seem disparate, each can play out within a single task-based interview. By interpreting communication acts revealed in data sources, researchers drawing on the theorizing of positioning can work to develop different storylines for the same episode.

Positionings and storylines are dynamic and constantly evolving. By attending to scale, researchers can clarify the level of positionings and storylines (Herbel-Eisenmann et al., 2015). For instance, a small level can refer to a single moment in time, slightly larger levels can refer to episodes spanning a few minutes or even a few hours, and even broader levels can refer to the product of repeated experiences over time. For example, an "expert-novice" storyline may happen in the moment, span a short exchange between interviewer and interviewee, or even extend to the entire interview. At a broader level, students' repeated experiences over time may reinforce that researchers/authority figures are experts and students are novices. Furthermore, the construct of scale can help to explain resources that students bring to an interview when they draw on

past conversations or experiences. For example, in mathematics class, if a teacher asks a question after a student gives a response, the student may think that the teacher is attempting to redirect or evaluate them, and as a result, the student may change their response. Hence, if students view task-based interviews to be a place to perform "school mathematics," as Goldin (2000) cautioned, then they may expect a researcher's questions are to redirect or evaluate them. Because it is typical for researchers to ask students follow-up questions during task-based interviews, it is valuable to explore how power relations may impact students' interpretations of such moves.

POSITIONING AND TASK-BASED INTERVIEWS: THEORY, METHODOLOGY, AND METHOD

The research method of task-based interview emerged within a methodology connected to the theorizing of students' mathematical problem-solving (Goldin, 1997). By methodology, we mean something broader than strategies or techniques (i.e., the research method); methodology refers to the logic underlying the approach to the method (Tashakkori & Teddlie, 2010). Thus, the theorizing of students' mathematical problem-solving guided the logic underlying the development of the research method of the task-based interview. While methodologies are intertwined with theories (Radford, 2008), a relationship between theory and methodology is not necessarily prescriptive (Chan & Clarke, 2019). Hence, it is possible for a research methodology and/or associated research methods to connect to theoretical perspectives beyond those that guided their development.

Researchers' methods-driven decisions connect to their sensitivities to their theoretical assumptions, whether those assumptions are tacit or explicit (Bikner-Ahsbahs et al., 2019). One such decision is how to implement research methods, such as the task-based interview, to address research questions. For example, MERs may employ different theoretical perspectives to investigate students' mathematical thinking related to the same topic. Yet, their answers to those research questions will differ based on the principles of the theory (or theories) guiding their study. To illustrate, consider the research question: How do students interpret and sketch graphs to represent attributes in dynamic situations? A researcher employing a theory on mathematical cognition could produce data to explain students' mental activity by making inferences from students' observable behavior. In contrast, a researcher theorizing positioning could produce data to develop storylines based on communication acts (which include nonverbal as well as verbal productions) between students who are interacting with graphs. In both settings, researchers could use the research method of task-based interviews to investigate the research question. Importantly, the logic underlying their approaches would be different, depending on whether the researchers were producing data to explain mathematical cognition or develop storylines.

Like theories, research methods also evolve, and one way that a research method can evolve is through researchers' use of a method in conjunction with different theoretical perspectives (Johnson & McClintock, 2025). With our research question, we draw on the theorizing of positioning, to offer expanded guidance for task-based interviews. In so doing, we demonstrate how the research method of task-based interview is not necessarily bound to the methodology in which it emerged. By adapting the methodology underlying task-based interview, we also are impacting the logic underlying the approach to the method, at least to some

degree. Our work illustrates how researchers can draw on different theories to advance a research method (i.e., the task-based interview) developed in conjunction with another theoretical perspective.

THREE POSITIONING PRINCIPLES FOR TASK-BASED INTERVIEWS

Before articulating the positioning principles, we share our own positionalities. Our author team comprises one White woman and two White men, who grew up in different generations, social classes, and geographic locations in the U.S. We bring experience designing and conducting task-based interviews as well as classroom teaching experience spanning elementary through undergraduate students. We respect the complexity of the work of teaching and research, and we acknowledge the need to honor students' brilliance in our work. In the last few years, we have been conducting task-based interviews with postsecondary U.S. students enrolled in a college algebra course. To accommodate students in different geographic locations, we have conducted the interviews via videoconference. Typically, we have not met the students prior to the interviews or visited their local contexts. Hence, our need to account for power dynamics has been acute, and these principles have evolved from our own learning and reflections.

Drawing on our theorizing of positioning, as well as our own experiences in our context, we offer three positioning principles to guide design and implementation of task-based interviews. The principles are: Set the stage to surface interviewees' brilliance; be alert to the influences of power on interviewees' responses; and redistribute power from interviewer to interviewee. We share these principles with the assumption that researchers are conducting task-based interviews to investigate students' mathematical thinking. However, we think these principles could apply with different purposes in mind.

We view these principles as being complementary, rather than in opposition to, or as a replacement for, Goldin's (2000) principles. For example, Goldin (2000) recommended that researchers train for and pilot-test interviews. When researchers are training to conduct task-based interviews, it can be valuable for them to have power dynamics in mind when they do pilot-testing. This way, they can gather feedback on how interviewees were feeling during the interview, with regard to interviewees' agency to share their mathematical thinking and how they felt the researcher supported such mathematical thinking. We recognize that this sort of feedback likely requires a level of trust between interviewer and interviewee. Hence, researchers new to task-based interviews may pilot-test with friends or family prior to pilot-testing with students. Furthermore, the positioning principles themselves are interdependent. They can overlap and may appear more prominently when designing, implementing, and reflecting on task-based interviews.

Set the Stage to Surface Interviewees' Brilliance

Even though task-based interviews are to be a place where students engage in unrestricted problem solving, students may think that they are to produce correct answers via established procedures (Goldin, 2000). By setting the stage, researchers can help students to anticipate the kinds of interactions they may have during a task-based interview, and how those interactions may compare to the kinds of experiences they have had in school. In our experience, we have set the stage before starting to record, to build trust with students prior to moving to the formal part of the interview.

We provide three kinds of interactions that researchers can address when setting the stage for a task-based interview. First, describe the kinds of materials that students will be using and how they will work with those materials. If the interviews take place in a face-to-face setting, researchers can tell students how cameras will be recording their work, and the kinds of tools students are to work with (e.g., markers rather than pencils so the camera can more easily capture their inscriptions). If the interviews are in a videoconference setting, researchers can instruct students on sharing their screen and/or video. Second, encourage students to talk about their thinking; let students know that they are experts in their thinking, and as interviewers we are here to learn from them. If students are to read questions out loud, then it is useful for researchers to tell students this will be the case, as often students may read questions silently, which may make it more difficult for researchers to gather evidence of their thinking. Third, describe what the back and forth will be like during the interview. Below is a statement adapted from those that we have shared with students:

> During this interview, I'll be asking you to explain your mathematical thinking. And that means I'll likely ask questions after you respond. I know that sometimes when instructors ask questions, it might make you think that you are wrong about something. When I ask questions, it doesn't mean that I think you are wrong. I am asking to learn more about how students are thinking when they are working on these tasks. I will do my best to understand how you are making sense of things, and sometimes that means I will ask clarifying questions. For example, if you use a pronoun like "it" or "that," I might ask you to show me what the "it" or "that" is. If you aren't sure how to answer a question, it is okay to say "I don't know." It is also okay to say that you don't want to answer a question, and if you aren't sure what a question means, you can ask me to say it another way. Now, what questions do you have for me?

We intend the language in the statement to be informal, to help students to feel comfortable as they begin the interview. We have developed this language with secondary and post-secondary students in mind; for younger children, we expect the language to be different. We want to make explicit the expectations that students may have when they are asked questions, and we also want students to have a sense of why researchers may ask so many questions. Furthermore, we want students to know they have agency to respond, or not respond, or to ask questions of their own. The statement concludes with an invitation to students to ask about the interview itself. We use the phrasing "what questions do you have" rather than "do you have questions," to imply that we welcome questions. While we suggest communicating expectations to commence the interview, we do not think that the communication ends here. In our experience, there has been a need for the interviewer and interviewee to negotiate what those expectations look and sound like during a task-based interview.

Be Alert to the Influence of Power on Interviewees' Responses

When researchers become aware of their own positions of power, it has potential to enhance their ethical actions during interviews (Parks & Schmeichel, 2014). Sharing one's mathematical thinking is a vulnerable act (Johnson et al., 2025), and researchers can respect that vulnerability by making room for students to respond in ways that honor the knowledge and experience they bring to the interview. This includes being attentive to the ways that students communicate (verbally or nonverbally) their comfort with participating in the interview. Parks and Schmeichel state (2014, p. 532): "Of course, despite any research

protocol we put in place, researchers will have to make in the moment decisions on a case-by-case basis about the most productive course of action when children demonstrate discomfort during interviews." Even if researchers do not intend it, their positions of power may impact the flow of the interviews. One way that students may express discomfort is by providing limited or no responses to reviewer questions; they also may change their body language (see Parks & Schmeichel, 2014). One way to be alert to the influence of power is to be attentive to the length of the talk turns that students provide with respect to the researcher. If researchers notice that they are talking far more than the students, that is one cue that students may not feel comfortable. Furthermore, if the researcher is from a dominant population and the student is from a nondominant population, there may be potential for students' discomfort to be heightened (see Parks & Schmeichel, 2014). Not only is it important for researchers to be aware that students may express discomfort, but also to acknowledge that students' discomfort does not mean a lack of mathematical capabilities. Retrospectively, researchers can take discomfort into consideration when making inferences about a students' thinking, to not ascribe a lack of response to a lack of understanding.

Redistribute Power to the Interviewees

If researchers are to position students as experts in their mathematical thinking, then students need to know that they have the space to explore and respond in ways that may be unconventional. As Goldin (2000) asserted, when researchers put themselves in the place of listeners and observers, students can offer surprising responses. When researchers respond to surprises with curiosity, rather than judgment or incredulity, they can communicate that students are experts in their mathematical thinking. For example, if a student hesitantly sketches a graph representing attributes in a linked animation, the researcher may point to a particular part of the graph and ask how that part of the graph relates to the animation. Prior to the interview, researchers can plan for the redistribution of power, to allow the interview to proceed as a conversation, rather than an interrogation. During the interview, researchers can encourage students to express their thinking via communication acts that redistribute power to the students in the moment as they are working on the tasks.

Researchers can communicate a redistribution of power via verbal and nonverbal actions, and it is useful for researchers to consider how their actions may communicate unintended messages to the students. For example, if a researcher is nervous, they may communicate disinterest or judgment through a rigid posture or tense facial expressions. This underscores the importance of training for and piloting the interview, as recommended by Goldin (2000). By planning responses to redistribute power to students, researchers can be prepared to make more effective in the moment decisions. For example, if a student says that they do not know an answer to a question, a researcher can ask the student to talk about their wonderings. Questions such as this can communicate that the researcher is interested in the students' thinking, not just canonical answers to predetermined questions. Furthermore, if a researcher notices a student expressing discomfort with the interview, they can pause the interview and ask the student if they would prefer to continue or stop the interview. Questions such as this can promote students' agency over their participation in the interview.

OPERATIONALIZING THE POSITIONING PRINCIPLES

To operationalize the positioning principles, we provide excerpts from a videoconference task-based interview conducted in Fall 2023 with Lainey (pseudonym), a U.S. postsecondary student enrolled in a college algebra course. Johnson conducted the interview while Knurek observed and took field notes. In the U.S., college algebra is one of the earliest credit bearing mathematics courses for students, packed with content (Gordon, 2008), including treatment of functions and graphs. During the interview, Lainey worked on a digital activity linking a dynamic graph to the animation of a circus performer ("Cannon Man") being propelled from a cannon, then parachuting back to the ground. While Knurek had corresponded with Lainey via email to schedule the interview, the interview was the first meeting between Lainey, Johnson, and Knurek.

Operationalizing the First Principle: Setting the Stage

To set the stage, Johnson communicated expectations for Lainey to share her mathematical thinking during the interview. She began by making explicit a broad purpose for the interview, to learn how students make sense of digital graphing activities. While the activity collected students' graphs and written responses, she told Lainey that by talking to students, we could gain a deeper understanding than if we were just to review sources of data collected by the activity. Next, Johnson told Lainey that she knew that sometimes when instructors ask students to explain their math thinking, it might imply that students are wrong or should fix something, but that was not the case here. She continued, telling Lainey that her goal was to learn more about how students thought about these questions, and she wanted to do her best to understand Lainey's point of view. She also said that it was okay for Lainey not to know how to respond, to ask for clarification, or even to pass on a question entirely. Then Johnson asked Lainey what questions she had, and if it was okay to begin, to which Lainey agreed. While we set these expectations at the outset, negotiations continued during the interview.

Operationalizing the Second Principle: Being Alert to the Influence of Power

Prior to the interview, Johnson intended to foster a "listener-expert" storyline across the span of the interview, to position Lainey as the expert in her mathematical thinking and Johnson as the listener. Yet, Johnson knew that Lainey might be unfamiliar with graphing tasks like the Cannon Man task, which might shift the storyline. Hence, Johnson planned to ask whether Lainey had seen tasks like the Cannon Man at the outset of the interview. In the moment, when Johnson knew that the task was novel for Lainey, she watched Lainey's facial expressions and listened for verbal responses that might indicate Lainey was uncomfortable with the interview itself. Prior to the interview, Johnson planned in-the-moment questions in response to potential student discomfort, including students if they found the task strange, if they liked working on the task, or if they wanted to continue with the task. Even when students are comfortable with a novel task (as Lainey demonstrated that she was via her nonverbal and verbal responses), students may still view the researcher as the authority to whom they need to defer. In the moment, Johnson was alert to when Lainey's responses communicated that Johnson was the one with the power to deem those responses as worthy (or not worthy). Prior to the interview, Johnson planned potential questions to distribute power to Lainey, which leads to the third principle.

Operationalizing the Third Principle: Redistributing Power

Johnson asked Lainey numerous questions, as typical for a task based interview. Often, Lainey responded to Johnson's questions with questions of her own, reversing the "questioner-answerer" storyline, but still positioning Johnson as the one holding the power. Many of Lainey's questions referred to whether Johnson thought Lainey's responses were "okay," as well as to Johnson's expectations for Lainey. When Johnson responded to Lainey's questions, she intended to communicate that she did not have set expectations for how Lainey was to respond, and that she valued Lainey's willingness to share her thinking. To illustrate, when using an online graphing tool for the first time, Lainey asked: "Would you prefer me to just use the cursor?" Johnson confirmed that Lainey could use her touchscreen device in the way that she preferred. Then Lainey sketched a graph, relating Cannon Man's height from the ground and total distance traveled during his circus performance. When Lainey finished, Johnson asked: "How did you decide to make it shaped like that?" Lainey described different elements of her work, including how she moved the cursor ("I don't know if you saw my cursor go over here") to show how Cannon Man "was going up and down," but the distance was "always going up." Lainey's response demonstrated her thoughtful attention to the task, and she demonstrated covariational reasoning, the form of mathematical thinking being investigated in the interview. Yet, she concluded that response by saying: "I hope my thoughts are clear. I'm thinking of a lot of things at once." To affirm Lainey's participation in the interview, Johnson stated "I really appreciate how you're talking about those things." After Johnson's response, Lainey continued to share more of her thoughts, including how the graph might change if Cannon Man moved in different ways.

DISCUSSION

We have offered three positioning principles to guide the design and implementation of task-based interviews. By setting the stage to surface students' brilliance, researchers can make explicit the power dynamics at play. By being alert to the influence of power on students' responses, researchers can attend to the ways that students can position the researcher as the mathematical authority. By redistributing power to students, researchers can position students as experts in their mathematical thinking. Researchers can respond to the principles through planning for the interview (e.g., deciding what to say to set the stage), enacting in the moment communication acts (e.g., setting the stage with the interviewee), and reflecting on the interview (e.g., deciding if there may need to be adjustments to the stage-setting). With the principles, we intend to address power dynamics inherent in task-based interviews. We do not view the set to be exhaustive, and we welcome further work to advance principles for the design and implementation of task-based interviews. We have shared our own experience with task-based interviews to keep our feet empirically grounded (see Bikner-Ahsbahs et al., 2022) when examining issues of theory and method. We offer our own experience with humility, knowing that we always can continue learning and furthering our expertise.

The first positioning principle guides the outset of the interview, and the second and third principles work together to achieve the goal of the first principle—to surface students' mathematical brilliance. In task-based interviews, students often work on novel tasks, and they may engage in struggle when working on the tasks. In the second principle, when we suggest that researchers be alert to students' discomfort, we do not

mean that researchers should avoid any situation where students experience some challenge or perturbation. Rather, we mean alertness to verbal or nonverbal cues that students no longer feel comfortable participating in the interview. Furthermore, when conducting task-based interviews, researchers are to encourage students to engage in unrestricted problem solving (Goldin, 2000). In the operationalization of the third principle, Johnson expressed her appreciation for Lainey's willingness to share her thinking. In so doing, she intended to honor Lainey's vulnerability in sharing her thinking, and to encourage Lainey to continue, even if she was not sure about her responses or if her responses were not fully formed.

By offering the three positioning principles, we mean to complement the design, logistical, and implementation considerations advanced by Goldin's (2000) principles. We view the positioning principles to connect most closely to Goldin's principles of encouraging unrestricted problem solving and being alert to the unexpected. Here, we suggest that alertness can extend to power dynamics related to the positioning of interviewer and interviewee. We also suggest that distributing power from researcher to student can promote students' unrestricted problem solving. Furthermore, the positioning principles address the design and implementation stages of the task-based interview. For example, in response to the second principle, researchers can anticipate verbal and/or nonverbal cues that students might give to express discomfort with the interview, then be alert to those cues during the interview. In response to the third principle, researchers can design interview questions intended to distribute power from researcher to student. In addition to guiding design and implementation, researchers also can use the positioning principles as tools to for reflection.

To develop the positioning principles, we sourced a theory from outside the paradigm in which the research method was developed, which is rarely observed in the research literature (Mertens, 2020). Specifically, we examined the method of the task-based interview (Goldin, 2000), with theoretical grounding compatible with what Mertens calls a "constructivist" paradigm. We used the theorizing of positioning (Davies, 2023), compatible with what Mertens calls a "transformative" paradigm, which includes critical and feminist theories. When making such a use of theory, it is necessary for researchers to demonstrate the viability of the approach. Drawing on Goldin's (2000) handbook chapter on task-based interviews, we highlighted guidance that provided some glimpses to the possibility for power dynamics to emerge in task-based interviews. Furthermore, the recommendations from Parks and Schmeichel's (2014) study provided backing for our second principle. In our work, we adapted the logic underlying the method of task-based interviews to include positioning principles to provide guidance around power dynamics inherent in interviews. The positioning principles can support researchers to cultivate interview settings where students feel comfortable to share their authentic thinking, rather than just canonical thinking they view a researcher may want to hear (e.g., established procedures leading to correct answers). In future studies, MERs can draw further connections between theory and method.

While we applied these positioning principles to task-based interviews in mathematics education, the principles have relevance to interview methods in other disciplines. Our work to source a theory from a transformative paradigm to examine a research method in mathematics education is compatible with the work of science education researchers (Russ et al., 2012) who examined how students interpreted interactions in cognitive clinical interviews (diSessa, 2007). Drawing on linguistics and anthropology, Russ et al. (2012) investigated students' expectations, or frames, for how to engage in cognitive clinical interviews and found that the frames impacted students' participation. The "expert interview" was one such frame, in which

students (the experts) intended to help researchers (interested listeners) to better understand their science thinking. With Russ et al. (2012), the unit of analysis was students' understanding of the interview setting itself, and they demonstrated how that understanding impacted students' behaviors during the interview. In our work, the unit of analysis was the relations between researcher and student, which could happen in the moment or over time. Drawing on the theorizing of positioning, we offered the "listener-expert" storyline, in which the researcher was the listener and the student was the expert, and we explored how power dynamics between researcher and student may influence the actualization of the storyline. By sourcing theories and/or theoretical constructs from different paradigms, researchers can advance research methods. In future studies, researchers can use different paradigms to investigate qualitative research methods beyond interviews.

Johnson et al. (2025) illustrate how the theorizing of positioning could support the training of doctoral students around task-based interviews in mathematics education. With the positioning principles, we provide actionable guidance. For example, doctoral students may use the positioning principles to guide the design of task-based interviews, then observe and/or lead the interviews, and use the principles to reflect on the interviews. As Johnson et al. (2025) showed, sourcing a theory from a transformative paradigm has potential not only to advance existing research methods, but also to support new researchers in learning to implement the methods. While we have developed the positioning principles for task-based interviews, we view there to be potential for the principles to inform qualitative methods more broadly. Future research can provide insight into such potential.

Rather than treating the task-based interview as a "neutral" method, we examined interviews as social acts involving power dynamics. This resulted in positioning principles to guide the use of the method to investigate students' mathematical thinking. When researchers position students as experts in interview settings, students can feel more agency to share their mathematical thinking, even if it is unconventional. In turn, the mathematical insights that researchers develop have potential to expand, because students can view the interview as a place where they are the star and their thinking is the main event.

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