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Amy Noelle Parks

Mardi Schmeichel

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Amy Noelle Parks[1] and Mardi Schmeichel[2]

1. Department of Teacher Education, Michigan State University, East Lansing, Michigan, USA
2. Department of Educational Theory and Practice, University of Georgia, Athens, Georgia, USA

Corresponding author – Amy Noelle Parks, Department of Teacher Education, Michigan State University, 313 Erickson Hall, East Lansing, MI, 48824-1034, email parksamy@msu.edu

Abstract

Despite the increased use of video for data collection, most research using assessment interviews in early childhood education relies solely upon the analysis of linguistic data, ignoring children's bodies. This trend is particularly troubling in studies of marginalized children because transcripts limited to language can make it difficult to analyze embodied power relations between majority researchers and minority children. This article responds to this problem by outlining a theoretical position on power and bodies, describing multimodal analysis strategies, and using these strategies to analyze the subject positions available during a mathematical assessment interview for three African American preschool child-participants and the European American adult researcher. This study draws attention to the complexity of human interactions during assessment interviews by describing the ways children positioned themselves as willing (or not), attentive (or not), and competent (or not) as well as describing the ways the researcher sought to position herself.

Keywords: assessment, early childhood, equity

Despite the increased use of video for data collection (Bezemer & Jewitt, 2010), most research involving assessment interviews in early childhood education, as in many other fields, relies solely upon the analysis of linguistic and textual data to make meaning of

researchers' interactions with children. While published reports may include brief references to the use of video in the description of the methodology or research design, our review of early childhood assessment research in the United States indicated that when the use of video was acknowledged, there was rarely a description of *how* video was used beyond, for example, allowing "the accuracy of the interviewer's notes to be verified" (Curtis, Okamota, & Weckbacher, 2009, p. 328). We find this trend troubling because in our own experience in an ongoing ethnographic project studying the mathematical understandings of a group of low-income, rural, African American preschool children, video data have highlighted the importance of nonlinguistic modes of communication. Specifically, we began the analysis presented here when Tyrell, one of the boys in the study, said quietly "I want to go back to my classroom" after the first minute of the assessment interview. The first author responded by asking if he wanted to play with Lego blocks. Tyrell shook his head, moved to stand, and repeated "I want to go back to my classroom." The first author jumped to her feet to walk him back, feeling that she had been responsive. However, when she reviewed the video recording of the interview, she was surprised by the nonverbal cues of discomfort she had missed during the minute before he verbalized his request.

This recognition prompted a desire to go back to the video from all of the assessment interviews to review research events in which children and researchers used their bodies—through facial expression, posture, gesture, gaze, proximity, and movement—to communicate. Our attention to the use of bodies in these videos required that we find new ways of seeing and reading ourselves and the children and that we find new ways of recording and describing the interviews.

The void in the attention to bodies in assessment-based research, even when available video data would enable this analysis, is of particular concern when considered within the context of research with marginalized populations. Within mathematics education, research on differences in mathematical understandings and performance of young children across demographic groups has been contradictory. A number of studies have reported significant gaps between the mathematical knowledge of middle-class, majority students and the knowledge of poor and minority students (e.g., Denton & West, 2002; Saxe, Guberman, & Gearhart, 1987; Starkey & Klein, 1992) with studies of kindergarteners reporting that while 66% of European American children pass tests on reading numerals, counting past 10, sequencing, and comparing, only 42% of African American and 44% of Hispanic children pass similar tests (National Resource Council, 2005). At the same time, other studies have found no significant differences in the mathematical performances of middle-class and working poor children or among majority and minority racial and ethnic groups (e.g., Ginsburg & Pappas, 2004; Ginsburg & Russell, 1981; Tudge & Doucet, 2004). Ginsburg and Pappas (2004) argue that the varying results of this work may be related to differences in the ways that various demographic groups of children react to the experience of the assessment interview, leading to different results in different contexts.

> Standard administration of tests requires treating all children in the same manner. Although offering many apparent benefits with respect to comparison of groups, this approach is not always an effective method for motivating young

children, especially for providing children from different backgrounds with equal motivation. They may be uncomfortable in the testing situation, may find it difficult to attend, may display variable interest in the task, and may be unfamiliar with the task setting. . . . The results of such testing are therefore often unreliable. (Ginsburg & Pappas, 2004, p. 173)

When researchers report only answers to questions (or as is common in quantitative work, *summaries* of answers to questions), as a field we have no way of knowing the extent that factors such as those Ginsburg and Pappas (2004) described may be having an impact on the results of the interviews. Additionally, varying power relations between majority interviewers and minority children and class differences related to comfort with unfamiliar adults may play significant roles in the kinds of answers that children produce in assessment interviews. But evidence of comfort or lack of comfort is often absent from data reports of children's answers to assessment questions. In order to improve our understanding of differences in knowledge and performance across demographic groups of young children as well as our knowledge of assessment interviews of young children as a research tool, we need to find ways to document children's experiences of assessment interviews so that their answers can be understood in a broader context. We believe that while attention to bodies cannot give us definitive answers about the extent to which discomfort, skepticism, and anxiety may be differentially having an impact on the performance of some groups of children, documenting and reading the body during interviews could be an effective method for understanding claims about children's knowledge, which have traditionally been presented as unproblematic certainties.

In designing this study, we drew on the research of other scholars in early childhood education who have used video methodologies to turn their attention toward bodies, although typically not in the context of assessment interviews (e.g., Flewitt, 2005). For example, Tobin's work using video-cued methodology (Kurban & Tobin, 2009; Tobin & Davidson, 1990; Tobin, Hsueh, & Karasawa, 2009) attends to bodies by using videos as "visual mini-ethnographies" (Tobin & Davidson, 1990, p. 271) to elicit commentary on cross-cultural schooling practices broadly and on the ways that children and adults use their bodies while engaging in these practices. Although Tobin typically does not analyze the bodies in the video as data, the video record supports focus group conversations that could not take place without the visual representations of bodies in schools: Tobin's participants frequently turn their attention to topics that were of interest to us in this study, such as interpreting children's levels of comfort and anxiety. Other researchers have used video to document nonverbal as well as verbal performances during experiments (e.g., Correa-Chavez, Rogoff, & Arauz, 2005; Mejia-Arauz, Rogoff, Dexter, & Najafi, 2007). For example, Silva, Correa-Chavez, and Rogoff (2010) used video recording to capture children's "gaze, posture, gestures, and other visual and verbal cues" (p. 905) while they made a toy. Video segments were then coded to compare use of verbal and nonverbal strategies across cultural groups of children. Similarly, psychological research on the ways that children develop basic reasoning skills, such as the understanding of causal relationships, has used video to capture children's engagement with materials so that correct and incorrect responses can be coded based on children's actions (e.g., Gopnik, Sobel, Schultz, & Glymour,

2001; Kushnir & Gopnik, 2007). Goldin-Meadow (2003) has argued that gesture not only communicates understanding but reflects thinking, and that reading children's gestures may predict when they are ready to learn new things even when they are not able to express understanding verbally.

In this study, we used video to capture images of bodies in ways similar to the work these researchers have done in other settings; however, we also drew on multimodal analysis to support both closer readings of the body and more explicit ways of transcribing video in relation to making judgments about consent, comfort, and children's mathematical knowledge. In particular, we wanted to incorporate the body into the analysis of how and what children and researchers communicate in a research setting. To set the stage for this analysis, we begin by outlining a theoretical position that emphasizes the relationships among power, discourse, and the body and then describe multimodal analysis strategies. We explain how we used these strategies to analyze the embodied communication we observed in one aspect of our study: the assessment interview. In response to our research question "How do children's and the researcher's bodies inform the analysis of a mathematical assessment interview conducted with preschoolers?" we describe the shifting subject positions made available, taken up, and rejected during the assessment interviews. Our goal is to demonstrate the use of multimodal strategies in assigning meaning to events and to draw attention to the complexity of all human interactions and the dangers of simplifying these interactions by focusing only on linguistic channels of communication.

Power, Bodies, and Positioning

Over the past few years, the body has increasingly become an object of study by researchers drawing on diverse theories and methodologies. Following Merleau-Ponty's (1962/2002) contention that the body not only gives us access to and shapes our interaction with the world but "is our general medium for having a world" (p. 169), our interest in the body speaks to the corporeal turn (Witz, 2000) evident in feminist (e.g. Bordo, 2003; Jones & Hughes-Decatur, 2012; Orbach, 2009) and new materialism (e.g., Barad, 2012; Braidotti, 2010; Clough, 2009) theories that assert the relevance of bodies and embodied practices to the research context, power relations, and the subject under study. Within early childhood research in particular, Deleuze and Guattari (Deleuze, 2004; Deleuze & Guattari, 2004) have been used to theorize children's bodies. This line of work both acknowledges the socially regulated grids of identity in which all bodies are located and seeks to destabilize notions of difference through attention to children's always shifting embodied relationships and encounters (e.g., Davies & Gannon, 2009; MacLure, Holmes, MacRae, & Jones, 2010; Olsson, 2009). Across theoretical paradigms, the turn toward situating body practices as central to research enriches understanding of the ways in which discourses, subjectivities, and bodies are inextricably linked and the ethical and political responsibility that researchers have for exploring the ways in which we acknowledge and represent these linkages.

We ground our analysis of the body in poststructural work that sees the body as saturated in a variety of discourses (Foucault, 1975/1995, 1980, 1976/1990) both actively involved in writing meaning into the world and necessarily being read by others in relation

to the many discourses available to all human beings in any lived moment. We want to clarify that our use of a poststructural body is not a bloodless, ephemeral caricature of a body that exists only in discourse. We are talking about real bodies. While our poststructural commitments keep power and discourse in the mix, we have also relied upon Latour (1993) to think about the "simultaneous impact" of both the materiality of the body and the social context in a way that is "not reducible to the one or the other" (p. 5). In other words, it is not our intention to exorcise the subjectivities of our participants or ourselves from their material, embodied contexts: rather, we seek to show their intersections and to describe the potential of those intersections to add complexity and depth to educational research. As Foucault (1975/1995) contended, the material body is "directly involved in a political field; power relations have an immediate hold upon it; they invest it; mark it; train it; torture it; force it to carry out tasks; to perform ceremonies; to emit signs. This political investment of the body is bound up in accordance with complex reciprocal relations" (p. 25). This understanding of bodies as "maps of power and identity" (Haraway, 1991, p. 180) enmeshed in complicated and dynamic contexts is particularly relevant to our concern about the ways in which researchers recognize, analyze, and read bodies in ways that are shaped and constrained by culture and history, as well as how these practices exist within a cycle in which the knowledge produced in research creates and reinforces the categories by which children can be read. Foucault's work to show the connection between the body and power brings analyses of gender, class, and race explicitly into focus and creates a space to interrogate the circular nature of educational research as a process in which bodies are described and produced in ways that can reinforce notions of what some groups of children can and cannot do.

The addition of video to qualitative research heightens the responsibility of researchers to avoid producing work that would reinscribe the problematic discourses written onto some children's bodies. All research must be held accountable for avoiding the reproduction of deficit-oriented descriptions of marginalized children, but the visual images produced in video research, in which bodies are reviewed repeatedly and may be reproduced in research results, require additional ethical responsibility for attending to bodies and the problematic discourses that can be written on them—discourses that make it possible to simply look at the participants in the video to "know" who they are (Parks, 2009). In an attempt to avoid this pitfall, we draw on Foucault's descriptions of "power as circulating rather than being possessed, productive and not necessarily repressive, existing in action, functioning at the level of the body" (Gore, 1998, p. 233). The application of this concept of power in video research disrupts and undermines received readings of students and researchers because instead of assigning power to some and not others through simply viewing bodies, it acknowledges that power is an unstable force that shifts between participants during research events. Furthermore, the conception of power as productive, crystallized in Foucault's (1975/1995) statement that "power produces; it produces reality . . . the individual and the knowledge that may be gained of him belong to this production" (p. 194), holds us accountable for thinking about the ways in which both researchers and child-participants—who may differ in terms of race, class, gender, and status—deploy power in research settings in order to negotiate or even refuse the ways in which they are being produced. As Graue and Hawkins (2005) noted in their description of two fourth-grade

students who declined to be interviewed after the researcher had finished interviewing their parents in their homes, "power relations between adults and children are permeable" (p. 48). Recognizing that even young children exercise power in their interactions with adults means that we must consider both how to recognize power plays during assessment interviews and how to deploy power differently to both meet the needs of our young participants and better represent what they know and can do.

To do this, we draw on positioning theory (e.g., Davies & Harré, 2001; Holland, Lachiotte, Skinner, & Cain, 1998; Smith, 1988) to describe the ways that both the children and the researcher exercised power to assume attractive positions in the discourse and to reject unattractive ones. Davies and Harré (2001) assert that a strength of this theory "is that it recognizes both the constitutive force of discourse, and in particular of discursive practices and at the same time recognizes that people are capable of exercising choice in relation to those practices" (p. 262). Positioning theories assume that discursive acts create truths by making certain subject positions available to certain people in certain contexts and that these positions are continually shifting and contested. Through discourse, both spoken and embodied, individuals engage in "acts that constitute relations of hierarchy, distance, or perhaps affiliation" (Holland et al., 1998, p. 128).

In examining how individuals are positioned in particular social settings, positioning theorists consider both intentional and unintentional acts, which can include choices about speech, posture, and clothing. In other words,

> There can be interactive positioning in which what one person says positions another. And there can be reflexive positioning in which one positions oneself. However, it would be a mistake to assume that, in either case, positioning is necessarily intentional. One lives one's life in terms of one's ongoingly produced self, whoever might be responsible for its production. (Davies & Harré, 2001, p. 264)

In their anthropological work, Holland and colleagues explore a similar notion of positioning, describing the ways that Naudadan women, college students, and AA members take up, refuse, and transform particular positions in discourse. For example, the ethnographers described a Naudadan woman who rejected her caste positioning when interacting with the Western ethnographers (by violating her culture's norms and entering the home of the higher-status Western ethnographer) but reassumed her lower-status position (by disguising her entrance to the home) in the presence of higher caste women from her own community. Similarly, Holland and colleagues describe how young college women sometimes take up the position of objects of desire in their interactions with men, sometimes successfully reject this positioning, and sometimes find themselves positioned against their will within the discourse of desire. These studies make it clear that individuals do not have an infinite number of subject positions they can occupy. Naudadan women cannot, for example, take up the privileges reserved in their culture for men; however, they can exercise some agency in how they take up available positions and in how they accept or reject the attempts of others to position them.

Researchers working in interpretive traditions in early childhood research have described a variety of ways that child-participants and adult-researchers position themselves

in research endeavors (e.g., Corsaro, 2003; Davies, 2003). For example, sociologist Corsaro (2003) contrasted his method of approaching children, which involved quietly watching their play until he was invited to join, with the ways that researchers conducting interview studies approached children with questions like: "Do you want to play a game with us?" Corsaro wrote that this question was a synonym for asking children "to be in one of the research experiments that occurred routinely in [the] lab school" (p. 13). Corsaro positioned himself as an atypical adult who wanted to be treated as a peer as much as is possible and invited the children to take up positions as his friends. In contrast, the researchers conducting interviews sought to occupy positions as more typical, but friendly, adults. These positioning moves have implications for the ways that power can be exercised in interviews or observation studies. The interviewers maintained their adult privilege and thus could issue directions to the children as part of the study and expect them to be followed; whereas, by positioning himself as a peer, Corsaro gained access but gave up the privilege of issuing commands. Recent interpretive work in early childhood has been exploring ways that the traditional positions occupied by children and adults during research can be adapted. For example, scholars have positioned even very young children as co-researchers, rather than as participants, asking children to help frame research questions, collect and interpret data, and make decisions related to dissemination (e.g., Einarsodottir, 2011; Lundy, McEvoy, & Byrne, 2011); however, children participating in assessment interview typically have been positioned in very different ways.

Positioning in Assessment Interviews

We are interested in drawing on positioning theories to describe the ways that the children and the researcher in the interviews worked to position themselves and each other. We also want to explore the subject positions available to the participants in the particular context of the assessment interview, which is a common practice in research with young children and in educational research more broadly. In designing the assessment interviews for this particular study, the first author drew—both consciously and unconsciously—on previous research reporting the results of interviews. As such, this literature provided one important discourse that shaped the structure of the interactions described in this study. In this section, we present a brief analysis of the types of subject positions made available to children and researchers in assessment research.

In the literature on assessment interviews, the subject positions made available to children relate almost exclusively to their capacity to perform. For example, children are often described in terms of having the ability to count or not, having the ability to count in specific contexts, or having the capacity or not to complete the tasks of the assessment. Importantly, there are also very few studies that describe procedures, methodology, or results in terms of the experiences of individual children. Instead, the individual participants are lumped into groups of children who were taken into separate rooms to complete assessments and whose aggregated performances on discrete skills and tasks are tallied and compared. Sometimes the language used in the findings erases any evidence of actual children, as in one study that described results by making the intervention curricula the subject under investigation: "*Tools* classrooms attained higher overall levels of quality. . . . The

advantages of *Tools* on the ECERS-R were particularly evident on the Language and Reasoning, Activities, and Interactions subscales. *Tools* classrooms also scored higher on . . ." (Barnett et al, 2008, p. 310). Clearly, these kinds of reports leave little room for children to be positioned in ways that transgress the bounded categories of competent or incompetent.

In addition, the race, gender, and class of participants were rarely acknowledged in the literature we reviewed. While some studies listed demographic identifiers, these subjectivities were almost never addressed in the methodology or findings, other than in comparisons of groups of children (e.g., Curtis et al., 2009; Kaminski & Sloutsky, 2013; Skwarchuk, 2009; Slusser & Sarnecka, 2011). The evaporation of participants' race, class, and gender create the impression that these subject positions may be relevant in the selection process but become irrelevant in terms of the researchers' interactions with the children in the study or the analysis. Studies that do not address the race, gender, and class of participants at all offer no space for the children to be read as raced, gendered, or classed subjects. The race, gender, and class of researchers are made explicit even less often than those of child-participants, and as such, readers are unable to read them and consider their interactions with children on the basis of these subjectivities. Instead, the subject positions available for the researchers appear in terms of their competence and trustworthiness, as seen by references to researchers who were "trained" (e.g., Harden, Sandstrom, & Chazan-Cohen, 2012, p. 574).

Furthermore, the actions of researchers are largely invisible in many studies, and as such, there is very little attention paid to bodies and the social aspects of the interview. When bodies are referenced at all, the language used is often oblique. For example, when Jordan, Huttenlocher, and Levine (1992) examined differences in calculation abilities between middle- and low-income families, they described in great detail the assessment tasks given to children but provided little information about the way children responded to these tasks other than to say that a "sufficient break" was given between the two testing sessions and that "two examiners were present during the HPTCS testing to help children attend to the tasks and follow directions" (p. 647). The fact that a break was given and that the researchers recognized a need to help children attend and follow directions suggests that children's bodies must have been objects of attention for the researchers and that these bodies must have communicated some information about children's willingness and ability to engage in the tasks. However, no details about what *inattention* or *not following directions* looked like are provided. Statements in research reports like this one also raise questions about what it means for young children to give informed consent. Young children may not always tell an adult that they no longer want to engage in an activity; however, if through inattention or off-task behavior, they indicate that they would rather be elsewhere, researchers may need to consider whether this behavior ought to be considered a revocation of consent.

Similarly, studies that note researchers attempted to make children as comfortable as possible" (Barnett et al., 2008, p. 305), or conducted assessments with children with whom they were already familiar (Day & Burns, 2011), or spent time in classrooms before the assessments in order to build rapport with the participants (Curtis et al., 2009) are referencing researchers' efforts to establish relationships with children. The fact that children needed to be made comfortable implies the possibility that some children may have been

uncomfortable with researchers, but acknowledging only the efforts to make children comfortable eliminates the possibility for children to be read as unwilling or coerced subjects.

We found one study that addressed students' comfort in a bit more depth than others, noting (although not theorizing the impact of) the diverse class backgrounds of the children in relation to their participation in the assessment interviews. In this study, which compared the mathematical reasoning of 40 children from lower-income families attending Head Start to the reasoning of 43 predominantly middle-income children attending private preschools, Sophian (2002) reported that 8 potential participants, all of whom attended Head Start, were excluded from the study "because they failed to respond to any of the items of the pretest, the posttest, or both" (p. 293). In a footnote, the author theorized that the children who had been excluded *were* comfortable because they handled materials without being asked to do so but may have been unfamiliar with the question-answer structure of the interview. So while the significance of the differences in the exclusion rate for the two groups was acknowledged, it was not used to frame the interpretation of differences in the performance of children from both groups who *did* complete the test. In other words, given that 8 of 48 potential participants from Head Start did not engage in the interview while all of the 43 children who attended a private preschool did engage, it seems likely that even the Head Start children who *did* complete the interview may have been more unfamiliar and uncomfortable with the interview setting than the private school children and that this discomfort may have been related to class differences. The researchers as well as populations of both schools were described as ethnically diverse; however, the racial and ethnic identities of the 8 children who did not participate were not discussed.

The interview setting itself could have produced some differences in mathematical performance across the two groups studied. Indeed, one of the results of this study indicated that there were "dramatic differences" (Sophian, 2002, p. 300) between the Head Start and private school students in terms of the students' capacity to explain their mathematical thinking to the interviewers. Reporting the results of the interviews as if the Head Start children's interview experiences were qualitatively the same as the experiences of the children attending the private preschool may be conflating mathematical understandings with social comfort. Our goal in reporting our own assessment interviews was to find a way to document, write about, and theorize children's in-the-moment reactions to our interviews in ways that would let these reactions inform our interpretation of the results. To do this, we turned toward the field of multimodal analysis.

Multimodal Representation and Transcription

We drew on multimodal methods for representing and analyzing our data because we wanted to document and consider ways that the participants and researcher were communicating beyond analyzing the words used. As Norris (2004) wrote, "all interactions are multimodal" (p. 1) because people communicate with gesture, gaze, posture, and expression, along with the words they use. Researchers using what Bezemer and Jewitt (2010) label social semiotic approaches to multimodal methodology extend the interpretation of meaning beyond language to not only include embodied modes of communication but to treat these modes as units of analysis. This approach relies upon the assumption that

communication occurs through the enactment of a range of meaning-making modes other than spoken language. Importantly, it is also based on the understanding that like language, embodied modes of communication have "been shaped through their cultural, historical and social uses to realize social functions" (Bezemer & Jewitt, 2010, p. 183). Different social spaces require different resources for embodied communication and how the body will be "read" is situated in cultural, historical, and social contexts. The acknowledgment of the contingency of both communication and interpretation was important in our efforts to analyze data created through the interaction of researchers and participants who were culturally different.

Multimodal researchers seek to represent as much of this embodied communication as possible in a format that makes it possible to analyze. Representing data in this way is a challenge because in-print representations necessarily reduce the complexity of moments that we experience and understand through multiple modes (Jewitt, 2009; Norris, 2004). Many of the conventions developed for other forms of discourse analysis do not transfer easily into multimodal work. For example, transcripts privilege spoken language and are often organized and analyzed through the use of turns and episodes (e.g., Tannen, 1994). Researchers typically decide on turns based on the beginnings and ends of individual participants' uninterrupted speech and identify episodes based on changes in participants, locations, and topics of conversation, among other features. "Para-verbal" aspects of communication, like tone, volume, and gaze, if described at all, are often included as parenthetical comments.

Multimodal analysis, which seeks to bring attention to nonverbal communicative acts, requires a different form of transcription. A variety of formats have been used, including charts with columns for language and actions (Flewitt, 2005), cartoon drawings with speech bubbles (Plowman & Stephan, 2008), and annotated photographs (Flewitt, Hampel, Hauck, & Lancaster, 2009). For this study, we chose to use a chart that summarizes multiple modes of communication because we are able to represent a great deal of data succinctly. While the inclusion of pictures and drawings increases the modes available for analysis by readers, it significantly increases amount of space required to present data. In addition, for us, presenting transcripts that included pictures, or video clips in online formats, raised complicated issues around consent. Over the course of the three years of the study, parents agreed to varying levels of participation, ranging from declining to participate to allowing pictures and videos of their child to be shown online as well as in other formats. Most parents chose options in between, such as allowing video to be collected and shared in conference presentations but not to be shared in a (relatively) permanent format. Thus, limiting our analysis to only children whose parents had granted the widest possible permission for sharing video would have significantly reduced the number of children we could write about. Finding ways to frame research reports that both allow rich analysis of video data and that respect parents' desires to keep images of their children relatively private is central to performing finer analyses of videos of children.

In light of these issues, we decided to rely on a written transcript of the video with attention to multiple modes of communication. We chose not to use turns as a unit of analysis because we wished to highlight data other than spoken language. We organized the data into episodes, but we used changes in a variety of modes (gesture, gaze, posture, etc.)

to inform our decisions about the beginning and ends of episodes. Practically, this resulted in two noteworthy features of our transcription. First, some episodes are entirely silent. Second, the length of each episode varies from 2 seconds to 80 seconds. Each episode in the data is represented as a table with its own chart, with columns for mode analyzed, time on video, and the two participants: the interviewer (the first author) and one of the students. The representations were made though repeated viewings of the video segments using qualitative analysis software. The representations of the video and the videos themselves were analyzed by both authors, looking at the mathematical thinking present as well as the interviewer's and the students' communication about other topics, such as comfort with each other and with the interview.

Context of the Study

The data presented for this study was collected as part of a broader, multiyear project aimed at learning about the relationship between mathematical learning in formal and informal contexts at a rural school in the American South. Nearly all of the children attending the school came from low-income families and most were African American. For most of the three-year study, the observed cohort included 16 children, all of whom were eligible for free or reduced lunch; 13 of the 16 were African American, 1 was European American, 1 was an Indian immigrant, and 1 was a Latina.

As part of the larger project, the European American, middle-class first author spent one morning or afternoon a week throughout three academic years observing and videotaping children during free play and formal mathematics lessons. In addition to these observations, as well as parent and teacher interviews, focus groups, and planned family nights, the research team conducted four assessment interviews with each child in the study. Children were interviewed at the beginning of their prekindergarten year and at the end of each year of schooling, resulting in four assessment interviews over three years.

The Interviews

The preschool interviews, which are the focus of the research described here, lasted about 30 minutes and asked nearly identical questions in fall and spring. The first author, who conducted the assessment interviews, visited the classroom on two occasions to play with the children before beginning the fall interviews. She continued to visit the classroom weekly throughout the year to collect data during formal lessons and free play and had visited about 20 times when she conducted the second set of interviews in the spring. The first 15 minutes of each interview was spent primarily on tasks typical in early childhood assessment interviews in mathematics, such as counting cubes, identifying shapes, and naming collections of more and less. The last 15 minutes of each interview was spent solving a 24-piece puzzle and doing tasks with Lego blocks. The goal of these tasks was to identify children's strengths related to number and geometry. The episodes shared in this article focus on the counting task that opened the interview, in which the first author asked the children to count out loud as high as they could. This question was designed to elicit children's ability to count as an ordered list, a skill most 4-year-olds possess. To count even in this relatively rote manner, children must know that they should not leave a number

out of their list, switch the order of numbers, or repeat numbers (National Research Council, 2009, p. 24). Later interview questions, which were designed to elicit more complex thinking around number, asked students to count the number of objects in a set, compare sets, count objects in two combined sets, and solve simply story problems. The primary data described and analyzed in this article are excerpts from the first two minutes of the fall and spring interviews of three children in the study and therefore focus on children's recitation of the number list.

The Participants

We chose the three children we focus on in this article for a variety of reasons. First, as a collection their interviews demonstrated the broad range of embodied responses we observed during the interviews. Second, the children represented a range of subject positions available in the classroom. One of the children was read as a strong mathematics student across the three years, while another was identified as struggling in each of the three classrooms we observed. Finally, the episodes we chose to highlight here were dense and analytically rich, allowing us to convey a great deal of information in a relatively short text. Like the majority of students in the cohort, all three children are African American.

Here, we briefly describe the three children highlighted so that their performance in the assessment videos can be read within a slightly broader context. We provide these portraits as part of our larger argument that making sense of data produced in assessment interviews must be interpreted cautiously, particularly when little is known about the children being interviewed or their relationships with the interviewers. We also describe the first author in relation to the context of the study. Although five different researchers, including the second author, have been involved in the project over the three years, the first author was at the site most often and conducted most of the assessment interviews in the study and all of those described in this article.

Tyrell

Throughout the three years of the study, Tyrell was one of the quietest children in the classrooms. He spoke rarely in whole groups, although he could be quite talkative with close friends in informal spaces. Particularly in preschool, he was inseparable from his best friend John. During free play, Tyrell and John often played with sets of cars, driving them in and out of garages and building structures in which to house the cars. The first author routinely sat near Tyrell during free play and sometimes video recorded his engagements; however, unlike many of the other children Tyrell was not receptive to her overtures to be included in the play and declined to answer questions about what he was doing when asked directly. During kindergarten, Tyrell was identified by his teacher as needing extra support, and he spent one math class a week with a member of the research team playing math games along with three other children, including his friend John. During this year, and throughout first grade, Tyrell seemed to grow more comfortable with the research team, occasionally directly asking one of us for help on a math assignment. All three of Tyrell's teachers considered him well behaved. Tyrell's parents did not volunteer to be interviewed, but his father did attend both Math Nights and spoke positively about Tyrell's experiences in school and with the research project.

Eliot

In contrast to Tyrell, Eliot was extremely extroverted. He engaged all of the adult researchers in conversations beginning with our first visit to the prekindergarten classroom and frequently got up to give hugs when we walked in the door throughout the three years of the study. During preschool, Eliot moved around the room frequently talking to both classmates and teachers and routinely invited researchers to either video record his play or to engage in games with him. In formal lessons, Eliot contributed frequently and could usually be counted on to produce a correct answer. During the parent interview, Eliot's mother said that he routinely talked to strange adults when they were shopping, even trying out his elementary Spanish in order to engage with non-English speakers. All three of Eliot's teachers described him as a strong mathematics student; however, Eliot had a great deal of difficulty in kindergarten when students were expected to stay seated for long periods of time. During that year, Eliot would often cry when scolded, and the first author spent a lot of time in the room comforting Eliot and trying to engage him in tasks that would not draw the ire of the teacher but would still allow for some movement.

Imani

Imani was one of just five girls in the cohort. During preschool she was vivacious and often took a leadership role among the girls in directing play. She would assign girls roles in the housekeeping area and would give advice when others struggled to solve puzzles or play games. Her mother called her a "natural leader" and encouraged Imani to develop this trait. Imani did not seek out members of the research team to play with or later to get help but would generally answer questions or allow researchers to enter a game if prompted. Sometimes in the kitchen area, the first author would ask Imani and the other girls to make a meal for her, and Imani seemed happy with this game. Imani was also the only one of the three children described in this article to directly note the first author's race, which she did by handing her a white baby doll and taking away a brown one, saying "this one can be yours." Imani herself did not seem to choose dolls based on their skin color. During kindergarten and first grade, when there were few opportunities for help, Imani occasionally asked the first author for help on a mathematical task or to review her work before she turned it in; however, she did not seem to seek out social contact with the first author or other members of the research team, as some students did. All three teachers and Imani's mother considered Imani a strong mathematics student and did not express any concerns about her behavior.

First Author

Before beginning this three-year project, the first author had led two years of professional development at the school and conducted a pilot study observing mathematical play in the preschool for a year. She was a former elementary school teacher who interacted regularly with the children in the classroom, while other members of the research team took primary responsibility for taking videos of children's mathematical engagements. Although her teaching experience had been in classrooms that were demographically similar to this school in terms of race and class, she had taught in urban, rather than rural, environments. Over the course of the study, children periodically asked her questions about her life,

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including whether she had children, if the research assistants were her children, and if she lived in the local community. During the preschool year, she had many informal conversations with the students during play and often engaged in pretend play and other activities with interested children while sitting on the floor with them or at small tables. She also conducted most of the assessment interviews.

Reading Bodies, Articulating Positioning

In this analysis, we discuss the ways that attending to the body allows researchers to more explicitly discuss shifting power relations during interviews with small children and makes it possible for researchers to be able to recognize a greater variety of available subject positions for both themselves and their participants. The positions available for both the interviewer and the children in these interviews were neither fixed nor entirely open. In other words, as they came together in these moments, both parties were drawing on other discourses in which they've participated to figure out how to be in relation to each other. For the interviewer, this included her sense of how teachers and children relate to each other in schools, work that she has read about research with young children, and her experiences as a majority teacher and researcher in a minority community. In the spring interviews, she drew upon the fall interviews as well as the experience of observing students in the classroom during the year. For the students, this may have included drawing on what they have learned about being students in school (during the short 6 weeks they had spent in the fall and after the whole year in the spring), experiences with strangers, experiences of being children with adults, experiences of being African American children interacting with European American women, and in the spring interviews, experiences with the first author in particular. In the following sections, we describe three major themes related to our embodied analysis: issues around consent, issues around compliance and attention, and issues around interpreting mathematical competence.

Reading Consent and Coercion
Following our assertion that few assessment studies in early childhood allowed for students to be read as unwilling or disengaged, in this first episode, we want to draw attention to the embodied signs of discomfort demonstrated by Tyrell during one seven-second episode that occurred during the first minute of his fall interview. When engaging in research with children, we believe assessing their comfort moment to moment is important, in part because of the historical power relations between children and adults in schools. Empirical education research has for some time been considered ethically defensible because of the principle of informed consent. Typically, the informed consent of young children is secured through the consent of their parent(s) or legal guardian(s) along with verbal permission from the children themselves. However, when researchers, as adults, interview children in school settings, children may not feel as though it is possible for them to end the interview if it becomes distasteful to them (just as they may not feel empowered to leave their seat or decline to participate in a spelling test in the classroom). Similarly, adults, with their own agendas, may find themselves spending time encouraging children to "attend" or

"follow directions" without considering how children's disengagement may signal the desire to end participation in the study.

In addition, all of these relations between adults and children are situated not only in social and cultural traditions around childhood but also in the differences in physical size between adults and young children. Although it is difficult to imagine that a researcher would physically compel a child to sit down or complete a task, most children have had the experience of adults using physical force to gain compliance, whether this includes gripping a hand to cross a street or being carried unwillingly to bed. In fact, in the observed prekindergarten classroom, the teacher and the paraprofessional routinely held children in their laps and rested hands on their shoulders to secure compliance with a task. Over the course of the year, on several occasions the first author held children's hands as they walked down the hall to control the pace of their movement and sometimes patted children's backs in large group lessons to help them stay calm and focused on the teacher. Thus, in the spring, the children had experience with the interviewer herself using her body to attempt to control their actions. But even if adults in research settings never make reference to their size advantage, this relationship is central to young children's sense of themselves in the world and is likely to inform their decisions about what is possible for themselves in any engagement with a grown-up. For example, in the following episode, the child used a variety of strategies to communicate that he did not want to engage in the interview, but did not simply leave the room, possibly at least in part because of his inscribed position as a small child with a larger adult.

The following transcript in Table 1 describes an episode that took place during the wait time after the interviewer posed the first interview task to Tyrell, which was to count out loud as high as possible. This episode points to the importance of transcribing data in a way that attends to bodies as well as words. For example, in a typical transcript the first few moments of the interview might have been represented in the following way:

> *Interviewer:* All right. So, I'm going to start by just asking you to count out loud for me as high as you can? (1-second pause) All right? (1-second pause) Can you go ahead and do that? (3-second pause)
> *Interviewer:* Start with 1. (8-second pause)

In this representation, much of the communicated meaning is erased, including the entire episode detailed previously, which occurred during the 8-second pause in spoken language. All of the ways in which Tyrell communicated his discomfort, such as declining to speak, leaning away from and gripping the table, refusing to hold the first interviewer's gaze, and maintaining a serious expression by keeping his mouth in a thin flat line, would not be available for analysis. Representing the data with attention to multiple modes forced us as researchers to seriously attend to these eight seconds in the interview, which in a typical transcription might have been marked by only "eight-second pause." It is likely the child would have been excluded from the study, removing his reaction to the interview from the data available for analysis.

Table 1. Tyrell Fall Interview, Episode 2, 15.01–23.00

	Time (in seconds)	Interviewer	Tyrell
Posture	15.01–23.00	Hands at sides sitting in chair.	Sitting with right hand gripping the table; left hand at side.
Facial expression		Smiling. Raises eyebrows after about 4 seconds.	Serious; mouth closed.
Proximity		Leaning forward.	Leaning back.
Movement			
Gesture			
Gaze		At Tyrell.	Looks away to right and then back at the interviewer. Then down to the table, then back at the interviewer; then to left.
Speech			

Representing and reading the interview in this way changes the problem from one of getting children to "follow directions" and instead focuses analysis on understanding the way in which the child is experiencing the interview. As in many studies with young children, we solicited written permission from parents to conduct these interviews. On the day of the assessment interview, we solicited verbal consent from the children, asking children in the class if they wanted to "come play math games" with us. In the classroom, Tyrell agreed to this and came willingly to the cafeteria for the interview. Once there, however, his reaction seemed to indicate a change in his willingness to participate, a change that the interviewer was relatively slow to recognize.

In this episode, the interviewer leaned forward and smiled, communicating engagement and interest in an attempt to elicit a response. At one point, she raised her eyebrow, which questioned Tyrell's silence without utterance. At the same time, Tyrell communicated his disinterest with the interview by sitting back in the chair and letting his gaze roam around the room away from both the interviewer and the materials she brought with the hope of engaging him. In addition, his right hand gripped the table, suggesting he was experiencing significant discomfort. In saying this, we do not mean to imply that nonverbal cues can give researchers direct access to a child's thoughts or feelings; nor do we wish to suggest that a gesture like gripping the table always indicates anxiety, whatever the context. Rather, we see the multimodal consideration of each movement and vocalization as data points that make it possible to more accurately interpret what the child was communicating. After another 30 seconds of similar reaction from Tyrell, the interviewer modified the interview by skipping the typical assessment questions and offering to do puzzles or play with blocks. This leaping ahead occurred not because of any verbal communication but because of the nonverbal messages the interviewer received in the early moments of the interview. After about a minute, Tyrell then said, "I want to go back to the classroom." The interviewer asked if he wanted to play with Lego blocks. Tyrell stood and reiterated his desire to go back to the classroom.

Reports of assessment interviews typically position (explicitly or by implication) the researcher as a friendly adult who wants to play games and the child as a willing and eager participant. But in light of Tyrell's obvious discomfort—which the interviewer recognized as evidenced by her abandonment of the study protocol—the interviewer had difficulty recognizing Tyrell's positioning of himself as an unwilling participant. None of her preparation had led her to expect a child to deploy this kind of positioning, which led her to move past the counting task and suggest increasingly "fun" activities, such as playing with counters, blocks, or Legos. These moves can be read as attempts to reposition Tyrell as a willing and engaged participant.

The interviewer could have exercised her adult authority at any point in this process and demanded that Tyrell engage in the task at hand, but doing so would have required taking up a position as an authoritarian adult that is not common in educational research settings, potentially indefensible in light of standards for informed consent, and was undesirable to the interviewer herself. In not demanding that Tyrell begin counting, the interviewer worked to reject Tyrell's positioning of her as an adult requiring him to do something against his will. Rather than issue commands or assume a stern voice, she continued to smile, lean toward the child, and ask questions. Tyrell's embodied discomfort and unwillingness to engage in the tasks challenged her ability to maintain the position of someone who was just here to "play games" and forced her to explicitly confront the power relations at play in the moment.

Given his evidenced discomfort from the beginning of the interview, it seems likely that Tyrell's initial decisions to agree to the interview and leave the classroom were made reluctantly. However, when he got to the interview, he was able to reposition himself as an unwilling participant through a series of escalating power plays with the interviewer: declining to speak, not making eye contact, stating his desire to return to the classroom, and standing up. Ultimately, Tyrell succeeded in ending the interview, demonstrating the "permeable" power relationships that exist between children and adults.

Of course, discourses of childhood and adulthood were not the only ones saturating this interaction. For example, discourses around race were salient for the interviewer, who, as a White academic, was aware of the problematic history of research involving majority researchers and minority participants and was eager to separate herself from it. This contributed to the interviewer's unwillingness to position herself as an authoritative adult, embodied in the smile she kept on her face. Similarly, her immersion in discourses around race and equity and her desire to not see herself as someone who would cause discomfort for minority children for the sake of research probably contributed to her inability to recognize Tyrell's discomfort because she did not want to acknowledge that it was occurring. Although it is impossible to know how discourses around race or class were salient for Tyrell, it is likely that they were. Given the community in which he lived and the fact that the interview happened within the first month of his prekindergarten year, the interview was almost certainly among his first experiences being alone with a White person. In addition, the interviewer's accent and choice of words almost certainly marked her class difference. It seems likely that these differences impacted Tyrell's experience of the assessment interview.

Reading Attention and Compliance

In designing the physical space for the assessment interview, the interviewer decided to sit across from the students to make the space between them the center of the video tape and to minimize the potential distraction of the camera. She arranged colorful mathematics manipulatives on either side of the two chairs at the table and placed her papers with the questions in front of one of the seats. When children came into the room, almost all of them recognized the seat that had been prepared for them and sat down to face the interviewer's chair, waiting for her to begin the interaction. In contrast, when Eliot came in, he wandered around the table, picking up objects and putting them down, and going to the student seat only when directed by the interviewer.

The following episode in Table 2 offers a detailed look at the first few seconds of his interview.

Table 2. Eliot, Fall Interview, Episode 1, 0.00–6.00

	Interviewer	Eliot
Posture	Sitting straight up.	Leaning over table.
Facial expression	(off camera)	Intent.
Proximity	Sitting forward in seat.	Across table, leaning close to the interviewer.
Movement	Reaches for bears and blocks.	
Gesture	Removes blocks and bears from Eliot. Puts them behind Lego box.	Hand extended toward bears and pulls them toward him.
Gaze	(off camera)	On bears.
Speech	We're going to do those in just a minute, okay?	

Unlike Tyrell, Eliot, once he took his seat, began the interview smiling and leaning toward the interviewer. In addition, he reached over the table, attempting to claim materials for his own use, causing the interviewer to alter her own body (reaching for and removing materials) and planned speech in order to encourage Eliot to follow directions.

Eliot's physical engagement with the materials shifted power relations in the interview. Instead of passively taking up the student-position that the interviewer implicitly offered to him, Eliot pursued his own agenda. This move forced the interviewer to abandon the friendly interviewer (who was just there to "play games") position that she had assumed and to take the toys away from Eliot. In addition, she tacks on "okay?" to her statement that "we're going to do those in a minute," which turns that command into a question.

The interviewer's actions—smiling and leaning toward Eliot—can be read as her refusal to take up the position of the directive adult that Eliot's move opened for her. If she had used a stern voice, frowned, or ordered Eliot to sit down, she would have vacated the friendly interviewer position she was trying to occupy in this moment and in her work as a researcher more broadly. In many ways, Eliot's refusal of the position of compliant participant forced the interviewer (at least during analysis if not in the moment) to explicitly confront how she routinely exercised power in her own research with children in ways that felt uncomfortable. In looking at this episode, where Eliot's agenda and hers come into

conflict, and in recognizing the ways in which her own agenda won out, she was forced to ask why. This question caused her to acknowledge the ways in which she drew on her power as an adult and, most probably, as a middle-class European American person in order to get her research done.

This is not to say that Eliot was unsuccessful in his own exercise of power in this interview. In fact, in his confident interaction with an unfamiliar adult, Eliot drew on many of the strategies and ways of engagement that he deployed in other contexts of his life. Eliot's enthusiasm, his movement, and his comfort all worked to encourage the interviewer to move more quickly through her own agenda so she could more rapidly accommodate his. Trying to maintain the position of the friendly interviewer, she moved through the planned tasks in just under 10 minutes with Eliot rather than the 15 minutes used for most children. This meant that Eliot had a longer time to play with Legos and puzzles at the end of the interview.

Whether conscious or not, Eliot's engagement with the interviewer can be read as a successful strategy to achieve his own goals for the interview and demonstrated the need to look at power relations as fluid and productive. Like Tyrell, Eliot can be read as not passively taking up the offered position of willing child-participant who desires to "play games" within boundaries set by the researcher. In exercising power in these ways, both boys produce subject positions for themselves as children who pursue their own goals, rather than as participants who only comply with the wishes of the adult-researcher. By reporting their moves here, we write these positions into the world more widely, hopefully making it possible for others to recognize and name these positions when they are taken up by other children in other interviews. Whether reading reluctance or eagerness, our attention to bodies allows us to open up the story of the interviews beyond whether or not the children were able to perform the tasks the researcher set ahead of time and to consider what the children themselves might have been trying to get done in the social space.

Reading Competence and Incompetence

The primary research question in the vast majority of studies using assessment interviews is whether or not children can competently perform a given task or set of tasks. As noted previously, in the majority of such studies the only positions available to students involve being competent or incompetent at an academic task (e.g., counting or reading sight words). By creating only these subject positions, and reiterating them again and again in discourse, literature on the assessment of young children makes it difficult for readers to understand children's performance in such interviews as anything other than a relatively accurate proxy for their knowledge of a particular academic domain. However, as the interviews described previously suggest, whether a student performs competently or incompetently may be the result of their refusal to take up the subject position of a willing and engaged participant as much as an indication of their academic knowledge. Furthermore, analyzing children's bodies during their performance of assessment tasks may also provide a window into the conditions under which a competent or incompetent performance is elicited. For example, Tyrell's interview at the end of the school year looked very different from the interview at the beginning of the school year.

During Tyrell's spring interview, the first author was highly focused on Tyrell's comfort level, not wanting to create for him the discomfort that he experienced in the fall. She took a number of steps to make him (and other students) comfortable before the interview began, including occasionally asking another member of the research team to conduct an assessment interview so that children who had been most nervous in the fall would have a companion in the room with them during the interview. In Tyrell's case, drawing on what she had learned about Tyrell over the course of the year, the first author asked her research assistant to interview his best friend John at the same time. Periodically during the interview Tyrell mentioned that he could hear John talking to the other interviewer and wondered about what he was doing. During the interview, the first author watched Tyrell's body closely and planned to call off the interview if she observed signs of discomfort. However, even though he paused for nearly as long as he had in the fall interview when she asked him to count as high as he could, his relaxed posture encouraged her to prompt him with "1, 2." The episode in Table 3 (15 seconds into the interview) occurs after that long pause.

Table 3. Tyrell Spring Interview, Episode 2, 15.00–35.00

	Time	Interviewer	Tyrell
Posture	15.00–35.00	Sitting in chair. Arm resting on table.	Sitting straight up in chair. Arms at sides.
Facial expression		Off camera.	
Proximity		Leaning slightly forward.	Leaning slightly forward.
Movement			Leans over to watch as someone comes into the door of the library in the middle of counting.
Gesture			Places right hand on table.
Gaze		Off camera.	Looks down and then off to the side as the interviewer counts. Gaze moves around the room as he counts. Watches the interviewer write as he finishes counting.
Speech		1, 2, Good job.	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20.

In this episode, Tyrell occupied the position of the willing, attentive, competent student. Not only did he count to 20 but he appeared relaxed as he did so, leaning toward the interviewer and glancing around the room. As Davies and Harré (2001) note, this analysis does not mean that Tyrell *intentionally* took up the position of willing participant, but perhaps that what Tyrell had learned about math and about being a student in school made it possible for him to assume this position. Certainly these two interviews captured differences in competence across the year and could be read as an indication of the success of the preschool program in teaching a child who did not know how to count how to count correctly. However, the changes in Tyrell's gaze and posture indicate that other important

changes in the performance need to be considered. After spending a year working with educators, European Americans, middle-class people, and the interviewer in particular (because she visited the classroom each week), Tyrell's two interviews could be read as evidence that he has learned more about the appropriate subject positions for a child at school and was more willing and better able to inhabit them.

It is not our intention to imply that Tyrell's compliance in the spring interview was a sign of progress but rather to point out that the position he occupied was different from the one he occupied in the fall. While Tyrell's willingness to participate in the interview allowed the interviewer to better assess his mathematical knowledge, the change in his orientation toward the assessment interview could represent Tyrell's acceptance of a relatively narrow band of acceptable positions for students, or what Foucault (1975/1995) referred to as the "docile body" produced through institutions like schools. This narrow band of "normal" behaviors has serious consequences for all students, but this is especially true for African American boys, whom educators too often read as inappropriate or defiant (Ferguson, 2001/2010; Love, 2013). From this perspective, one way to understand the changes in Tyrell's performance would be to say that he felt less free to resist the power plays of adults in the school setting than he did in the fall. Reporting on Tyrell's body as well as on his spoken answers to the interview question opens up the possibility of these kinds of interpretations. When data about children's bodies are excluded from reports of assessment interviews, it becomes impossible to evaluate whether the child's responses to the tasks are credible proxies for the construct they presume to measure.

Even when considering only the subject positions of competent and incompetent, attention to the body offers an opportunity to make more nuanced readings of these two positions, as the following example taken from Imani's spring interview demonstrates. In this episode, Imani makes a counting error (skipping 25) when she moves her gaze away from the interviewer. The episode in Table 4 begins when the interviewer asked Imani to count as high as she could.

Through attention to the body, made available first by multiple viewings of the video records of Imani's interviews and then by multimodal modal transcript strategies that enabled us to align gaze and gesture with speech, it is clear that distraction may have contributed to the counting errors in her interview. Due to space constraints, we've provided only one multimodal transcript connecting embodied distraction to counting error, but the event described previously was remarkably similar to an incident during Imani's fall assessment interview in which a shift in gaze resulted in an error while counting a collection of blocks. If the body had not been attended to in these assessments, what conclusions would interviewers have drawn about her counting fluency? By attending solely to language, researchers would have noted her errors but would have been unable to read the momentary interruptions of her visual focus on the task that appear to have interrupted her counting flow. In addition, the repeated kicking noted in the multimodal transcript (once for every number she counted) suggested a sense of one-to-one correspondence, which, based on errors Imani made in a different task, might have been read as entirely absent. Thus, attending to the body makes positioning Imani as an incompetent counter complicated because the story is not simply that she could not correctly perform the task. Instead, considering her body makes it possible to name the conditions under which she counted successfully or unsuccessfully,

making Imani's counting competence a position dependent on context, rather than a fixed descriptor. In fact, Imani was observed many times in the classroom counting correctly, both when listing numbers and when counting sets up to 30.

Table 4. Imani Spring Interview, Episode 2, 0.00–1.12

	Interviewer	Imani
Posture		Arms almost completely under table. Shoulders leaning against table. On the edge of her seat.
Facial expression	Smiling, friendly. Eyes get bigger, raises eyebrows (looks surprised) at 15, 20, 30, 40.	Face serious, mouth open, as the interviewer sits down and asks question. Smiles a little as she begins answering question. Smiles a little as she finishes.
Proximity	Leaning into table. Pops up in seat when Imani hits 20, 40. Leans back in seat a little when Imani hits 32 and then moves back forward.	
Movement	Sits down in chair.	Begins nodding a little before the interviewer finishes asking the question. Kicking rhythmically as she counts.
Gesture	While asking question, picks up a bag in front of her and moves it to left and then clasps hands in front of herself with elbows beneath the table line. As Imani begins counting, she picks up her pen. Makes two marks on paper.	Hands and arms beneath table the entire time.
Gaze	Watches Imani, looking away only to write on paper.	As she counts, gaze moves from the interviewer's face to the table. When the interviewer writes something down, Imani watches her. From 12 to 23, Imani looks at the interviewer more consistently. At 24, she looks away from the interviewer to the right, where a research team member is working with another student. She skips 25 while looking away, but gets back on track with 26 as her gaze moves back to the interviewer and the table. When the interviewer writes something on the paper, Imani watches her. When she gets to 30, Imani looks right at the interviewer but then glances to the left as she moves on. Gaze stays to left until she gets to 39. Looks at the interviewer when she says 40. Looks away from the interviewer when the interviewer says "wow."
Speech	(When Imani is finished): Wow.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40.

Beyond considering students' competence, these multimodal transcripts also make it possible to read the competence of the interviewer in evaluating the work. In reading these transcripts, other experienced researchers have offered a variety of recommendations for improvement, including suggestions about where to sit, when to write, what to have or remove from the room, and even about where to look. Most reports of assessment interviews do not allow readers to make such judgments about the competence of the interviewer or to consider the findings in this light. Often, only the questions and materials are described, and even then, the research report often assumes that each interview took place exactly as written in the protocol with no subtle variations in either the physical environment or in the embodied interactions of the researcher and participants. This sort of reporting makes it impossible to consider interviewers as competent or incompetent beyond evaluating the kinds of questions they pose and the number of participants they question.

We contend that this analysis suggests that attention to body should become another factor in making decisions about children's and researchers' competence. By attending to bodies, we may be able to develop more nuanced descriptions of competence, such as, for example, documenting ways that bodies might reveal progress in counting fluency through the use of rhythmic gestures or the ability to count while the gaze wanders. Similarly, detailed reports of interviewers' bodies may help us as think about the variety of positions it is possible for interviewers to take up in various contexts.

Opening Up Assessment Interviews

Each of the assessment interview analyses we've provided support the argument that claims made about these students' mathematical knowledge are enriched through consideration of the embodied interactions captured on video. However, there is little evidence in the literature that such interpretations are taking place. As video becomes more common in a variety of research settings, researchers will have both greater opportunity and responsibility to attend to bodies as well as words in analyzing data. As demonstrated in this study, multimodal analysis provides tools that allow researchers to consider previous research claims in new ways, such as evaluating the validity of previous assessment studies, and to make new kinds of claims, such as finding links between ways of knowing represented in words and ways of knowing represented in bodies. Pursuing this line of research seems particularly important for early childhood educators for a variety of reasons. First, young children, who tend to be playful, physically active, and expressive, often rely on their bodies rather than their words to communicate. Second, the differences in the physical size of adult bodies and children's bodies as well as the cultural positioning of adults and children in school settings means that researchers doing interviews with children must be particularly sensitive to nonverbal cues that children wish to withdraw participation. Studying bodies in relation to assessment interviews could open up interesting new lines of research. For example, rather than only attending to children's bodies, researchers' bodies and interactions with children could become objects of analysis, allowing us as a field to develop to build stronger repertoires of moves during interviews and to describe the impact of different styles of interaction.

Studying and reporting multimodal interactions is particularly important around issues of consent. In reviewing the early childhood assessment literature, we found almost no examples of authors reporting moments of abandoning protocols or individual interviews all together in response to the discomfort of students. This raises a few questions. First, are we as researchers considering the ways in which the children we interview may be declining to participate rather than simply considering their behavior off-task? And second, if we *are* recognizing children's desires not to participate or to alter their participation, then why aren't we reporting these efforts? It is possible that these "noninterviews" are seen as uninteresting and therefore not worthy of reporting; however, by not reporting these moments we fail to give an accurate account of how stressful these assessments may be for children. Finally, how much "support" in helping children attend and follow directions should be considered reasonable and how much ought to be considered coercive? We would argue that young children should not be expected to explicitly tell us in words when they do not want to participate in a study, but that we as researchers have an ethical obligation to learn to attend to bodies in ways that will allow us to make reasonable decisions about when children are revoking consent. In addition, awareness of our positions of power as researchers in the interview might also help us to act more ethically in assessment interviews with children, such as by building checkpoints into interview protocols where researchers ask children if they would like to return to the classroom or continue the interview or by having a familiar adult ask children if they would like to go and participate in the interview rather than having the researcher make the request. 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. While we support Graue and Hawkins' (2005) argument that researchers "take seriously the notion that no is not maybe later" (pp. 47–48), there may be times when reinterviewing after the child has had opportunities to build a relationship with the interviewer or when the interview is moved to a more familiar context may be ethical. In addition, researchers have to make context-based decisions about how to handle data about children who refuse to participate in studies. Reporting such data allows readers to make judgments about the stressfulness of the interview on all participants and understand the context in which the claims about children's knowledge were produced.

Multimodal work could be important in helping researchers make more nuanced claims made about the knowledge and capabilities of children during assessment interviews. This seems especially important in the context of research with children whose bodies are already mired in discourses of deficit. Video footage makes it far more difficult to ignore raced, classed, and gendered bodies than language-focused transcript data. Majority researchers who ignore bodies may attribute children's nonresponses or incorrect responses to lack of knowledge without considering ways that differential power relations may be impacting the study. We feel there is an additional need when working across lines of cultural difference to be attentive to signs of discomfort and stress and to modify our work as researchers accordingly, whether this means changing our plans for the interview or viewing student responses to assessment questions through a lens that considers the ways that such discomfort might be impacting our judgments about what *some* students

can and cannot do. Claims made about the mathematical knowledge of certain groups of children (i.e., poor, minority) without description and analysis of comfort levels in the interview setting lack credibility. Over time and across a variety of research contexts, multimodal analysis may help us to name the variety of ways that identity discourses shape our interactions. This would provide us with opportunities to design research projects more likely to be equitable to all participants and would help us to become more explicit in talking about observer effects and in making subjectivity statements.

We also need to expand theories that let us discuss the complicated ways that social categories and positioning impact particular interactions. For example, in this study Tyrell's anxiety and Imani's distractibility may have been heightened by the fact that the interviewer was a European American woman; Eliot's engagement strategies may have been shaped by his previous experiences with engaging with other adults across racial and ethnic lines of difference. Eliot, as described by his mother, had strategies for engaging with unfamiliar adults across lines of both ethnicity and language. The fact that he addressed Latino shoppers in Spanish demonstrated that he both noticed race and ethnicity and shaped his own responses in relation to it. It is likely that this knowledge played a role in his performance during the interview. We cannot assume that because Tyrell and Eliot's responses to the interview were different (while their racial identities were similar) that race did not play a role in the interactions.

While we believe that including analysis of bodies in more assessment studies would make a significant contribution to educational research, we are not arguing that all assessment research must include detailed description of bodies. It would, for example, be very difficult to attend to the bodies of all participants in the written reports of large-scale studies. However, researchers conducting large-scale studies can draw on multimodal work both to inform decisions about how interviews are carried out and to make sure that study claims are as specific and nuanced as possible. In other words, researchers can begin to acknowledge in published reports that studies demonstrate not what children know globally, but what children know in particular contexts, with particular researchers, at specific times. Broadly, multimodal analysis of video allows researchers to pay attention in our data collection and analysis to a much wider range of the ways that human beings communicate with each other. It can also provide a language for talking about bodies, even when video data is not available, because as human researchers we are always making sense of other people, in part, based on their bodies. The language and recording strategies of multiple modes creates an obligation for researchers in human contexts to report and theorize embodied communication, rather than to treat it as unintelligible.

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About the Authors

Amy Noelle Parks is an associate professor in the Department of Teacher Education at Michigan State University, 313 Erickson Hall, East Lansing, MI, 48824-1034; email parksamy@msu.edu. She

works in the fields of early childhood and mathematics education. Her research is concerned with equity issues related to young children's experiences of schooling and representations of children and families in research.

Mardi Schmeichel is an assistant professor in the Department of Educational Theory and Practice and affiliate faculty in the Institute of Women's Studies at the University of Georgia. Her research interests include equity in education, neoliberalism, and the use of technology in teaching and research.