MONOPOLIZING TEACHER ATTENTION: A CASE OF MULTILINGUAL LEARNERS' COMPETENCE EMBODIED IN SOCIAL FORMATIONS

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The rapid growth of multilingual mathematics learners in the US creates an urgent need for researchers and teachers to pay close attention to the complex social negotiation of resources in their classroom because these students are some of the most vulnerable to continual dehumanizing practices. Researchers and teachers need to understand how multilingual learns access resources but also how they manage the social risk of incompetence ascribed to students utilizing these resources. The current work presents an interaction as a case of the negotiation of resources, access, and competence during of a breakdown in the expectations of whom is allowed to make meaning of mathematics. Through the analysis, we see both how multilingual students are othered and excluded from mathematical discussion and how these students can reconstruct themselves as competent.

Keywords: Classroom Discourse, Marginalized Communities, Embodiment and Gesture, Learning Theory

Introduction

The rapid growth of multilingual mathematics learners in the US creates an urgent need for researchers and teachers to pay close attention to the complex social negotiation of resources in the classroom (Barwell, Chapsam, Nkambule, & Phakeng, 2016). Multilingual students are some of the most vulnerable to continual dehumanizing practices (Gutiérrez, 2018). Furthermore, their competence is constantly in question around both their mathematical conceptual knowledge and their language communications (Moschkovich, 2002), yet competence is a co-constructed phenomenon within classrooms (Gresalfi, Martin, Hand, & Greeno, 2009) meaning all students' power and identity play a major role in the formation of competence and incompetence of multilingual learners. In order to design and facilitate educational spaces that support multilingual learners, teachers and researchers need to understand how students manage both their access to resources but also the social risk of incompetence if/when resources are needed (c.f. Gibbons, 2003). As multiple students balance these two factors within the classroom system, they socially negotiate the resources present to assert power and reify their mathematical identity. The current work unpacks this negotiation by presenting a case where meaning-making resources are managed, and language incompetence is used to bar access. Within the case, I seek to answer the research questions: What role does language competence play in student-student negotiations of resources? and How are these negotiations embodied in students' social formations? My analysis breaks down how a dyad of 7th-grade students competes for resources, including the attention of a researcher-teacher, and negotiates each other's and their own competence around an educational digital narrative environment designed for single player. I discuss the implications of this type of negotiation in undermining educators' efforts to support all learners to make meaning of mathematics.

Literature and Conceptual Framework

Across a diverse array of approaches to research in mathematics learning, researchers increasingly recognize the themes of identity and power as urgent, especially where equity is foregrounded (e.g. Aguirre, Mayfield-Ingram, & Martin, 2013; Boaler & Greeno, 2000). These constructs are especially important as global immigration and language diversity in classrooms grow (Barwell et al., 2016). Mathematics plays a politically significant role in our society both as a gatekeeper to educational

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success and in our culture overall (Gutiérrez, 2013), so the imprints left on students' mathematical identities, self-efficacy, and confidence from negotiations of power in math class greatly impact their lives. Multilingual learners must balance their need to draw on language resources with others' perceptions of their incompetence. This tension permeates their experiences of mathematics and school in general through discourse, both at the interactional level and through larger Discourses (Gee, 2004). Greater understanding of how narratives of incompetence are perpetuated and used to further alienate these students is a vital component of efforts to support teacher noticing of the power dynamics at work in their classroom and then to disrupt microagressions within those dynamics.

To unpack these dynamics, I present a conceptual framework of discourse understood as layers of the semiotic field that can be 'read' by participants in the class which are laminated together in interaction (c.f. Goodwin, 2017). I parse these layers into three forms of discourse to better understand student-student negotiations of resources and how they make use of different aspects of the semiotic field in those negotiations. The first form is the active communication, both verbal and nonverbal, among people within the classroom. In many ways, the active communication between the teacher and the students and amongst the students is the most important form of discourse because it encompasses all the in-the-moment teacher moves to scaffold student thinking (Cazden, 1988). Yet, another form of discourse exists, the historically situated narratives around the discipline, the classroom/school, the students, and the teacher, conceptualized as Discourses (Gee, 2004). These narratives permeate the classroom, framing interactions and relational identities as they are invoked, enacted, and inscribed. These two forms of discourse make up most discourse analysis approaches, but I argue for considering the institutional infrastructure in place around the classroom as an additional form of discourse. Key aspects of infrastructure are its seeming invisibility and also its deep relation to ongoing practiced (Star & Ruhleder, 1996). Together, these aspects of infrastructure generate a form of discourse which communicates what is normal and what isn't, what is allowable and what isn't, what is supported and what isn't. Each form of discourse plays a distinct role in the classroom, and understanding their relation allows us to understand the complexities of students' social negotiation and formation and the impacts of these on student learning and identity.

To understand each form of discourse, I build on different constructs within discourse analysis. I used two constructs to analyze in-the-moment, dynamic communication among individuals: footing (Goffman, 1981) and formations (Kendon, 1990). Footing provides a space to deeply examine roles of speaker and listener. Specifically, I employ Goffman's distinction between ratified and unratified participants. Ratified participants are those with the access and opportunity to fully engage in the social dynamics and enact any of the three roles of the speaker (animator, author, and principal). Unratified participants are persons present but expected not to engage directly with ratified participants. I use this distinction with Kendon's conceptualization of formations to analyze the embodied practices at work and the relational configurations of bodies, resources, and gaze. Formations are flexible patterns of physical arrangements of bodies during interaction that can be categorized, and F-formations, or formations where participants are facing each other, are a common one. By combining the principles of footing and formations, I present representations of bodies, people and objects, to understand and convey the direct communication and relational dynamics of social negotiation moment to moment.

Gee's Discourses (2004) provides a framework to understand the larger social, political, and historical contexts of the classroom within which interactions occur. Discourses are constantly at work in and through direct discourse where they are used and operated on to exercise power and manipulate positionality. By unpacking how students apply, perpetuate, or challenge different Discourses meaningful to the situation, my analysis in sensitive to Discourses role in social resource negotiation, specifically the Discourse of incompetence of (some) multilingual learners.

Finally to understand the role of infrastructure and its impacts on classroom interactions and social negotiations, I draw on conceptualizations of infrastructure as temporal and enacted through local practice (Star & Ruhleder, 1996). Star and Ruhleder (1996) characterize infrastructure with eight properties, two of which are especially significant in educational contexts. First, infrastructure becomes most visible upon breakdown, when the system does not function as it normally does. This property is especially important upon disruptions of the (classroom) system when new elements like digital games are introduced (c.f. Barab, Gresalfi, & Ingram-Goble, 2010). Another key feature is how infrastructure embodies standards which perpetuates what is 'expected' and what is 'normal.' In many ways, multilingual learners continuously grapple with both of these features of the infrastructure of 'normal school' in their daily lived experience. Unlike Discourses and moment-to-moment communication, infrastructure is an expression of the embedded norms within and assumptions of the classroom system. Important to note, both technological formations or socio-cultural formations play the role of infrastructure, and considering this social infrastructure is especially important in math classrooms (c.f. Yackel & Cobb, 1996) and multilingual learners (c.f. Langer-Osuna, Moschkovich, Norén, Powell, & Vazquez, 2016).

Data and Methods

The data for the current paper came from a multi-year design-based research study of how educational story games support students' mathematical engagement (XXX, 2017; XXX, 2016). The classroom of focus was within an ethnically diverse school serving a primarily low-income community (92% free and reduced lunch) and many multilingual learners (30% of the school population) located in a medium-sized city in the Southeastern United States. The classroom teacher, Ms. Lynn (pseudonym), was a seventh-grade mathematics teacher having seven years of teaching experience at the time of the study and in her second year of participation with the research team. The current work focuses on a class of thirty-two students, Ms. Lynn, and two to four researcher-facilitators in the room (including the author). The role of the researcher-facilitators was to support the teacher by assisting with both technical concerns and students' conceptual questions. Ms. Lynn implemented the game in a four-day unit on rates, ratios, and proportional thinking. I focus on a dyad of two students, X and LM. X was a female Latinx multilingual learner with Spanish as a first language and seemed socially active with other Spanish speakers but rarely in whole class discussions. LM was a female black student active in the class and seemed to have a positive relationship with Ms. Lynn and other students, including A, another multilingual learner.

While data collected for the larger project encompassed much for each of the four days, I focus on data of a focal dyad working on a single computer. I use video data collected from three sources. First, a standalone camera captured the table at which students were working. Second, a camera embedded in the computer provides a view from the computer's perspective to give both an additional angle and to show who is framed in front of the computer. Finally, a screen capture software records students' digital actions on the game. Audio is provided from both the computer microphone and a table microphone, but because of the proximity of another group, not all speech is captured, especially simultaneous utterances. Coordinating these different sources allows for a bird's eye view representation of the dyad's dynamic.

To analyze the interactions of this dyad, I first watched their complete progress through the four days selecting the focal case of social negotiation. I chose this interaction because it captured a breakdown in interaction when X attempts to participate and this creates an activation of a social infrastructure of other multilingual learners to "help" X. After bounding the focal interaction, I transcribed intelligible talk and noted the occurrence of any unintelligible talk and (when possible) the speaker. Next, I transcribed each participant's body language and then coordinated these multimodal transcripts in a single transcript. By coordinating this transcript with the video, I

generated a series of bird's eye views of the relevant space using representations similar to those employed by Kendon (1990). These temporally discrete snapshots were created at significant changes in the dyad's formations during the interaction. Lastly, I analyzed these representations with both the video and transcript to contextualize the formation changes, document salient Discourses, and understand the enacted infrastructure.

Analysis

Overview

Evident from the first day and throughout the implementation, LM and X appear to be working together as a dyad against their wishes (at least in part). As directed by the teacher on the first day of gameplay, students choose partners to work on the game together with the condition that at least one person in the dyad reads English, the exclusive language within the game. LM and X seem to have been joined largely based on this latter requirement. Two other individuals are also the main actors within the interaction of focus, A and F. A is a female Latinx multilingual learner positioned as bilingual and a translator for multilingual learners, including X, within the class. A and three other multilingual learners sit at a table group, referred to here as G1, directly at the back of LM and X. F entered the classroom for the first time only a days prior and is a female Thai research assistant working in the class as a researcher-facilitator.

The scene starts with LM communicating frustration with a specific part of the game where students are pushed to solve unit rate calculations using a double numberline tool before moving on. LM attempts to engage both the teacher, Ms. Lynn, and G1 to little effect. F approaches and offers to help LM and X. LM expresses her confusion with this part of the game, and F provides scaffolds via clarifying and probing questions. Throughout this first part of the exchange, X seems to follow the interaction and, in a lull, makes a bid to participate in F and LM's meaning-making around the problem and the tool. Upon X's attempt (and the ending of segment 1), LM draws on A in G1 to aid in the interaction by translating. The start of the final segment is the inclusion of A. LM continues to engage directly with F to solve the problem and move forward in the game while X and A converse inaudibly in Spanish. As A finishes translating and returns to G1, LM figures out the answer to the problem and inputs it into the computer. F asks the question "Does 8 [the answer] make sense to you?" and as LM responds with "Yes," X points to the computer bidding for participation once again but this time to close the interaction.

During this time, LM is acting as both a pivot point for the formation and the arbiter for whom can join in it while X remains slouched toward computer gazing downward. F, a somewhat new resource to the environment, offers to aid the pair, and she and LM solidify the formation into an F-formation to include the three individuals (LM, F, and X) and the computer. F positions herself as a ratified listener and lets LM take up the role of ratified speaker. At the same time F is joining the dyad, X engages in sideplay (Goffman, 1981) with members of G1 from between F and LM.

As LM talks with F (the third picture of Figure 1), F constricts the F-formation around the computer, and this constriction seems to draw X into the interaction. She begins to follow the interaction between F and LM, and as LM pauses to think of an answer to F's main question, X makes a bid to participate by offering an alternative answer and looking to LM as a meaning making partner. X's attempt to connect with LM as partner is in stark contrast to the behavior of LM, who has yet to even look at X, let alone make eye contact. This difference is further expressed in the subsequent segment when LM reacts to this bid as a disruption and a violation.

This moment holds a lot of tension for the group, which can be seen in the contortion of their formation, and for the individuals, which can be seen in the LM's twisted body. Furthermore, highlighting these contortions helps us to see the breakdown of 'normal' within the scene which reveals the social infrastructure to 'support' multilingual learners. LM enacts this social responsibility for A to leave her formation and mathematics learning in G1 and 'deal' with X's constructed incompetence. Unpacking this further, X's constructed incompetence is twofold, combining both language incompetence and social incompetence, because she did not activate the infrastructure of G1 and A in the first place (unlike during the sideplay of segment 1). Following this fraught moment, LM turns her body back towards the remnants of the previous formation and makes a slight, but distinct, motion with her posture and elbow between X and F. In this microaggression, LM simultaneously recovers the formation with F capturing her attention, absolves F of responsibility to engage with X, and further positions X as a non-member of the formation and an unratified speaker.

An analytic finding problematizes Kendon's F-formations. Kendon defines F-formations as semi-static spaces of interaction where each participant has equal access to the resources within the formation. Presumably, unratified participants could not be included in F-formations because they would not have equal access. Yet in this instance, we see just that, an F-formation where an unratified participant attempts to contribute and is re-positioned out of the formation. In the final picture of Figure 1, the closeness of F, X, and LM seems to show resoundingly that they form a single formation, at least as how F and X enacts it. Yet in segment 2, LM's surprise at X's bid implies LM's enactment of the formation rendered X as virtually invisible, merely meant to engage in sideplay and animate others authorings. Such a finding pushes on Kendon's F-formation definition and brings up the question of whose formation is being described.

..	= short pause, 2-4 secs
…	= long pause, more than 4 secs
()	= inaudible
(words?)	= sounds like "words"
((actions))	= Speaker is performing "actions"
[ ]	= Simultaneous speakers, always comes in sets of at least, but not limited to, 2
-	= Latched talk (see Dressler and Kreuz's "=")
?	= Rising intonation
.	= falling intonation

Thick Dotted line	= formation
Solid line	= F-formation
Thin Dotted line	= gaze
-People-	
Complete white center	= unratified participate not included in formation (i.e. bystander)
Gradient with white center	= unratified participate in formation
Gradient with black center	= ratified participant in formation

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