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How Brianna Became Bossy and Kofi Came Out Smart: Understanding the Trajectories of Identity and Engagement for Two Group Leaders in a Project-Based Mathematics Classroom

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Abstract: This article addresses equity in mathematics classrooms through a focus on students' co-constructed trajectories of identity and engagement in cooperative learning groups. I examine how two students who served as group leaders in a projects-based algebra classroom constructed markedly different trajectories of identity and engagement across the academic year. Results showed that group members differentially interpreted their respective project-related directives in gendered ways such that the female group leaders' displays of authority were positioned as inappropriate, while the male group leaders' displays were positioned as desirable.

Résumé: Cet article se penche sur la question de l'équité dans les cours de mathématiques par le biais d'une analyse des parcours d'identité et d'engagement construits en collaboration par les étudiants, dans des groupes d'apprentissage coopératifs. J'analyse comment deux élèves, qui étaient les leaders de leur groupe dans un cours d'algèbre à projets, ont construit des parcours d'identité et d'engagement très différents tout au long de l'année scolaire. Les résultats montrent que les membres du groupe ont interprété les directives reçues dans le cadre du projet de façon différenciée en fonction de leur sexe: l'autorité du chef de groupe féminin a été jugée comme inappropriée, tandis que celle du chef de groupe de sexe masculin a été jugée comme positive.

Many mathematics classrooms have shifted toward cooperative and project-based learning to decrease inequities in students' opportunities to engage with meaningful problems (Esmonde, 2009; Jurow, 2005). Ways to structure student participation, such as utilizing group roles (Herrenkohl & Guerra, 1998) and tasks that require multiple competencies (Cohen & Lotan, 1995), are meant to enable greater access to learning opportunities. Structuring participation also increases the likelihood that students become positioned with competence and authority (Kurth, Anderson, & Palinscar, 2002). Students positioned with authority participate frequently in small groups, are able to gain access to and hold the floor, are able to decide what is correct, are seen as contributing meritorious ideas, and become influential in student-led discussions (Cohen & Lotan, 1995; Engle, Langer-Osuna, & McKinney de Royston, 2008; Inglis & Mejia-Ramos, 2009).

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Cooperative projects that utilize group roles and require multiple competencies offer a powerful participation structure within which students may become positioned with authority. Erickson and Schultz (1997) defined *participation structures* as interactionally marked ways of speaking and listening, getting and holding the floor, and leading and following. In this sense, participation structures can be seen as the contexts in which acts of positioning occur. As stated by Davies and Harré (1990), "positioning . . . is the discursive process whereby selves are located in conversations as . . . participants in jointly produced story lines" (p. 48). Participation structures guide the "story lines" by which students interpret one another's actions, mediating students' positional identities (Wortham, 2006) and their patterns of engagement (Cohen & Lotan, 1995). For example, the embodiment of the role as "group leader" through such discursive acts as issuing directives or offering help may position students with authority. Such interactions, over time, "thicken" (Leander, 2002) into trajectories of identity and engagement (Holland, Lachicotte, Skinner, & Cain, 2001; Wortham). That is, patterns of positioning and of engagement emerge from moment-to-moment interactions when viewed over time. These patterns can be thought of as trajectories, pointing toward likely patterns in the future.

Though such participation structures may afford students positions of authority, the role of leader is not only up to the student assigned that role but rather is also co-constructed by the other group members. For a student to function as a group leader, the other students in a group must respond in ways that also position the student as a leader and source of credible information, rather than reject or modify such positions (Davies & Harré, 1990; Holland et al., 2001). Indeed, the goals of equitable cooperative learning are difficult to accomplish even in small groups with such participation structures, in part because students tend to construct inequitable relations of authority among themselves (Bianchini, 1999; Engle et al., 2008; Lubienski, 2002; Southerland, Kittleson, Settlage, & Lanier, 2005).

Building on Wortham's (2006) framework to understand trajectories of learning identities, I develop a two-part argument in this article: (a) trajectories of identity and engagement are co-constructed in interaction, and (b) these trajectories develop in relation to both the classroom practices that serve to structure participation and the broader social worlds that at times support and other times conflict with classroom practices. Wortham focused on the ways in which teachers and students position particular students in relation to curricular themes. For example, Wortham analyzed a unit on the Peloponnesian War, during which students cast Sparta as a "draconian collectivist state that stripped away individual freedom" (p. 79). These themes ultimately positioned a particular student as a Spartan because his large size would allow him to "beat up" other students, identifying him in terms of his brawn as opposed to intelligence or moral character, themes that were associated with Athens.

In this study, the focus moves away from how curricular themes can organize both the learning of content and the positioning of students as kinds of people and instead onto particular participation structures. This shift in focus allows analysis of student identity in relation to how cooperative projects are structured, an increasingly important topic as mathematics classrooms continue to move toward such learning environments. I then directly link the process of positioning to students' patterns of engagement in mathematical activity, a central area of concern for equity (Esmonde, 2009).

Second, and related, this article draws on Wortham (2006) to understand the role of broader social categories, such as gender, in how students take up the positions of authority afforded by group roles. For instance, linguistic studies that investigate how gender is constructed in and

through talk have shown that displays of authority (Jack, 1991) and giving orders (Goodwin, 1990) have negative connotations that do not occur when men and boys display authority or give orders (Goodwin, 1990). Displays of authority by women and girls are related instead to the notion of *bossiness* (Belenky, Clinchy, Goldberger, & Tarule, 1997; Gilligan, Lyons, & Hammer, 1990). These gendered notions of authority interact and likely conflict with teacher-intended interpretations of authority displays when girls become group leaders and are thereby positioned to issue directives.

The research questions explored in this article emerge from recent concerns around the role of identity in developing equity in cooperative learning in mathematics education (Esmonde, 2009). Specifically, this article asks: How are group interactions and acts of positioning related, and what are the implications for equitable engagement in cooperative mathematics projects? How are positional identities and patterns of engagement related to broader social categories such as gender? And, finally, how do broader social categories interact with positional identities constructed within the classroom?

DATA SOURCES AND ANALYTICAL APPROACH

I analyze a case of ninth graders in a project-based algebra classroom in a new "school within a school," Holly Hills New Tech (HHNT).[1] HHTN was housed within a larger high school and structured to resemble the recommendations of reform-oriented documents, such as the National Council of Teachers of Mathematics (NCTM) Standards (2000). Specifically, all courses were taught through collaborative projects structured to resemble adult work teams in technology-related sectors such as architecture, engineering, and graphic design.

HHNT is located in a primarily African American community in North Carolina. HHNT is almost exclusively African American, with about 1% White and 2% Latino students—roughly the same demographic population served by the larger high school. The teacher in the focal classroom, Mr. Stevens, is a White male who had previously taught mathematics at the larger school and received the district's Teacher of the Year award at the end of his first year at HHNT.

Data were collected during three multi-week-long group projects at the start, middle, and end of the academic year. Brianna, Kofi, Terrance, and Brandon were assigned to work together as a group during all three projects. During the other projects not analyzed in this study, the four students were assigned to other small groups.

The data utilized in this article include (a) detailed transcriptions of six videos of the four focal students working together during the three focal projects; (b) one-on-one interviews at the end of each focal project; and (c) year-long field notes based on classroom observations. The three focal projects are described in Table 1.

Analyses focus on moment-to-moment videotaped interactions of the four students working collaboratively, with a particular focus on how group interactions positioned the project leaders (a group role) and its relation to their patterns of engagement. Group member interactions were coded and analyzed at the level of verbal utterances. An *utterance* is defined as what a speaker verbalized when the speaker held the floor, regardless of whether the utterance was interrupted or was a completed turn. In the case of an interrupted utterance, if the speaker gained the floor again to complete the turn, the two turns were each coded as separate utterances.

TABLE 1
Description of Focal Group Projects

Group project	Description
First project of the year: feasible areas and volumes given a set of constraints Group leader: Brianna	Student groups designed a community pool as a way to explore feasible areas and volumes given a set of constraints. The project involved many nonmathematical aspects, such as choosing safety and recreational features, a specific pumping system, and the location to place the pool. At the end of the project, each group presented a 3D model of their pool and turned in a digital sketch and a written paper detailing their project choices, including their mathematical thinking that led to their choices.
Mid-year project: exploring linear relationships Group leader: Kofi	Student groups researched retail industries as a way to explore linear relationships. Each student graphed three linear relationships in Excel, representing the total cost of service, including starting and monthly costs, as a function of the number of months of service. At the end of the project, each student "defended" his or her understanding of one of their graphs, projected onto the front wall, to a panel of invited guests (teacher and parents).
End-of-year project: preparing for state-wide exams No group leader[a]	Individual students created PowerPoint tutorials explaining one algebra topic that had been covered during the academic year as a way to review and prepare for the state-wide "end-of-course" exam. Groups collaborated by offering and asking for help. At the end of the project, tutorials were distributed to each student as study aids.

Note. [a]This was the only individual project of the year in which groups worked together only for the purpose of asking for or offering help to each other during work on the project.

To analyze the process of positioning group leaders, I first coded for utterances by the respective group leader that indexed leader-related functions, which included (a) assigning tasks to group members, (b) keeping group members on task, (c) offering nonmathematical, project-related help, (d) offering mathematical help, and (e) gathering group members together for a meeting or workshop (see Table 2). These codes were derived from the body of video data (Derry et al., 2010; Erickson, 2006).

TABLE 2
Types of Leader-Related Utterances

Type of leader-related utterance	Examples
Assigning tasks	"Why don't you find, like, safety feature requirements?" "You have to make three different graphs."
Keeping members on task	"Brandon, write your questions!" "Find something to write on. I'm serious here."
Offering nonmathematical help	"So in order to um, . . . go to maps dot google dot com." "Press copy . . . now drag it all the way down to 10."
Offering mathematical help	"Okay, $59.68, that's the starting cost and then how much do you pay monthly?"
Gathering members for meeting or workshop	"Where are you going? We're planning for the whole week." "Come on, team. Let's go."

TABLE 3
Type of Response to Leader-Related Utterances

Type of response to leader-related utterances	Definition	Examples of responses after being assigned a particular task:
Successful uptake	Utterances by other group members that indicated agreement or alignment with the group leader's request or help without any evidence of complaint	"Okay" or "When do you want me to have that by?"
Resistant uptake	Utterances by the other group members that indicated ultimately aligning with the request or help given by the group leader but in ways that showed evidence of complaint or stalling	"Chill out, I'll do it!" or "Whatever," but was followed by the group member positively working on the assigned task
Ignoring	Utterances by the other group members that conversationally did not follow the leader's utterance, such as changing the topic, and also showed verbal or nonverbal evidence of not aligning with the request or information given by the group leader	"Terrance, check out this video!" or "Anybody got candy?" that was also *not* positively followed by the group member working on the assigned task
Rejection	Utterances by the other group members that indicated a refusal to align with the request or help given by the group leader	"I ain't doing that" or "I'm working on something else" and was also *not* positively followed by the group member working on the assigned task

Next, I coded each utterance by individual group members in response to leader-related utterances as either taking up, resisting, rejecting, or ignoring leader-related utterances (see Table 3). Though these categories emerged from the data, they are similar to the categories developed by Clark (1996) of taking up, altering, declining, or withdrawing from joint projects.

To analyze student engagement, I coded each utterance by individual group members as project-related or off-task (personal) talk. Project-related talk included utterances that showed that the speaker was involved in project-related activities. Personal talk included utterances that indicated that the speaker was engaged in off-task activities.

Frequencies of coded utterances were analyzed in order to reveal patterns of group interactions. Selected excerpts from these focal days are used to illustrate the texture of these patterns. Interviews with the focal students and year-long field notes were used to aid in interpretation of these patterns.

RESULTS

Analyses focus on (a) Brianna and Kofi's trajectories of identity as group leaders; (b) Brianna and Kofi's trajectories of engagement in group projects; (c) how group members responded to group leaders' directives and help; and (d) Brianna and Kofi's reflections of their group experiences.

Trajectories of Identity as Group Leaders

Brianna and Kofi were both A students with strong academic pasts and plans for college. They worked together in the same group during the three focal projects and each served as group leader during one of these projects. But their positional identities shifted markedly across the academic year: Brianna moved from a student displaying "good leadership" to "being bossy," and Kofi became the "smart" student in his group. In this section, I summarize these shifts; subsequent sections will explain how these shifts occurred within this particular small group.

Brianna—From Good Leadership to Bossy

Brianna was the group leader for the first project of the year. She self-selected as group leader, although the other three students indicated agreement with this choice and generally oriented to Brianna as leader. For example, before the group leader was chosen, the other three group members gathered around Brianna's computer, allowing her to take the lead in creating the group contract. The teacher took early notice of Brianna's high level of group participation and stated to the class, "I'm already seeing some good examples of leadership going on. Right, Brianna?" However, less than midway through the project, group members increasingly positioned Brianna as bossy, claiming that Brianna was overstepping her authority by assigning tasks or trying to keep students on task. For example, when Brianna was assigning tasks, Terrance interrupted her and teased that Brianna was working on "being bossy." Brandon joined Terrance in teasing Brianna, calling her bossy several times. Later the same day, while Brianna was away from her group, Brandon and Terrance commented that Brianna was "so damn bossy." Terrance and Brandon also positioned one another as allied against her bossiness by stating, "You can't let her be the boss."

During the mid-year project, group members chose Kofi, not Brianna, as the group leader and Brianna was instead the group "secretary." In effect, Brianna continued to carry out the administrative aspects of the role of group leader that she had in the first project but without the authority to manage the group's behaviors that Kofi now assumed. Additionally, she was spatially closed off from the group and excluded from conversations. Specifically, there was an empty seat between Brianna and the other group members, who sat directly next to each other and often huddled around a shared set of headphones while working. Because she was not integrated with the group during discussions, she often asked for clarification on what she was to be working on and began to lag behind.

During the end-of-year project, Brianna was completely isolated from the group, working silently and engaging in little mathematical conversation with her group. In interviews, Brianna expressed frustration in working with boys and recast her experiences over the year as that of being a "workaholic" learning how to "give someone else the stick" (i.e., allowing others to lead) and "relax."

Kofi—From Quiet Loner to Smart Ally

At the start of the year, Kofi avoided interactions with his group. He frequently wore headphones and sat hunched down such that it was both spatially and verbally difficult to interact with him. At one point during the first project, all three group members and the teacher had to loudly call to Kofi, gesture dramatically, and even clap by his ears to get his attention. However,

at the whole-class level, Kofi often volunteered ideas and was otherwise publicly positioned as a knowledgeable and serious mathematics student.

Kofi was chosen as group leader during the mid-year project. Unlike Brianna, Kofi's displays of authority were taken up as appropriate attempts to manage group tasks in order to successfully complete the project by the final deadline. Throughout the mid-year project, Terrance and Brandon increasingly positioned Kofi as the smart student. For instance, Terrance stated that Kofi, who was dominating the use of the headphones that the three boys often shared, had a right to the headphones because he had an A in the class. Brandon took up the assertion, stating repeatedly that indeed Kofi had an A. Spatially, Kofi was frequently surrounded by Terrance and Brandon, who sought his help and shared his headphones. Although Kofi rarely initiated off-task talk or activities, Terrance and Brandon often brought Kofi in to personal conversations and activities.

By the end-of-year project, Terrance stated that Kofi was "the smart person" in the group and positioned him as a helpful ally. Terrance and Brandon often requested mathematical help from Kofi, who thereby engaged in numerous mathematical conversations during which he shared ideas, decided what was correct, offered possible solution paths, and explained mathematical concepts and procedures. In our interviews, Kofi claimed to enjoy mathematics and planned to pursue mathematics in the future.

Trajectories of Project-Related Engagement

Brianna's and Kofi's patterns of engagement across the group projects shifted in concert with shifts in their positional identities. That is, as Kofi became positioned as a smart ally with respect to his group, his engagement in group projects increased. Likewise, as Brianna became positioned as bossy and inappropriate in relation to her group, her engagement decreased across the group projects.

Chi-square analysis indicated significant differences between Brianna's and Kofi's shifts in the frequencies of their projected-related talk across the projects, $\chi^2(2, N = 237) = 80.624$, $p < .001$ (see Figure 1). Differences in Brianna's and Kofi's shifts in frequencies of talk generally (an indicator of group interaction) were also significant ($p < .001$). Kofi greatly increased his project-related talk and talk more generally across all three projects; Brianna's project-related talk and talk in general decreased greatly.

One possible interpretation is that the shift was due to who was the group leader at the time. That is, each student spoke most when she or he was leader and less when she or he was not. However, the shifts in project-related talk among the other two group members who were never group leader indicate that this is not a likely explanation. For one, Terrance's project-related talk also significantly increased in frequency ($p = .004$). Brandon's project-related talk remained about the same ($p = .471$) and higher than Brianna's talk during the mid-year and end-of-year projects. Furthermore, no student was group leader at the end of the year, yet these respective trends continued. Brianna's increasingly marginalized position accounts for both her overall decreased participation and the consistency in the participation trend of her non-group-leader peers.

Shifts in project-related engagement affected the kinds of learning opportunities made available to Brianna and Kofi. For one, the amount of talk in general and project-related talk in particular is linked to relative success in mathematics (Bianchini, 1999; Cohen & Lotan, 1997). Second, Kofi engaged in the kinds of talk that are linked to mathematics achievement, including discussing problem-solving strategies and explaining his thinking to group members (Chizhik, 2001; Webb, 1991). For example, particular mathematical learning opportunities arose when Terrance sought
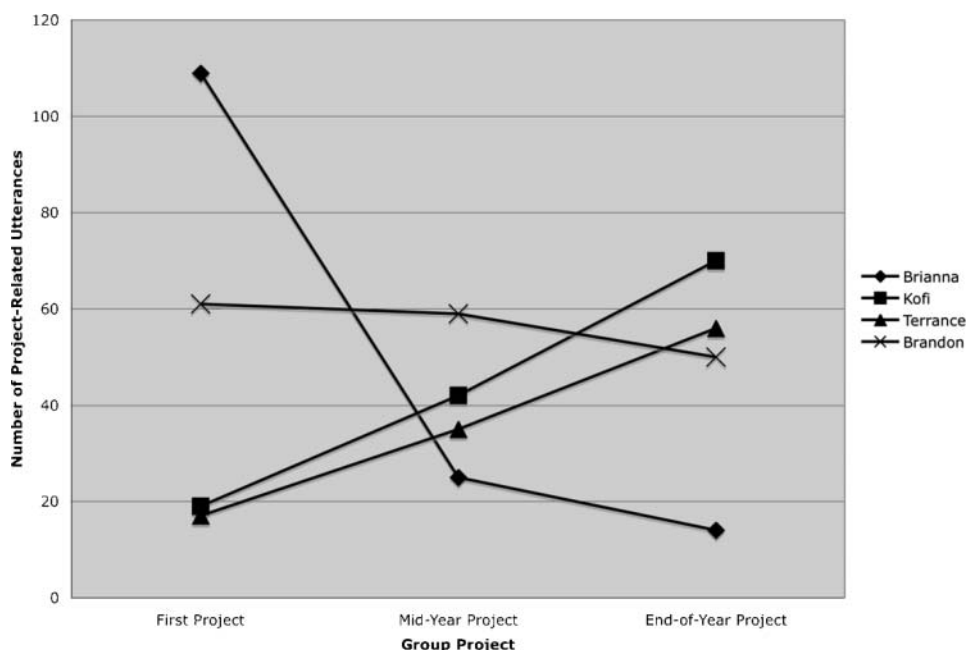
FIGURE 1   Shifts in Group Members' Project-Related Talk During the Academic Year.

help from Kofi during the mid-year project. Students were expected to research a service industry, such as cable TV, and represent its costs as a function of months of service. Students were asked to find "starting costs" such as installation fees, and "additional costs" such as monthly service fees, and represent them as a linear equation. In this excerpt, Terrance asked Kofi for help in clarifying these costs.

Excerpt 1. Mid-Year Project

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1 Terrance:	[shifts gaze toward Kofi] I already got it [the cost of cable TV].
2 Terrance:	It's, um, fifty nine dollars.
3 Terrance:	No, the installation fee is fifty-eight sixty-four.
4 Kofi:	[shifts gaze toward Terrance] That's—
5 Kofi:	that's the, um, starting cost.
6 Terrance:	[shifts gaze to computer screen, then back to Kofi] Yeah, starting cost.
7 Terrance:	It's fifty-eight sixty-four.
8 Kofi:	[facing Terrance] That's—
9 Kofi:	that's the additional costs.
10 Kofi:	What you pay monthly.
11 Terrance:	[shifts gaze to computer screen, then back to Kofi] Month—
12 Terrance:	the monthly is thirty-nine ninety-five.
13 Kofi:	[facing Terrance] Yeah, that's—
14 Terrance:	[facing Kofi] That's the additional cost.
15 Kofi:	[shifts gaze back to computer screen] What?

16 Kofi:	How much do you have to pay to get it, man?
17 Terrance:	[facing computer screen] Fifty-nine ninety-four.
18 Terrance:	Fifty-nine sixty-eight.
19 Kofi:	[shifts gaze back to Terrance] Okay, fifty-nine sixty-eight.
20 Kofi:	That's the starting cost—
21 Kofi:	and then how much do you—
22 Kofi:	how much do you pay monthly?
23 Terrance:	[facing Kofi] What's that?
24 Kofi:	[facing Terrance] How much do you have to pay monthly?
25 Terrance:	[facing Kofi] Thirty-nine ninety-five.
26 Kofi:	[facing Terrance] So do—
27 Kofi:	y equals thirty-nine ninety-five x plus fifty—
28 Kofi:	nine ninety-five.

Kofi offered help to Terrance in navigating the connections between the online research on cable TV prices and creating a linear equation. In doing so, particular mathematical learning opportunities emerged. Kofi was able to connect the cable TV service's installation and monthly fees to the idea of starting costs and additional costs that Mr. Stevens had tied to the concept of linear relationships (lines 9, 14, 19–22). Additional costs occurred monthly and served as the coefficient for the x variable, which represented the amount of months one paid for the service. The starting cost was a single fee that was added to the relationship (represented as b) in order to come up with the total cost of service (represented as y). Kofi made this connection with his final utterance to Terrance that "y equals 39.95x plus 59.95" (line 28).

Brianna, on the other hand, was more often ignored by group members, a kind of interaction shown to have negative effects on learning (Webb & Mastergeorge, 2003). For example, on the same day in the mid-year project, Brianna sought mathematical help from Brandon:

Excerpt 2. Mid-Year Project

1 Brianna:	[pointing to listed fees of retail service on internet site, faces Brandon] Brandon, what's—
2 Brianna:	that thing again?
3 Brianna:	What's that stuff?
4 Brandon:	[looks over to Brianna] Installation fee, additional fee—
5 Brandon:	and, um,
6 Brianna:	[facing Brandon] Additional fee?
7 Brandon:	[facing Brianna] Like additional fee—
8 Brandon:	what you pay after the installment.
9 Brandon:	What else do you have to pay?
10 Brandon:	Um, and how much does it cost—
11 Brandon:	to keep it?
12 Terrance:	[shifts gaze to Brianna's computer and leans toward her, points to screen] Oh, yeah—
13 Terrance:	there's a TON of it right there.
14 Brianna:	[facing Brandon] Monthly fee?
15 Brandon:	[shifts gaze back to his computer screen] Yeah, monthly.
16 Brianna:	[frustrated, facing Brandon] WHAT?
17 Brianna:	WHICH is it?
18 Brandon:	[quickly glances to Brianna, and waves hand dismissively] Make that shit up—
19 Brandon:	Who has some candy?
20 Brandon:	Who has some candy?
21 Brandon:	Got some candy, Brianna?

Brianna asked Brandon to clarify the connection between the retail service costs she had researched online and linear equations (lines 1–3). Brandon responded that the costs represented additional fees and starting fees (lines 4–5), but Brianna remained unsure (lines 6, 14, 16–17). She asked again, "What? Which is it?" showing visible frustration. Instead of continuing to offer his help, Brandon told Brianna to simply make up the equation (line 18) and then shifted the conversation to looking for candy (lines 19–21). Brianna worked alone for the rest of the day. Though she had attempted to gain clarity about the mathematical connections between her online research and the linear functions she was expected to create, this is one example of missed opportunities to engage in mathematical thinking with her peers.

The Construction of Marginalization and Privilege: How Group Members Responded to Group Leaders

This section explains how Brianna's and Kofi's trajectories became differentially constructed during small-group interactions. Analyses show that group members took up each group leader's directives differently and in ways that positioned Brianna's displays of authority as inappropriate while positioning Kofi's as desirable.

Chi-square analyses show that group members responded negatively to Brianna's leader-related utterances significantly more often than to Kofi's leader-related utterances across all categories, $\chi^2(2, N = 222) = 38.3, p < .001$ (see Figure 2). Group members successfully took up an average of 30.1% of Brianna's leader-related utterances, resisted an average of 46.8% of them, and ignored or rejected an average of 22.5% of them. In contrast, Kofi had little trouble managing the group. In particular, group members successfully took up an average of 77.0% of Kofi's leader-related utterances, resisted an average of 16.5% of them, and ignored or rejected an average of 6.5% of them.
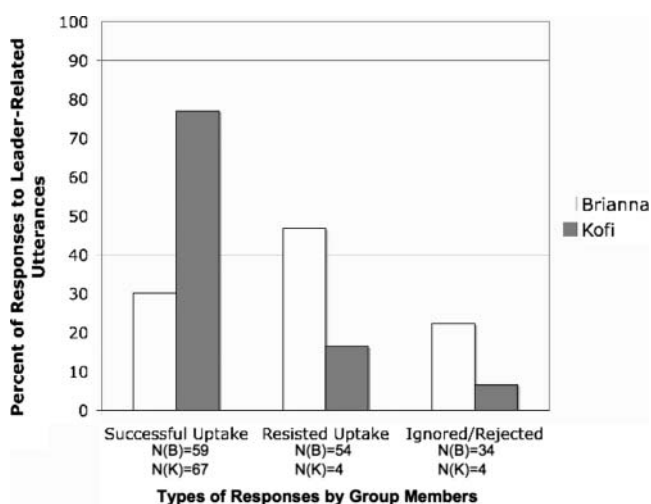

FIGURE 2   Comparison of Group Members' Responses to Brianna's and Kofi's Leader-Related Utterances.

Successful Uptake of Leader-Related Utterances

Kofi experienced more successful uptake of his leader-related utterances by group members in every category. Group members were about twice as likely to take up Kofi's assignment of tasks (45.5% for Brianna vs. 86.4% for Kofi; $p < .001$) and about six times as likely to take up Kofi's attempts to get them back on task (12% for Brianna vs. 71.4% for Kofi; $p < .001$) without resistance or complaint. Although Brianna's nonmathematical help was taken up more than half the time, Kofi's help—both mathematical and nonmathematical—was taken up without resistance or complaint 100% of the times he offered it ($p < .001$). Finally, whereas Brianna was never successful in gathering her group together without some form of resistance, Kofi was met with full compliance half the time he attempted to gather his group together for a meeting, although this last difference was not statistically significant ($p = .125$).

Resisted Uptake of Leader-Related Utterances

Brianna experienced more resistance to her leader-related utterances in all categories ($p < .001$). For instance, whereas Kofi experienced resistance in 9% of his attempts to assign tasks to his group members and 7% of attempts to keep them on task, Brianna experienced resistance about three and seven times more often (28.6%, $p = .048$; and 48%, $p = .013$, respectively). Additionally, Kofi experienced no resistance when offering help, whereas Brianna did ($p = .001$). Though Kofi experienced resistance for half of his attempts to gather his group members together, Brianna almost always experienced resistance in this category (85.7%), although this difference was not statistically significant ($p = .35$).

Rejecting or Ignoring Leader-Related Utterances

Brianna's leader-related utterances were more likely to be rejected or ignored[2] in all categories ($p < .001$). For instance, though group members ignored or rejected some of Kofi's leader-related utterances, in particular when assigning tasks (4.5%), Brianna's utterances in this category were ignored or rejected far more often (27.8%, $p = .022$). However, none of the other comparisons between Brianna and Kofi in this category were statistically significant.

One possible interpretation of the patterns described above is that their respective leader-related utterances were different enough in form and substance to explain why group members took them up differently. However, the form of their respective leader-related utterances was strikingly similar. For instance, the kinds of utterances Brianna or Kofi used to keep group members on task were similar during each of the two projects. During the first project, Brianna stated, "Brandon write your questions!" in an effort to get him back on task. Similarly, during the mid-year project, Kofi stated, "Terrance! . . . Find something to write on. I'm serious here." In both utterances, Brianna and Kofi called the attention of the off-task student by exclaiming their name loudly and then gave them a direct order. However, the group members' responses to Brianna and Kofi's similar utterances to keep them on task were markedly different. Brandon rejected Brianna's attempts to get him back on task by answering, "I'm not a slave!" He interpreted her utterance as inappropriate; rather than position her utterance in relation to fulfilling the job of the group leader, Brandon positioned her utterance in relation to a "slave owner" forcing work upon a subordinate. Yet, when Kofi used a similar style to get Terrance back on task, Terrance initially

showed some resistance by responding, "I have nothing to write on!" but soon aligned with Kofi's demand by pulling out his notebook and getting back on task. Even the initial resistance positioned Kofi's utterance as appropriate. That is, Terrance claimed that he was off-task because he was lacking school supplies, implicitly acknowledging that he should be working.

Even help-related utterances, which were initiated by the help-seeker, were taken up differently when the requested help was offered by Brianna or Kofi. For instance, during the first project, Brandon initiated a conversation with Brianna by asking her for help ("What am I doing?"). When Brianna responded to his request, Brandon reacted against it by yelling, "I have a freakin' life!" This occurred even though Brandon had been the one to initiate the conversation and had sought Brianna's help. During the mid-year project, Brandon similarly sought help from Kofi. The initial questions to both Brianna and Kofi were also similar in form and intent: "What am I doing?" (first project) and "What do I do?" (mid-year project). The nature of Brianna's and Kofi's responses was also similar in that they answered the question with a direct instruction. Yet, in contrast to his reaction to Brianna's help, Brandon readily took up Kofi's help by following his instructions.

Given that there was little or no difference in the leader-related utterances, it seems that group members interpreted each leader's directives and help differently such that Brianna's displays of authority were taken up as inappropriate and undesirable (Humphreys & Berger, 1981), whereas Kofi's were taken up as appropriate. As discussed further in the next section, students' interpretation of group leaders' directives were framed not only by the teacher-intended classroom participation structures but also by broader gendered experiences that interacted with, and at times conflicted with, the teacher-intended uptake of the group leader role.

Kofi's and Brianna's Gendered Reflections of Their Experiences as Group Leader

Although explicit mention of gender occurred only a few times in the forms of insults toward Brianna, such as, "She workin' us to the bone. Girl, get off" by Brandon (first project) and, "None of your business, woman!" by Terrance (end-of-year project), Brianna described her experiences explicitly in terms of gender during our interviews. At the end of the first project, Brianna offered a gendered interpretation of her role as group leader:

Excerpt 3. First Project of the Year

1 Brianna:	I think my challenge was because—
2 Brianna:	I was the only girl in my group—
3 Interviewer:	Mm-hmm.
4 Brianna:	and it was all boys—
5 Brianna:	so it's kind of challenging—
6 Brianna:	because they weren't listening to what I had to say.
7 Interviewer:	Why was that?
8 Brianna:	They didn't listen to what I had to say—
9 Brianna:	because I was a girl.

During our interview after the mid-year project, Brianna again brought up gender as a way to explain her experiences with the group, although by then she was no longer the group leader:

Excerpt 4. Mid-Year Project

1 Brianna:	I said Kofi should do it [be group leader]—
2 Brianna:	because last time when I was the leader in the group—
3 Brianna:	like they want—
4 Brianna:	they listened to me—
5 Brianna:	but I have to force them to 'cause I'm a girl.
6 Interviewer:	What do you think it is—
7 Interviewer:	about being a girl—
8 Interviewer:	that makes things harder?
9 Brianna:	'Cause they don't listen to you.
10 Brianna:	They don't.
11 Interviewer:	Mm-hmm.
12 Brianna:	Boys don't listen to girls.
13 Interviewer:	Mm-hmm.
14 Brianna:	I mean it's not just in the classroom—
15 Brianna:	but it's outside too.
16 Brianna:	It's like—
17 Brianna:	I mean—
18 Brianna:	they think they can control you—
19 Brianna:	especially at high school—
20 Brianna:	it's like think they can control you—
21 Brianna:	"they're the man" stuff.
22 Brianna:	you 'posed to listen and all that stuff like that.
23 Brianna:	So that's why the last time in—
24 Brianna:	if you remember—
25 Brianna:	I was yellin' at them—
26 Interviewer:	Mm-hmm.
27 Brianna:	all the time and stuff like that.
28 Brianna:	That's the only way you could get, like, authority—
29 Brianna:	is to yell at them so they'll get scared or something.
30 Interviewer:	Mm-hmm.
31 Brianna:	But like if I don't do that—
32 Brianna:	and I talk like right now—
33 Brianna:	talk to them like—
34 Brianna:	okay can you do this please—
35 Brianna:	they'll annoy you and stuff like that.
36 Interviewer:	Mm-hmm.
37 Brianna:	'Cause I have a little brother, so—
38 Brianna:	and then I have boy cousins—
39 Interviewer:	Mm-hmm.
40 Brianna:	and stuff like that.
41 Brianna:	So I know what it's like . . .

During this interview, Brianna discussed how her gendered interpretation of her experiences drew from their local community, including her extended family (lines 14–22, 37–38). In particular gendered relationships included assumptions such as "boys don't listen to girls" (lines 9, 12), boys "think they can control [girls]" because "they're the man" (lines 18–21), and that

the only way for a girl to get "authority" when interacting with boys is to "yell at them" and attempt to "scare them" (lines 28–29). Brianna claimed that had she spoken to the group members politely or normally (lines 31–35), the boys would have responded with disrespect (line 35).

By the end of the year, Kofi also expressed a gendered interpretation of his experiences as group leader, indicating that he had responsibility for securing the success of "his boys" and not letting them down by being too lenient.

Excerpt 5. Mid-Year Project

1 Interviewer:	What did you think—
2 Interviewer:	about having to tell your group members—
3 Interviewer:	what to do—
4 Interviewer:	or warn them when they weren't doing—
5 Interviewer:	what they are supposed to?
6 Kofi:	I don't think it's so bad—
7 Kofi:	'cause if we warned them,—
8 Kofi:	that means we're looking out for them.
9 Interviewer:	Um-hmm.
10 Kofi:	Tellin' them they're doin' something wrong.
11 Interviewer:	Um-hmm.
12 Kofi:	And if we didn't,—
13 Kofi:	if we see them doin' something wrong—
14 Kofi:	and we just let 'em go—
15 Interviewer:	Um-hmm.
16 Kofi:	we're being bad friends—
17 Kofi:	'cause it's like we're dragging them down—
18 Interviewer:	Right.
19 Kofi:	and letting them go down alone—
20 Kofi:	instead of trying to pull your boys up.

Kofi interpreted his success in managing his peers as aligned with male friendships (lines 8, 16–17, 19–20) and in particular with military service, which spanned both in- and out-of-school practices. Kofi, a member of the junior Reserve Officers' Training Course (ROTC), stated that he did not think that managing his peers was bad because, "that means we're looking out for them" (line 8). He linked his management to friendship (lines 16–17, 19–20) and, in particular, to the idea that friends help each other up when they are down. In this sense, allowing group members to be unproductive was akin to "dragging them down" (line 17).

These experiences with small-group work had implications for how each of the students reflected on their identities as math learners. During our mid-year interview, Kofi discussed mathematical aspects of his experiences in the group.

Excerpt 6. Mid-Year Project

1 Interviewer:	How would you describe yourself—
2 Interviewer:	as a student in this class?
3 Kofi:	Um, right now I don't know,—
4 Kofi:	but I'm really interested in math.
5 Interviewer:	What, what, what do you—
6 Interviewer:	what do you like about it?

7 Kofi:	It's challenging.
8 Interviewer:	Okay.
9 Kofi:	It requires you to think.
10 Interviewer:	Um-hmm.
11 Kofi:	Before it's not like—
12 Kofi:	uh, English—
13 Kofi:	where you just have to read and write.
14 Interviewer:	Okay.
15 Kofi:	Math actually requires you to think about—
16 Kofi:	what you're doin' first.
17 Interviewer:	Uh-huh.
18 Kofi:	If you know,—
19 Kofi:	it's like you're doin' a cur—
20 Kofi:	EQUATION and notice something's wrong.
21 Interviewer:	Um hmm.
22 Kofi:	So something in your brain goes, like,—
23 Kofi:	let me figure this out and see what's wrong.
24 Interviewer:	All right.
25 Kofi:	And then once you figure it out,—
26 Kofi:	you feel accomplish,—
27 Interviewer:	Yeah.
28 Kofi:	you feel like you accomplish something good—
29 Kofi:	and, and it's kinda like a good feeling.
30 Interviewer:	Oh, yeah.
31 Kofi:	Plus, it's like a workout for your brain too.

Kofi described himself as a student who was "really interested in math" (line 4). He stated that mathematics was challenging (line 7), required one to think (lines 9, 15), and was a "workout for your brain" (line 31). Kofi also indicated the feeling of accomplishment—"kinda like a good feeling"—involved in solving a mathematics problem (lines 25–26, 28–29).

Unlike Kofi, Brianna's description of her identity as a student was not focused on mathematics at all, but rather on moving away from being a "workaholic":

Excerpt 7. End-of-Year Project

1 Interviewer:	How would you describe yourself—
2 Interviewer:	as a student in this class?
3 Brianna:	The beginning of the year,—
4 Brianna:	I mean,—
5 Brianna:	I was, like, a workaholic.
6 Interviewer:	Okay.
7 Brianna:	So now I'm not as much of a workaholic,—
8 Brianna:	but I think it's because I have so much to do now.
9 Brianna:	But I'm getting it, but before,—
10 Brianna:	I used to want it.
11 Brianna:	Now I don't as much.
12 Interviewer:	Mm-hmm

13 Brianna:	So I think when I came in,—
14 Brianna:	I was like, "Okay, I'm gonna do this,—
15 Brianna:	I'm gonna do that,"—
16 Brianna:	and all that stuff.
17 Brianna:	And I think that's what it was,—
18 Brianna:	and I was just doing it a little bit too much,—
19 Brianna:	but now I feel that I'm doing enough.
20 Interviewer:	What do you think is,—
21 Interviewer:	is the negative of working hard?
22 Brianna:	I think because when I,—
23 Brianna:	like I mean,—
24 Brianna:	especially, like, being in a group,—
25 Brianna:	I think I was,—
26 Brianna:	all I had was boys.
27 Brianna:	So that also,—
28 Brianna:	like, that put me in a tragedy.

Brianna, who was originally positioned publicly by the teacher as an example of strong emerging leadership, recast her early identity as a "workaholic." In explaining how she "used to want it. Now I don't as much" (lines 10–11), Brianna claimed to have lost a desire for engaging intensely. She claimed that she had been doing too much at the start of the year and had learned to do "enough" (lines 17–19). However, when asked to explain why working too hard was a negative quality, she returned to her gendered experience, calling it a "tragedy" (line 28).

Brianna's and Kofi's trajectories of identity and engagement were differentially co-constructed in part because their group members took up their leader-related talk in different ways that were marked by the leaders' genders. As group members interpreted their interactions with one another and attempted to establish common ground, they drew on assumptions derived not only from the teacher-intended function of the group leader role but also from broader experiences, in particular that of gender relations (Belenky et al., 1997; Gilligan et al., 1990). These conflicting expectations complicated how students enacted and understood their own and each other's respective roles in the group, in particular around displays of authority (Wortham, 2006).

DISCUSSION

This article describes an algebra classroom that was designed to decrease inequities. The teacher created rich group projects that required multiple competencies and utilized student roles to structure participation (Cohen & Lotan, 1997). The teacher's approach in this classroom was generally successful. Indeed, other analyses based on this same classroom describe powerful shifts in identity and engagement by a different group member, Terrance, as he drew on his out-of-school experiences to reconcile his personal and academic identities (Langer-Osuna, 2009). However, this analysis focuses on a case in which two group leaders in the same group, who were both A students, developed opposite trajectories of identity and engagement across the academic year.

Though a focus on Brianna's and Kofi's achievement would not show great disparities between them, an analytic focus on their trajectories of identity and engagement tells a different story. By the end of the year, Kofi was centrally engaged in math talk and identified strongly as a learner of mathematics and a leader. Brianna, however, was engaged in almost no talk and reflected instead on her need to take more of a back seat in her education.

As we study cooperative learning environments, we must examine how classroom practices set conditions in which students can productively engage with each other around positions of authority. This is especially critical when such positions are afforded to students who are members of broader social categories wherein authority displays are often rejected as inappropriate. Cohen and colleagues' (1995) work in complex instruction describes the importance of addressing student status hierarchies in order to legitimize mathematical contributions of low-status students. A subtle but important additional focus to this work may be needed; that is, to not only legitimize particular students' mathematical contributions but also to legitimize their displays of authority. Brianna and Kofi were both considered smart and even popular in school. What became problematic for Brianna was not the validity of her ideas but her right to be, in some ways, an authority over her group members as manager and leader, a problem that Kofi did not face.

Lave and Wenger (1991) conceptualized learning as the movement of participants in social activity from legitimate peripheral participation as newcomers toward the more central participation of experts. In mathematics classrooms, students may begin at different levels of fluency in classroom practices (Lubienski, 2002) but move toward respectively more central participation—a sign that classroom practices are equitable without expecting (or finding) equal outcomes. We may instead find that some students' trajectories of engagement remain static or perhaps even become increasingly marginalized. An analytical focus on students' trajectories of identity and engagement allows us to move beyond achievement gap measures in order to understand not only when inequities are constructed but how and under what conditions.

NOTES

1. The names of the school and all study participants are pseudonyms.
2. Group member responses that rejected or ignored leader-related utterances were collapsed into one category because both indicated that the group members did not comply with the group leader's request, as well as because the frequencies in each category were relatively low.

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