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The Co-Construction of Opposition in a Low-Track Mathematics Classroom

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Student opposition in school is traditionally cast in terms of individual dispositions, whereby particular students or groups of students are said to "resist" or "oppose" school structures and identities aligned with the dominant cultural group. The author examined instead how the teacher and students in a low-track mathematics classroom jointly constructed opposition through their classroom interactions. Analysis of the classroom interaction revealed the emergence and escalation of a number of classroom practices that became oppositional. These practices were related to the nature of the mathematical activity, the framing and positioning of student participation in this activity, and multiple interpretations of student competence in and out of the classroom. The author found that classroom opposition is fostered by weak opportunities for meaningful mathematical engagement and the transformation of a polarized participation structure into an oppositional one.

KEYWORDS: mathematics education, equity, discourse processes

The phenomenon of school opposition has proven to be a significant theoretical and social challenge for many years (D'Amato, 1988, 1996; Darder, 1991; Erickson, 1987; Fordham & Ogbu, 1986; Freire, 1970; Giroux & McLaren, 1989; McLeod, 1987; Ogbu & Simons, 1998; Willis, 1977). Accounts of opposition in classroom learning have typically focused either on (a) the behavior of "resistant" or "troublemaking" students or on (b) hegemonic or oppressive school or classroom systems that disenfranchise

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groups of students because of their ethnic, racial, or social backgrounds. Researchers have suggested, however, that focusing solely on oppositional students or, vice versa, inequitable school structures without attending to how students negotiate these structures ignores the important relation between social structure and individual agency (for a recent discussion, see Warikoo & Carter, 2009).

Accounts of social activity that stem from situative, sociocultural, and cultural-historical perspectives have been particularly illustrative in highlighting the joint interactional accomplishments of individuals in relation to broader communities, processes, and structures (Cole & Engeström, 1993; Greeno & Middle-School Mathematics Through Application Project Group, 1998; Lave & Wenger, 1991; Rogoff & Lave, 1984; Wertsch, 1998). These accounts afford an understanding of how individuals organize routine ways of participating in a particular social activity such as school learning in response to features of local and broader contexts. Examining complex social phenomena such as classroom opposition through this lens has the potential to situate individual acts of resistance within the various levels of social activities in which they are embedded, providing impetus, constraints, and rationale to these behaviors. In this study, I draw primarily on the situative perspective to examine the interactional processes through which a teacher and his students co-constructed opposition within a low-track mathematics classroom. Set against the backdrop of the persistent gap in mathematics achievement scores between White and nondominant students (i.e., those groups of students generally marginalized by the dominant or White culture of power; Gutiérrez & Rogoff, 2003), the aim of this study was to understand how practices in the educational system such as tracking, coupled with the rich hybridity of discourse and cultural practices in today's classrooms, complicate what at first blush appears to be a problem of oppositional and resistant students. The findings reveal that explanations of opposition that focus on individual motivation may mask the process of classroom structures coming into opposition with each other, as classroom participants struggle to make sense of what it means to learn (or not learn) together.

By *classroom opposition*, I draw on McFarland's (2001, 2004) definition of disruptive and/or antagonistic behavior directed at resisting or overtly challenging school representatives and activities. Overt and active resistance, whereby students refuse to cooperate or disrupt the class, tends to be more obvious. However, passive forms of resistance, in which students display subtle or indirect defiance, are also highly consequential to the learning environment (McFarland, 2004). Although they are largely undertheorized, I find it useful to conceptualize some of the moves that teachers make as acts of resistance to their students and the practices and meanings they bring to the classroom.

There is an extensive body of research on opposition and resistance with respect to educational systems. It is important to note that while I use *opposition* and *resistance* interchangeably in this article, important and subtle distinctions have been made between them, which are significant for other arguments. Broadly speaking, research on opposition in the context of schooling has identified links to economic structures and achievement ideologies (McLeod, 1987; Willis, 1977), power structures and dominant discourses (Diamondstone, 2002; Giroux, 1997; Gutiérrez, Rymes, & Larson, 1995), racial stereotypes and deficit perspectives (Fordham & Ogbu, 1986; Fryer, 2006; Stinson, 2006) and power dynamics in classroom settings (D'Amato, 1996; Leander, 2002; McFarland, 2001; Wortham, 2006). A growing number of studies have also illustrated how educational contexts can be restructured to engage students who might typically be viewed as oppositional (Duncan-Andrade, 2007; Nasir, 2004). Most recently, Warikoo and Carter (2009) criticized what they view as the tendency for cultural theories of identity and learning to be "premised on racialized oppositional cultures" (p. 368) and urged researchers to take a more nuanced view of cultural practices and their variation within ethnic and racial groups. I do not attempt to summarize the corpus of literature on student opposition in this review but instead focus on studies that explore the characteristics of oppositional classrooms and the coordinated actions of their teacher and students. I also introduce a conceptual scaffold, classroom participation structures, that I have found particularly productive in unpacking classroom features that lead to productive and less productive mathematical engagement.

Characterizing Classroom Opposition

McFarland's (2001, 2004) work has contributed to greatly our understanding of the nature of classroom opposition by characterizing it as a *social drama* that relies on certain instructional formats and social networks. In his research on opposition in high school classrooms, McFarland found that students' resistant acts were attempts to *reframe* dominant classroom activity to a social one, often in which these students held more clout. Instead of attributing this reframing process to the students alone, however, McFarland (2001) argued that "[this] process . . . is variably enacted through the strategic framing of actors" (p. 1250). In other words, classroom resistance emerges as classroom participants frame each other's actions in particular ways, which, over time, can come to take on a ritualistic, dramatic quality. Particularly relevant to this study, one of his findings was that classrooms that are student centered and rely on a discussion-based format have a greater likelihood of fostering opposition among students. He argued that this instructional format typically distributes some control to classroom participants, which can be reassembled into the hands of a few students who hold high social status. Opposition arises when these students are negatively identified with school, and they decide to initiate open defiance among their peers.

The notion that classroom resistance is related to competition among classroom frameworks was also supported by Diamondstone (2002), who interpreted classroom opposition as "a misreading of dominant discourse, arising from sociocultural perspectives that have been marginalized" (p. 3). From this perspective, resistance is a natural occurrence in the classroom and relates to the processes by which individuals choose to align or misalign themselves with dominant meanings and interpretations in performing their identities. Similarly, Gutiérrez et al. (1995) and Gutiérrez, Baquedano-López, Alvarez, & Chiu (1999) argued that classrooms with students from diverse backgrounds comprise multiple, overlapping, and sometimes competing discourse practices that reflect and reproduce broader hierarchies and processes of power and oppression found in society. Teachers who are successful at creating hybrid spaces for learning, or *third spaces*, are less likely to face opposition among potentially resistant students.

Few studies have closely examined the relation between opposition, sociocultural practices, and *mathematics learning* (Cobb & Hodge, 2002; Martin, 2000). One reason for this lack of attention is a popular conceptualization of mathematics learning as "culture free." This conception often leads to the acceptance of a priori distinctions between "social" and "mathematical" activity, which can mask important cultural processes involved in mathematics learning. Researchers concerned with the cultural implications of mathematics learning challenge these distinctions. They argue that mathematics classrooms function as cultural spaces, where normative practices within them often privilege particular communities of practice over others (Cobb & Hodge, 2002; Diversity in Mathematics Education Center for Learning and Teaching, 2007; Lerman, 2001; Moschkovich, 2002, 2007; Van Oers, 2001). For example, Moschkovich (2002) and others have illustrated how the informal linguistic practices of nondominant groups of children are often overlooked as resources in classroom learning because of their unfamiliar form, despite the fact that they often reflect students' meaning-making (Gutiérrez, 2002; Rosebery, Warren, & Conant, 1992; Warren, Ballenger, Ogonowski, Rosebery, & Hudicourt-Barnes, 2001). Central to these ideas is the notion of what counts as *competent* participation in classroom mathematics learning. Given that an individual's participation in one social context is intertwined with his or her membership in and strategies for competence in multiple others (Wenger, 1998), students from nondominant groups may participate in ways that are interpreted as unproductive in the classroom yet reflect and maintain their membership in outside communities. It is the tension between the various meanings assigned to individual participation practices that may give rise to classroom conflict.

Competent Participation

How does competence become associated with particular routines in classroom activity? By *competence*, I mean a quality of an individual's or a group's participation in an activity system that is treated as being skilled and productive (Gresalfi, Martin, Hand, & Greeno, 2008). One way is through the organization of structures for participation, whereby classroom participants (often teachers) mark and reinforce what counts as competent activity (Cobb, Stephan, McClain, & Gravemeijer, 2001; Lampert, 2001). As individuals orchestrate their activity with one another over time, they develop well-worn and highly coordinated participation structures (Phillips, 1973), which both comprise and influence ongoing social interaction over time. By *participation structures*, I refer to interactional routines (in discourse, gesture, posture, etc.) that are shaped by implicit rules and norms that participants in a social activity come to expect over time and that support coordinated action. I find it useful to consider participation structures in classrooms as being guided by two levels of norms (Hand, 2003). At the first (and most often recognized) level is set of *positioning norms*, which orient individual activity with respect to classroom activity. At the second, or overarching, level is a set of *framing norms*, which create and maintain distinctions among different forms of participation.

Positioning norms shape and are shaped by domain-related classroom activity. Yackel and Cobb (1996) identified three such norms in mathematics classrooms: mathematical, sociomathematical, and social. This categorization allows us to examine how students and teachers organize their work and each other in relation to classroom mathematical practices. Researchers have found that norms around students' *authority* (Engle & Conant, 2002), *accountability* (Boaler, 2006), and *meaningful connection* to the discipline (Boaler & Greeno, 2000) are particularly important to students' mathematical reasoning. Examples of these norms include ones that reinforce students' sharing their ideas at the board and engaging in respectful and critical discussion of these ideas (Lampert, 2001) and ones that support work in groups in which students progress together and make their thinking explicit (Boaler & Staples, 2008). In both of these cases, competence is getting organized around particular practices deemed mathematically productive. I argue that while the focus on norms and structures that support students' domain-related engagement has been very productive for the field, the importance of acknowledging students' cultural practices suggests that it may also be generative to consider classroom participation in a broader light. In other words, how does activity that may appear unrelated or even detrimental to mathematical activity reflect students' attempts to be viewed as competent across multiple contexts of their lives?

Framing norms are conceptualized as organizing distinctions in general participation, such as mathematical versus social activity, which may challenge taken-for-granted assumptions about what certain behaviors mean (D'Amato, 1996; Erickson, 2004). In prior work on the implications of reform-driven mathematical practices for classroom equity, I identified two types of participation structures that reinforced and were reinforced by markedly different framing norms (Hand, 2003). The first was a *polarized* participation structure, in which clear distinctions between mathematical and nonmathematical activity were established (usually at the discretion of the teacher); the latter treated as being detrimental to the former. The second was a *flexible* participation structure, in which the boundaries between different forms of activity were ill defined and could be negotiated by classroom participants. In that study, I found that the polarized participation structure fostered high levels of engagement among a *limited* number of students and resistance among others. In contrast, the flexible participation structure supported broad-based engagement among a range of learners. Polarized participation structures are what we typically expect to find in mathematics classrooms, while flexible participation structures are less common. Differences in the general features of the two participation structures can be conceptualized along a number of dimensions.

First, by definition, a flexible participation structure is unlike a polarized one in that it blurs the boundaries between cultural and mathematical participation. By blurring these boundaries, this structure provides opportunities for students to reconcile the ways of interacting with ideas, materials, and other people they have become good at in various communities, with the expectations for their participation in the classroom community. Second, in terms of forms of knowing, the polarized structure tends to reinforce a separation between cultural and domain-related knowing, instead of leveraging the former to foster the latter. This is beginning to change as mathematics reform calls for teachers to elicit and build on students' everyday and informal ideas about mathematics (National Research Council, 2005). Third, instead of reinforcing limits and controls on students' behavior, the flexible structure widens the spaces within which teachers and students can work out what it means to contribute productively to classroom learning. This represents a shift in emphasis from classroom management to the negotiation of opportunities for each student to fully contribute to the classroom community.

Orchestrating Opposition

The current study builds on this research by examining the mechanisms through which classroom participation structures support and constrain opposition. It is important to emphasize here that participation structures do not *organize* compliance or opposition; individuals do. However, according to Goffman (1967), participants often come to expect a dominant framework for their participation (as students often do after years of schooling) and are drawn into positions and roles without their conscious attention. This point is illustrated in McDermott's (1993) seminal work on Adam, a child acquired by a learning disability, which illustrates how opportunities can be organized for children to be consistently positioned (and to position themselves) as slow, resistant, and distracted. Horn's (2007) research on the categories of students typically available to teachers using traditional (vs. reform) mathematics curricula—slow, fast, lazy—makes a similar point. Both illustrate how normative features of school learning environments often have significant implications not only for what a student learns but also for the kind of student one can become over time. Thus, while it is apparent that both structure and agency play a role in classroom positioning, the way that these function together is necessarily complex.

I address the relation of classroom opposition to the organization of classroom features and participants in four ways. First, I illustrate the construction of opposition in moments of classroom interaction and over time in a low-track mathematics classroom. Consistent with a situative approach, elements of the activity system of the classroom such as the task structure, discourse routines, norms, and participation structures are examined independently, and as a whole, in shaping the teacher and students' interactions (Greeno & Middle-School Mathematics Through Application Project Group, 1997; Greeno & Gresalfi, 2008). Second, I outline key features of the mathematics classroom that supported this process. Third, I explore the relation between students' negotiation of status in the classroom versus the local school community. Finally, I conclude by offering a principle for the design of learning environments that may constrain opportunities for opposition to emerge.

Site and Methods

The study took place in an eighth grade algebra classroom in an urban public middle school in northern California during the 2003–2004 school year. The school within which this classroom was located was attempting to detrack its mathematics program at the time. However, in what has now become an unofficial means of tracking (Diversity in Mathematics Education Center for Learning and Teaching, 2007), the amount of content covered in each classroom was different. The fast-paced classroom was scheduled to get through the entire College Preparatory Mathematics reform algebra curriculum over the course of the school year; the slow-paced classroom planned to cover only half of the chapters. Placement decisions for the different tracks were guided by students' test scores in seventh grade mathematics, teacher recommendations, and perceived behavior management issues. I refer to the classroom in this study as "low" track because it tended to function and was viewed by the students in this way. Class periods were 45 minutes long.

The ethnic and racial breakdown of the school during the time of the study was 44% Black, 29% White, 15% Hispanic or Latino, 9% Asian or Asian American, and 2% other. The 26 students in the low track were predominantly of African American and Latino descent, with only 2 White students and 1 of Asian American descent. Although characterizing the population of this classroom and school in terms of individual racial categories provides a rough sense of the overrepresentation of nondominant students in the low-track classroom, it also ignores the diverse interracial backgrounds of many of the students.

The teacher in this classroom had over 20 years of experience teaching mathematics, at least two of which involved teaching with a reform curriculum. Importantly, this teacher, who is White, also voluntarily participated in a professional development program led by a local university-based research group aimed at narrowing the achievement gap in local schools. The professional development program, of which I was a part, ran concurrently with this study and involved having teachers examine student work and identify nonstandard student strategies that revealed instances of mathematical meaning-making.

The study of this classroom was part of a broader investigation that examined the relation between tracking, opportunities to learn mathematics, and students' social and cultural identities (Hand, 2004). A major finding of that study was the development of a culture of opposition in the low-track classroom. The study combined several ethnographic methods, including participant observation, video interaction analysis, participant interviews, and documentation of the in- and out-of-class activities of students. Data collection activities included (a) 33.75 hours of classroom observation and videotaping in the "high"- and "low"-track classrooms (about 40 tapes each), including daily conceptual logs; (b) 30-minute interviews with six pairs of students per class; (c) informal conversations with teachers during the school year and 90-minute formal interviews at the end of the year; and (d) approximately 30 hours of student shadowing in the schoolyard, at after-school events, and on school field trips. A wide range of methods were used to compare mathematical opportunities as they emerged in moment-to-moment interaction, to capture the teacher's and students' views of these opportunities, and to trace students' participation in the classroom back to other social contexts. The secondary analysis of opposition in the low-track classroom relied primarily on videotapes of classroom interaction in the low-track classroom, observation notes on classroom activity and students' routine activities in out-of-classroom contexts, and conceptual logs.

As a participant-observer, I worked closely with many of the students in both classrooms throughout the school year. I often sat with them as they worked individually or in groups and, at the request of the teachers, pulled them out of the classroom for extra mathematics help. I also communicated regularly with the teachers both during and after class, via e-mail, and during the professional development meetings. I became fairly immersed in the school culture, often visiting the school three times a week and observing the students in a variety of contexts.

My analysis of the construction of opposition in this classroom focused specifically on how opportunities for opposition were *afforded* by certain features of the classroom and *enacted* by classroom participants. "Oppositional events" were identified in videotapes of classroom interaction as instances in which (a) a student was actively or passively positioned by the teacher or by other students or (b) positioned himself or herself as challenging the teacher, norm, or another authoritative structure. *Overt* acts of resistance were operationalized as instances when students repeatedly violated classroom norms or were explicitly positioned as being oppositional. For example, the teacher might admonish a student for actively disobeying his request or for intentionally disrupting a lesson. *Passive* acts of resistance were operationalized as instances when students resisted the flow or meaning of the activity, without being explicitly positioned as such. Students might passively resist the teacher by socializing quietly when he was talking. Instances of opposition were first identified in an analysis of the classroom videotapes, and then specific video clips were shown at two different research meetings for additional confirmation. As will be illustrated quantitatively in a later section, instances of opposition gradually increased over the course of the school year.

Oppositional events were then transcribed and analyzed in terms of how *opportunities* for opposition were constructed by the classroom participants through their discursive and physical moves. Capturing the emergence of these events in moment-to-moment interaction involved exploring how instances of opposition were opened and closed, the type of interaction that preceded and followed them, and the nature of interaction within them. For example, a student might make a bid to open up space of opposition by talking back to the teacher. The teacher may have or may not have chosen to stabilize this space by treating such talk as oppositional.

These oppositional events were then juxtaposed with an analysis of the features of the low-track classroom and the patterns in students' participation in and out of the mathematics classroom. To identify classroom features, content logs were made of the corpus of videotapes, and codes were developed from these logs. Researchers coded several of the videotapes independently to check for consensus. Three classroom episodes were selected as representative time points of the change in classroom interaction over the course of the school year. Classroom interaction within these episodes was coded in 1-minute intervals. First, the nature and implementation of the classroom activities were coded (e.g., management vs. mathematical activity, type of mathematical task, shift to new mathematical task). Second, regularities in the activities of classroom participants were identified. These activities included creating opportunities to reason mathematically or to evaluate mathematical ideas or statements, holding students accountable for reasoning mathematically, teacher explanation, wait time, student explanation, student solution, reprimanding, and acknowledging nonstandard forms of participation and unconventional solutions. The percentage of time classroom participants engaged in coded activities was calculated to document shifts over time. These data are presented in a series of tables in the "Results and Analysis" section. Third, codes from the analysis of classroom activities and participant exchanges were combined to identify key features in the classroom system related to the co-construction of opposition.

A second line of analysis focused on making sense of the cultural practices that students brought to the classrooms. The purpose of this analysis was to investigate the different meanings ascribed to the practices that students enacted in the mathematics classroom and in other contexts. Did these meanings shift across contexts? If so, what did this imply about competent participation in these various contexts? Patterns in students' participation in the mathematics classroom and in other school and social contexts were identified through classroom content logs and shadowing notes. Holland, Lachiotte, Skinner, and Cain's (1998) notion of *positional identity* grounded the analysis, providing a lens on the negotiation of and shifts in meaning of students' participation across contexts. In particular, I examined how (a) students' routine practices were positioned in the classroom and schoolyard, (b) students positioned themselves in the classroom with these practices, and (c) these practices marked affiliation with local social groups and indexed broader cultural communities.

I present the results of the analysis in two sections. The first section comprises four episodes of classroom activity in the low-track classroom, in which one can witness opposition emerge in the moment-to-moment social interaction and over time. The first three video clips are the ones identified in the analysis as representative of the changing classroom culture. The fourth video clip illustrates how one student negotiated resistance and compliance within the span of one 15-minute classroom activity. The second section summarizes the key features of this classroom in quantitative terms by presenting counts of the changes in types of student and teacher behaviors over time and reflects on the different interpretations of students' schoolyard practices in relation to these features.

Results and Analysis

Co-Constructing Opposition

From the time school commenced in August until March of the following year, the low-track classroom increasingly became a place where the teacher and students were engaged in activities that they treated as being at odds with each other. As school was drawing to a close, oppositional activity began to wane, but by that time, a majority of the students had failed the course. Patterns of opposition began with minor infractions, as students were reprimanded for talking out of turn, being distracted (or distracting others), or joking around. Over time, however, students engaged in more deliberate acts of resistance, to the point that they would openly ignore the teacher's directives, talk back to him, and even leave room in the middle of his lecture.

I present three episodes of teacher-student interactions to demonstrate how opposition in the low-track classroom emerged and grew over time. They also illustrate how oppositional events were *co-constructed* by the teacher and his students in their moment-to-moment classroom interaction. While is it generally understood that all activity is jointly constructed by participants in interaction with each other (Erickson, 2004; Gresalfi et al., 2008), this point is often overlooked when focusing on individual students, who appear to be independently motivated, lazy, compliant, or resistant (Horn, 2007).

In the first episode, which took place in October, the students and teacher seemed to be in agreement about the activity at hand. The teacher opened up opportunities for students to engage in reasoning about mathematical patterns in the class discussion, and students took them up. However, there is also evidence that some of the students were not necessarily prepared academically to engage in these opportunities and that those initially opened by the teacher he later narrowed. In the second episode, which took place in December, the teacher continued to try to engage students in a version of a mathematical discussion, but the students had fewer opportunities to articulate and justify their mathematical ideas. A growing number of them were also bolder in their off-task behavior. By the third episode, which took place in February, the interactions between the teacher and students had significantly deteriorated. The teacher provided fewer opportunities for the students to "do mathematics" (Stein, Grover, Henningsen, & Henningsen, 1996), and the ones that students received they actively resisted. As mentioned previously, the final episode is included to illustrate the fluid negotiation opposition and mathematical engagement in classroom interaction. Together, these episodes illustrate how the construction of opposition was fundamentally related to the opportunities for mathematical engagement available to students and whether and how students took them up.

Episode 1: constructing competence. In this first episode, the class functioned relatively smoothly. The teacher and students discussed a homework problem that involved examining a table of numbers that were categorized by certain geometric properties (e.g., squares, rectangulars). The aim of the problem was to identify patterns among the numbers along the rows and columns of the table. As the scene opens, the students are sitting in pairs facing the board, and the teacher is projecting the table with an overhead projector. In the transcript, S# refers to an unnamed student, [ ] signifies nonverbal activity, words underlined were said with extra emphasis, ( ) signifies utterances that are unintelligible, = signifies latching, and [signifies overlapping speech.

Extract 1

1. T:	All right. Shhh. [*Puts fingers to lips.*] Let's talk about the problems now. Shhh. Please have your book open in front of you.
2. S1:	To what page?
3. T:	Shhh. To the problems from last night. Um. I wanna especially look at the chart on SQ-60. So the chart SQ-60 looks something like this. With the square numbers. Double-check your chart. Have your book open now. Darin, have your book open.
4. Darin:	All right.
5. T:	Thank you Tai. Thank you Jackie. Have it out, Ernie, likewise. Have your book out and open, SQ-60. Just scoot over here for now. [*Points to the overhead.*] So, the square numbers go one, four—Jackie, stop please—nine, sixteen, twenty-five. Open your book to SQ-60 please. The rectangulars went two. The triangulars—one, three, ten, sixteen, etcetera. I wanna hear about any of the patterns people saw in this chart. Edd, eyes here please. Book open.
6. Edd:	I left my book at home.
7. T:	That won't help you. You need to bring your book every day.
8. Edd:	Okay.
9. T:	Even if you don't have . . . even if you didn't finish this everyone can look at this chart now and see if they see patterns in this chart. [*Student raises his hand.*] Darin sees one. Hang on Darin. I want everyone look up here now. [*Several students raise their hands.*] Eyes up here. Tracy thinks she sees one. Nadia, please look up. Think of some patterns you see in this chart. Shayla thinks she sees one. Start moving the tables a little more to the center so you're not so far outside. OK, Darin, what's one thing you notice?
10. Darin:	For the square numbers, when you like multiply the numbers by . . . when you multiply a number by itself, that's how you get it.

(continued)

Extract 1 (continued)

11. T:	A number times itself gives you the which numbers?
12. Darin:	Like it
13.T:	[The squares? The rectangulars?
14. Darin:	[The square ones. When you multiply one times one, you get one. When you multiply [*Pauses.*]
15. T:	Two times two?
16. Darin:	You get four.
17. T:	Seven times seven [forty-nine.
18. Darin:	[forty-nine.
19. T:	Ten times ten, one hundred.
20. S2:	Are we supposed to mark that on our worksheet?
21. T:	Yep. If you have it in your homework, that's OK. Tracy, what's another thing you see?
22. Tracy:	Um, for the square and the triangulars, at the bottom, one plus three equals four, and three plus six equals nine, and then six plus ten equals sixteen
23. T:	Wait. Slow down. Say that one more time.
24. Tracy:	Triangulars, one plus three at the bottom equals four up at the squares. And then three plus six equals nine.
25. T:	So these two together add up to nine.
26. Tracy:	And then six plus ten equals sixteen. And then
27. T:	Does that work all the way? Ten plus fifteen is twenty-five
28. S2:	Yep
29. T:	Fifteen plus twenty-one makes thirty-six. Good. Yep. I hadn't seen that one.

Analysis of Episode 1. In the interaction that unfolded in this episode, the students' responses to the teacher's request to "hear about any of the patterns people saw in this chart" (line 5) is to offer up their ideas about the relations between the numbers in the table. Another way of describing this is that the teacher's utterance *opens up a space* for students to describe the patterns they found, and the students' responses indicate that they *interpret this space* in the same way. Whether the students actually identified patterns beforehand, they position themselves as capable of responding appropriately to the teacher's prompts for descriptions about what they notice (lines 10 and 22). The teacher acknowledged this as well and in turn pressed them to explain their ideas clearly and to justify the pattern for other entries in the table (lines 11 and 27). In this way, the students are being positioned by the teacher as competent both with respect to the mathematical task and the type of participation that "counts" in this class. This episode can be characterized as a case in which students and the teacher are in alignment in their communication around and understanding of the task at hand.

The episode occurred early in the school year, when the norms for classroom interaction were settling in. There are several features of this interaction that are interesting to note in this regard. First, in the initial nine turns, the teacher does a significant amount of "classroom management," quieting down the class and reminding students numerous times to open their books (lines 1–9). Since the table of numbers is projected on the screen already, having a book open is not essential for this task. Thus, an alternative interpretation of this series of exchanges is that the teacher's version of preparing to participate in a mathematics discussion involves opening one's book and waiting quietly for the instruction to start, as is typical in many classrooms.

It is also interesting to note that it only took a few turns of interaction for the students to become involved in the participation structure that the teacher was attempting to evoke. However, even when the students did shift into this structure, only a few of them responded to his request to identify patterns in the table. One of the ways the teacher attempted to reinforce this participation structure was by naming the students who were aligned with it (lines 5 and 9). Another was to wait until the majority of the class was looking up front before allowing any students to respond (line 9). All told, the teacher did a significant amount to prepare his students to do mathematics.

Another feature to note in this interaction is the nature of the teacher-student exchanges around the mathematics. While the teacher explicitly positioned the students who contributed to the discussion as having produced an important mathematical idea for the class, he was the one who checked the accuracy of their ideas (lines 21 and 29). For example, when Darin pointed out a pattern in the squares—that they equal a number times itself—the teacher verbally checked the mathematical calculations (lines 17 and 19). Similarly, while the teacher credited Tracy for having contributed an idea that was new even to him—that adding two of the triangulars produced the subsequent square—he legitimized her pattern by testing it with the ensuing entries (lines 25, 27, and 29). Thus, while the teacher provided opportunities for the students to produce mathematical ideas, he decided whether they counted. An alternative way to interpret his behavior is that he was modeling the practice of validating each entry to his students.

While there are a number of features of this interaction that can pointed out, attending to nature of the participation structure for the classroom mathematical activity—that the teacher established *how* students could participate in mathematical activity, and *whether or not* their participation mattered—provides important clues about the culture of opposition that developed.

Episode 2: repeated infractions. This second episode took place in early December. The students again sit in pairs facing the front of the room. Throughout the class period, a majority of the students are sitting quietly during the teacher's lecture and talking with their partners during group work. There is also evidence that a few of the students are following the line of mathematical inquiry and responding to the teacher's prompts to provide answers. However, when they start to work in pairs, a number of students "zone out," have their heads down, or are being excessively noisy.

The class is beginning a unit on multiplying algebraic expressions using algebra tiles. Algebra tiles are manipulatives used to represent algebraic expressions geometrically and to help students visualize what they are doing when they perform polynomial operations. For the first 20 minutes of the class, the teacher reviews examples from the book at the overhead projector and asks the students to take notes. Students have a few opportunities to calculate areas represented by the tiles.

In this excerpt, the teacher represents one of the expressions from the book on the overhead and has the students do the rest on their own.

Extract 2

1. T:	Look at KF-54 now. Turn the page. For KF-54, if you want to build it, you can build it, but you don't have to. It says use what you learned in the previous problem to multiply the following expressions. So, it says, "2x times 5x."
2. Darin:	10x.
3. T:	[*Ignores.*] Let's see. So, 2x=
4. Darin:	=2x
5. T:	I'm going to make a rectangle that's 2x. So, x and x. And 5x. X, x, x, x and x.
6. Shayla:	Do we have to show ( )?
7. T:	You don't have to draw this yet. You will be drawing some later on. One. Two. Three. I'm gonna draw it. It helps me. Four. Five. Now you gotta fill this all in. It's 2x this way. It's one, that's x, x, x, x . . . that's 5x. If fill this all in, it would be a big square. These x-squared's. What do I have?
8. S4:	10x
9. T:	10 . . . ?
10. S4:	10x-squared.
11. T:	10x-squared. That's right. Try b, c and d now. We'll talk about them. Try b, c and d. [*Starts to walk around to groups. Stops to work with group on his left. In the middle of the conversation, strides over to group on the right.*]
12. T:	<u>Gentlemen</u>, enough. <u>Enough</u>. I'm not saying who's doing what. I'm saying enough.
13. Hamadi:	( )
14. T:	Come on, you're falling behind now. [*A student begins to stroll around the desks. The teacher checks in with Matt to see if he gets it. Matt describes his procedure, and arrives at the solution of 10x. The teacher hints that he's missing something, and Matt revises his answer to 10x-squared. The teacher walks over to a pair of girls.*]
15. T:	Do you guys get it or no?
16. Erica:	I don't get it.
17. T:	So, 2x. It would be x, and another x down, right, and 5x. Draw a line across and make a rectangle out of it, right? So, fill it in now. Make a rectangle out of it. So, here's x and a line, x and a line, so here's 2x across. That's x. That's another x. Draw a line across. [*Hamadi laughs loudly in the background.*]
18. T:	[*The teacher leaves the girls and walks over to Hamadi's desk.*] Now it's making it so I can't help the person over there. If you want to do nothing, put your head down, but you distract me from=
19. Hamadi:	=I'm <u>doing</u> these things, though.
20. T:	I'm not asking anything, now. I'm not asking what you're doing. This is where I've seen you've been. [*Points to his work.*] OK. Get to work. [*The teacher goes over to work with the other students. During this time, Mark gets up from his seat across the room and walks over to socialize with Hamadi and Sam. Hamadi gets out of his seat as well. The teacher turns around and Hamadi quickly turns and sits down. Mark makes it back to his seat just as the teacher reaches the front of the room.*]

Analysis of Episode 2. For the first 11 lines of this excerpt, the teacher is explaining how to arrange the algebra tiles to represent and multiply the expression $(2x)(5x)$ (lines 1–11). Early on, a student interrupts him with a conjecture about the product, but the teacher does not take this up (lines 2 and 3). Instead, he describes how you "gotta fill this all in" (line 7), narrowing the task at hand to adding appropriately shaped tiles to completely cover a rectangular area. Another student makes a bid to participate by asking if they need to copy down what he's doing, but he says that they will do this later. The students' role, then, is to sit quietly and listen.

Upon completing the example, students are given an opportunity to use the tiles to complete three more on their own. The teacher starts to work with a pair of students but notices that another pair is obviously off task. He quickly goes to their desk and tells them to stop. They protest, but he positions them as falling behind the rest of the students (lines 12–14). He moves on to work with other students but is shortly drawn back to the pair when their voices carry out to him (and me) across the room. This time, he tells them that they are prohibiting him from helping other students. When they start to make excuses, he tells them that they can completely opt out of the work (line 18). One way to interpret this remark is that he is communicating to them that it would be better for everyone involved if they were not in the class at this point. Hamadi contests this by positioning himself as being productive (line 19). However, the teacher can see little evidence of this on his paper (line 20). He tells him to get to work, inviting him to participate productively. The teacher leaves again, and Hamadi immediately gets out of his seat to visit Mark, a student near him. As the teacher turns around, both quickly move back. The boys clearly understood that they were violating a classroom norm and chose not to do this in front of the teacher.

This episode illustrates what began to happen to the interactions between the teacher and students during group work. Instead of focusing on the task, and talking to each other about their thinking around it, a small number of students began to socialize or seek other distractions. This made the teacher's work particularly challenging. Hamadi's and Sam's repeated infractions suggest that they are willing to take the risk of getting in trouble with the teacher. However, when caught, they openly protest the teacher's portrayal of them as distracted and a distraction to others. It is also important to point out that this is the first (and only) response that the teacher makes. While he does not assign blame to Hamadi and Sam for certain misdeeds (line 12), he does little to reinsert them back into mathematical activity, for example, by asking them questions about the task. It may be useful to note that while Sam could be described as academically unmotivated, Hamadi was fairly academically inclined.

The nature of the opportunities for mathematical engagement has shifted as well. The teacher provides fewer opportunities for students to participate in the class discussion and focuses on eliciting solutions, instead of the students' mathematical reasoning (lines 5, 7, 9, and 17). For example, when Erica expresses confusion over the task (line 16), he explains step by step what she should do, instead of asking her what about the problem is confusing to her (line 17). Interestingly, when he goes back to work with her at a later time, she has filled in the rectangle with tiles, but she does not seem to grasp the idea that this represents an area. Unlike the kind of reasoning depicted in Episode 1, this except suggests that the focus has shifted to following mathematical procedures, and the teacher leads by example.

One possible explanation for this shift is that as the teacher found it increasingly difficult to manage the students, his attempts to control their disruptive behavior narrowed the space for them to engage in mathematical reasoning. (It is not uncommon for teachers to attempt to assert *more* control when they feel themselves losing control.) From the students' perspective, they were not being held accountable for doing much, if any, math and often got away with socializing.

Episode 3: students bid for opposition. As the year progressed, the students engaged in behavior that both the teacher and students positioned as off task and disruptive. Students were less willing to abide by the teacher's requests or to accept his admonishments. While opposition among the students was often initiated by a group of boys who were less academically inclined, it soon spread to many of the other students as well.

At the same time, the opportunities for students to engage in mathematical reasoning deteriorated. Students were offered fewer opportunities to identify patterns in the mathematics, make conjectures about them, and develop solutions to problems, and those that were offered were often narrowed in the course of classroom interaction. One explanation for this shift is that the teacher was not able to achieve the pacing he had planned through the textbook, and as a result, struggled to get through the material, while maintaining classroom order.

In this third episode, which took place in February, the class was working on a mathematical task called the Frobenius postage stamp problem, which they had begun to work on the day before. The postage stamp problem involves deducing patterns created by summing different amounts of postage with a given set of integers (in this case four- and seven-cent stamps) and supports standards in mathematics reform about pattern finding and number sense development (National Council of Teachers of Mathematics, 2000). As this scene opened, the teacher had written the numbers 1 through 30 on the board in a two-column list and filled in "possible" or "impossible" next to some. This indicates which values are possible to make with these stamps and which are not. The aim of filling out such a list is to be able to induce the "critical point," or the positive integer such that from this amount onward, one can use some combination of stamps to affix the proper postage (integer) to a letter.

Extract 3

1. T:	So all eyes look here please for a second. Thank you. If all you have are four-cent and seven-cent stamps. I think these ones are possible, and these ones are impossible. There's, and I, I think it's impossible. With four's and seven's. Jackie, take a look now=
2. Jackie:	=I'm lookin'
3. T:	I don't think there's anyway for to get two cents, two cents worth of postage.
4. Jackie:	Ain't nothin' funny. [*Speaks to team mate.*] You ( ) [*Talks over teacher.*]
5. T:	Shh. Don't make noise.
6. Jackie:	Dang, I'm not makin' noise!
7. T:	Parker. Parker. I don't think there's any way to get three cents. Thank you to the people who are paying attention now. Nadia and Desiree [*Strides over to girls and takes a piece of paper from them. Puts it in his pocket.*]
8. Nadia:	That's not even ours.
9. T:	I know. I know. Shss. 5 cents, no way. Sam. Six cents, no way to get it. But for seven cents, yeah, you can get it, with a seven-cent stamp. Mark W.
10. Mark:	What?
11. T:	Eight cents. You can get it with two four-cent stamps. So this shows the ones that are possible with four and seven cents. Parker can you come sit here now, please?
<Break in the transcript. Begins approximately three minutes later.>	
12. T:	There are too many people that are . . . Sebastian look. There are too many people that are not paying attention now. If I thought you could do this totally on your own, I'd say, "Get to it." But what I'm going to ask you to do is complicated. You will be able to do it, if you pay attention now. [*Student assistant walks up to the board and points to one of the entries, which the teacher then erases.*]
13. T:	Thank you. There's a mistake here. Thank you.
14. Shante:	I told him that.
15. T:	Seven cents and seven cents do make fourteen. So I did this pretty fast, and I made a mistake, which is possible to do. When you're working in your groups, hopefully you'll catch your mistakes. Thank you. I think eleven is possible. Twelve is possible. Thirteen, I couldn't see a way to make it. Check these now. [*Points to the list.*] See if they make sense. Twenty-one. Seven and seven and seven. Twenty. Four and four and four and four and four. Five fours make twenty. Turk. I think nineteen you can get. Eighteen you can get.
16. Frank:	Sixteen.
17. T:	Sixteen. Thank you. Thank you Frank.

Analysis of Episode 3. The interaction between the students and teacher during this class discussion is markedly different from the first and second episodes. In this case, the teacher reprimanded the students throughout the entire session (lines 1, 5, 7, 9, 11, and 12), to which the students reacted with explicit protest and defiance (lines 2, 6, 8, and 10). Another way to interpret this pattern is that the students were actively resisting opportunities to participate in this activity, which made it difficult for the teacher to get them to attend to the mathematics he was doing at the board. To make sense of how these two interpretations might be related to each other, it is necessary to look more deeply at the interaction.

One place to start is the nature of the mathematical task as it is implemented in this activity. This is a rather rich mathematical task that affords opportunities for students to notice the pattern of multiples, to determine if numbers can be broken down into multiples of four and seven, and to realize that after a certain point, all numbers are possible to construct with multiples of these two numbers. Students can begin to fill in the table quickly once they realize that they can recursively add the value of a new stamp to determine which values are possible (e.g., if you know that 4 plus 4 equals 8, then values of 12, 16, 20, 24, and 28 are also possible). The notion of multiples is a key pattern to notice in order to understand how to predict a critical point. However, in this excerpt the teacher primarily focused on the strategy of recursively checking each value through repeated addition (e.g., adding 4 plus 4 to get 8, noticing that one cannot make 9). This strategy made it difficult for students to discern the efficiency of using multiples, which is part of the beauty of the mathematics in this problem.

It is also useful to analyze the students' opportunities to engage in the mathematical discussion. There is evidence in this transcript and in the corpus of data that students in this class were reasonably competent at addition and thus could have been working on the task of figuring out multiples. However, in this episode, students had little opportunity to do anything mathematically, apart from watch the teacher perform calculations at the board (lines 11 and 15). For example, the teacher calculated each value until a student, Frank, found an opening to interject that 16 is possible (line 17). Hence, students had little opportunity to engage in even low-level cognitive work.

In contrast, they had ample opportunity to foster and engage spaces for opposition. For example, in the first line of the episode, Frank raps loudly on the desk with his pencil (line 1). Frank was a high-status student, who was friends with the most popular eighth grade students on campus. He also had significant social influence on students in this class. While watching this scene unfold, I concluded that by rapping in the midst of the teacher's talk, Frank was *intentionally* positioning himself as violating a norm that the teacher enforced against rapping and drumming in the class. The teacher did not take up this opportunity to position Frank as oppositional, but Frank's act seemed to stimulate resistance among the other students. Frank's act of opposition can be conceived of as a successful bid to organize opposition. Another student reinforced the construction of opposition by arguing that she was paying attention when she obviously was not (line 2). It is possible that this student could have been concurrently tracking both her conversation with her peer and the mathematical work, but that was not my interpretation.

As this episode unfolded, an increasing number of students participated in ways that constructed opposition. While it is difficult to capture the complex nature of the growth in opposition as it manifest in the classroom social interactions, key discourse exchanges provide a window on it. For example, Nadia and her friend constructed opposition when they chose to openly resist the teacher's indictment of them in unproductive activity by denying ownership of a note (line 8). Nadia was one of the shyest students in class. Similarly, Mark's response to being called out for not paying attention may appear minor (line 10) but in the context of the interaction can be interpreted as an indirect challenge to the teacher's authority. In contrast to Frank, who was one of the group of boys who often rejected school, Mark was a particularly strong student, who won an award for being one of the highest achieving African American students in the eighth grade. Even Parker, who never challenged the teacher, was drawn into opposition when the teacher asked him to change seats after ignoring his first warning (lines 7 and 11). In fact, one could argue that the *entire class* was positioned as oppositional when the teacher stated that a majority of the students were not paying attention (this after he repeatedly attempted to gain control of the interaction) (line 12). Since the teacher positioned the class in this way, and since many of the students appeared to be somewhat coordinated in their oppositional responses, it can be argued that they were *co-constructing* opposition.

There are several strategies that the teacher could have employed in this situation to attempt to reverse or even avert the students' decision to resist complying with the dominant participation structure (or task engagement). Throughout the transcript, as he did in general, the teacher attempts to be respectful to the students, which could have been the reason he chose to ignore Frank's rapping. However, the students did not appear to be responsive to this approach. Another tack would have been to direct students' attention in a different, more productive direction. Since the students had ostensibly done this activity for their homework, he could have asked them to share what they had found (e.g., have them come up to the board, propose labels for some of the numbers on the list, and explain their rationale for these labels). This move would have opened up a space for the students to actively engage in mathematical reasoning and to possibly position themselves as competent *around the mathematics*, instead of their social interactions. The teacher's motivation to move quickly through this task may have been to get to the "meat" of the mathematics: that of predicting critical point. This interpretation supported by the following statements: "If I thought you could do this totally on your own, I'd say 'Get to it.' But what I'm going to ask you to do is complicated. You will be able to [discover the procedure for finding the critical point], if you pay attention now" (line 13). However, in this series of utterances, the teacher not only positioned the students as incapable of helping him quickly fill in the list but also suggested that by paying attention to him they will be able to make sense of an undetermined task, which is somehow related to this table. In other words, they are to trust him that the task may *eventually* make sense.

It is important to note that only in the last line of this excerpt did the students have an opportunity to be positioned as competent for doing mathematics. The majority of the opportunities that the teacher opened up were ones that positioned students as off task. By creating these opportunities, instead of ones for mathematical reasoning, students had little opportunity to gain status in the classroom activity. Instead, as evidenced in this transcript, the students created their own opportunities for competence by organizing an alternative activity with their peers, one centered on openly resisting the teacher.

In my conversations with the teacher, he lamented the fact that his attempts to control the class conversely left him with less control and garnered greater resistance among the students. He observed that the strategy of continual reprimands and threats was counterproductive to motivating students to take part in mathematics. It is not surprising that resistance was met with resistance. These episodes also illustrate that the teacher's decision to break down powerful mathematics into bite-sized procedural pieces served to divorce the mathematics from its underlying conceptual system, thus limiting students' opportunity to make sense of it.

The moves this teacher makes around students' disruptive activity and limited attention to the mathematics are not unusual and obviously do not constitute the sole criterion for opposition to emerge. It is also the case that a particular group of boys, who met McFarland's characteristics of being more socially than academically oriented, were instrumental in inciting the culture of opposition that emerged.

Episode 4: revisiting Frank. In this final episode, which took place in mid-May, one can clearly witness the dance between structure and agency, as opportunities for resistance and engagement are initiated, embodied, and rejected by Frank, one of the students from this group. This excerpt also documents the transformation of what I described earlier as a polarized participation structure into an oppositional one.

At this point in the school year, the teacher and students appeared to have reached an agreement that certain students (this group of boys) will not do math, most of the time. Analysis of the trajectories of participation over the entire class period shows that out of a class of 24 students, 5 were overtly and openly oppositional to the teacher, 2 were tacitly so, 6 were reprimanded for repeatedly disobeying the teacher and were often off task, and the rest were generally engaged in the mathematics at hand. Thus, over half of the students were often disruptive in the class and were not learning mathematics most of the time.

The boys in the openly oppositional group did not appear to be significantly different from their peers in terms of their capacity to understand mathematics. They were often left to their own devices to socialize and wander the class, while the teacher directed his attention to the others. In reviewing their exams and working with them on a consistent basis throughout the year, I observed that like other students in the class, they rarely turned in their work and received poor grades because of this. However, they were often able to grasp mathematical concepts quickly, compared to some of their peers. Thus, in this classroom, it did not appear to be the case that lack of mathematical ability predicted oppositional behavior. This finding would be interesting to pursue in future research.

Against this backdrop, the fourth episode characterizes how Frank, who was reasonably good at math, could deftly alternate between productive and oppositional participation. I include this transcript to further illustrate how spaces for engagement and resistance are *actively* co-constructed in classroom moments. Instead of presenting the full transcript, I summarize various parts and insert a series of exchanges that best illustrate this process.

The aim of the task given to the students that day was to produce conjectures about scale factors, by scaling two-dimensional objects and predicting the new ratios of side lengths, perimeter, and area. During the first 10 minutes of class, the teacher reviewed the previous day's work at the board and gave the students a problem to do on their own. During the review, Frank and his table partner, Sam, played with a piece of paper and chatted with each other. Frank was reprimanded several times for misbehaving. The teacher then asked students to find the ratios for a four-by-three rectangle that is enlarged by a factor of five. He handed out a sheet of pink paper and then told the students exactly how to copy down the task. Frank scrawled something in a red marker across the sheet. He then turned his attention back to the teacher, wrote something on the paper in pencil, and began to calculate one of the new sides aloud, until another student came over to his desk. As the teacher walked over to him, Frank was twirling his hat:

Extract 4

1. T:	So, I'm gonna have to take this red pen away from you. [*Points at the paper. Is visibly upset.*]
2. Frank:	No you can't=
3. T:	=Oh, yes I can. [*Speaks calmly and shakes his head.*] So, don't make me take that red pen away from you. Do this work. [*Points to the paper.*] [*Sam laughs in a mechanical, forced way.*]
5. T:	Fill in these numbers. [*Looks at Sam and walks away.*] Fill in those numbers.
6. Frank:	( )
7. T:	I've said what I'm going to say. [*Shakes his head and fiddles with Frank's paper.*] You can believe it or not, Frank. [*Walks away.*]
8. Frank:	<u>Sam</u> doesn't believe it. [*Calls out to him.*]
9. Sam:	No, I don't.

After this exchange, Sam and Frank began to tease each other loudly and generally ignored their work. They called the paraprofessional over to ask her what to do, but when she tried to get them to work on the task, Frank protested that he didn't know anything. She persisted in showing them how to do the activity and remained bent over the side of their desk for nearly 8 minutes, during which time Frank finally started to engage the task. A few minutes later, Frank called the teacher over to check his work. The teacher looked it over and said, "Very good." As he walked away, Frank called after him, which elicits a smile and a comment he believed him. Frank retrieved another pink sheet and continued to work on the problem for another 4 minutes.

Analysis of Episode 4. This brief episode of Frank's participation in the classroom activity illustrates how Frank's opportunities for engagement and opposition are necessarily organized collectively and how a polarized participation structure best describes the set of norms guiding this coordinated activity.

First, Frank moved quite fluidly between mathematical and nonmathematical activity. His participation shifted between them repeatedly during the class period. He appeared most easily drawn into the latter, but did not completely disengage from the former. His first bid for a space of resistance was to draw a thick red line across his paper. (This was not part of the task and made it difficult to see his work on the paper.) Later, the space of opposition is formed by the teacher's response. Interestingly, only seconds after making the mark, Frank is working out mathematical calculations. This shift was made available to him by the teacher's invitation to the class find the dimensions of the newly scaled object. Seconds later again, he is drawn out of productive work, when a student comes over to his desk. He subsequently made a direct bid to move back into mathematical activity by asking the paraprofessional for help. A few minutes later, he was again, highly focused on the task and positioned himself as such by calling the teacher over to examine his work. To sum up the episode, Frank opened, closed, took up, and rejected opportunities to participate in mathematical and oppositional activity in a period of approximately 15 minutes.

The polarized participation structure clearly supports these shifts. Frank's move to make a red mark on his paper did not become an oppositional one until it was jointly positioned as such by him and the teacher. The teacher's threat to take away the red pen marked the organization of a polarized participation structure, in which different forms of participation are clearly distinguished as mathematically productive or unproductive. In this case, the red pen is treated as unproductive (and even detrimental) to engaging in or staying focused on the mathematical task. The evidence suggests otherwise, however, since Frank began to work on the task *after* making the mark on his paper. Frank's response that the teacher cannot take the pen away is a bid to oppose the teacher's authority. This bid is taken up when the teacher rejects Frank's claim. As the back-and-forth continues, the polarized participation structure allows the participants to deepen the opposition.

This series of exchanges contrasts sharply with the interaction between Frank and the paraprofessional. Frank not only invites the assistant over, thereby opening up a space of task engagement, but also reinforces this space (and thus mathematical competence) by looking for further validation of his work from the teacher.

Table 1
Key Features of the Low-Track Mathematics Classroom

Feature	Description
Reliance on didactic instruction	Few opportunities for students to engage in mathematical sense-making; rich tasks often broken down into procedural steps
Polarized participation structure	Norms for participation afforded clear distinctions between "social" and "mathematical" behavior, the former treated as unproductive
Weak participation practices	Low levels of engagement in mathematical practices (class discussions, doing homework, working on tasks in groups); attributions of being "slow" or "lazy" mathematics learners

Taken together, these four episodes illustrate an important relation between the opportunities for students to reason mathematically and competently, the functioning of particular classroom participation structures, and the agency students exercise around opposition. In the next section, I examine this relation systemically, from the perspective of features of the classroom activity system.

Classroom Features

The previous section illustrated how the teacher and students in this low-track mathematics classroom accomplished opposition in their moment-to-moment interaction. They did this by positioning each other as undermining the other's efforts, for example, to carry out a mathematical discussion or to maintain or improve classroom status. The next section identifies features of this low-track classroom that made it exceptionally prone to accomplishing this oppositional culture. These features include (a) mathematics instruction that increasingly relied on didactic approaches to simplifying mathematical activities and procedures, (b) a classroom participation structure that polarized different forms of activity, and (c) a growing number of students who were marginally engaged in mathematics learning and made bids and took up opportunities for passive and overt resistance (see Table 1). It should be noted that while these features functioned synergistically, it is unclear whether they are all required for opposition to take hold. That said, Oakes (1985) and others have reported that didactic teaching and highly authoritarian classroom practices often characterize low-track classrooms in predominantly urban communities. The three features are discussed in greater detail below.

What it meant to do mathematics. As has been illustrated in the classroom excerpts, there was a tendency in this low-track classroom for rich mathematical tasks to be "watered down" through procedural recall and

Table 2
Percentage of Time Teacher Engaged in Given Activity During Whole-Class Discussion

Activity	11/04	12/01	2/12
Provided opportunities for explanation	65	50	35
Accepted a range of participation	42	18	18
Reprimanded	38	36	82
Invited students to participate	4	11	0

leading questions. Enacting the curriculum as intended by its authors required that students engage in high-level reasoning and justification around arithmetic, algebraic, and geometric concepts. However, when it appeared to the teacher that his students were unable or unwilling to engage these concepts, he attempted to slow down the pace and control the classroom by "breaking down" the mathematics. This divorced the mathematics from its underlying conceptual framework (Hiebert et al., 1997), thus making it difficult for students to grasp and solve problems. This breakdown is supported by the fact that the opportunities for students to explain their mathematical thinking decreased by 30% from the first to the third episode (see Table 2).

As the opportunities for students to explain their mathematical thinking and the range of students who took them up gradually decreased, the teacher and one or two other students ended up doing the bulk of the mathematical work.

On the face of it, this finding seems to support McFarland's (2001) contention that open-ended tasks in a student-centered classroom can provoke resistance among students who are less academically inclined. However, as mentioned previously, not all of the students in the low-track classroom who succumbed to the oppositional culture were weak mathematically, and many started out willing to answer the teacher's questions and engage the tasks. Instead, as illustrated in the previous episodes, the students' lack of opportunities to deeply engage the mathematics, coupled with the fact that they were continually positioned as off-task, *organized* opportunities for the teacher and students to co-construct opposition.

What did and did not count as doing mathematics. The teacher framed any talk or activity during the class, apart from clear responses to his questions or discussions of math in the groups, as off task and unproductive. The amount of time he spent reprimanding students during whole-class discussions grew from 38% in Episode 1 (in October) to 82% in Episode 3 (in February). The fact that by February, the teacher felt the need to reprimand his students 82% of the time is quite startling and telling in terms of the amount of time this classroom was in some form of turmoil. The quality of the teacher's reprimands changed as well. Earlier reprimands consisted primarily of constantly shushing students for talking during explanations and instructions.

Later reprimands became more severe, as students blatantly ignored the teacher while he was talking, got up in the middle of lecture and started talking to their friends, or even began to play fight in the aisles. This downward spiral into stronger forms of discipline coupled with increased student disengagement was central to the co-construction of opposition in this classroom.

It is important to note that my interpretations of the students' activities were sometimes different from those of the teacher. Early in the year, as I moved about the room and sat with groups as they worked through problems, I sometimes heard mathematics in students' seemingly offhand remarks. I also observed students calling out answers using overlapping and animated speech, which the teacher often treated as a classroom disruption. It seemed to me that in trying to maintain control over his classroom, the teacher sometimes missed important clues about the varied ways that students were engaging in mathematics. I argue that this is one of the limitations of a polarized participation structure, which on one hand makes clear distinctions between what is unacceptable and acceptable behavior but, on the other, may obscure the meaning-making practices that students from nondominant backgrounds bring to the mathematics classroom.

Some of the patterns in the students' nonauthorized talk mirrored their informal discourse practices on the playground. Unlike Delpit's (2002) account of her daughter's ability to code-switch between informal and academic discourse practices at appropriate times, students in this classroom appeared to engage in the informal discourse practices rather indiscriminately. For example, they might make sarcastic and ironic comments, overlap in speech, use grand gestures as if on stage, and shift rapidly between social and mathematical talk during whole-class discussions. I call this type of informal discourse practice *performance talk*, in the same sense that Lee (1995) described the practice of *signifying* in her study of alternative English classes in an urban high school. Unlike Lee's finding that teachers leveraged signifying to recruit students' participation in and understanding of literary practices, this teacher's attempts to constrain what he perceived to be informal and inappropriate communication meant that performance talk was invariably positioned as off task. In an important twist, positioning of *performance talk* in this way became a means for students to bid for spaces of opposition. As a result, student engagement in these discourses practices became more strategic over the course of the school year (e.g., Episode 3), as students attempted to position themselves as competent members of the growing oppositional culture.

What it meant to be a student. The fact the low-track classroom gravitated toward didactic instruction and polarized students' participation does not entirely explain how and why it became an oppositional environment. These features are not atypical of many mathematics classrooms, and yet opposition does not always get constructed within them. It is important to examine additional features that may have contributed to the construction of opposition and the deterioration of meaningful mathematical activity. The

Table 3
Percentage of Time Students Engaged in Given Activity During Whole-Class Discussion

Activity	11/04	12/01	2/12
Talk quietly (<3 students)	19	29	35
Talk quietly (>3)	4	4	12
Talk loudly (<3)	0	0	12
Talk loudly (>3)	0	0	0
Actively disobey (<3)	8	25 (head down)	60
Actively disobey (>3)	0	0	18

Note. The category of actively disobeying the teacher in whole-class discussion includes activities such as putting one's head down, turning away from board, or getting up from one's seat to socialize.

Table 4
Percentage of Time Students Engaged in Given Activity During Group Work

Activity	11/04	12/01	2/12
Talk loudly (<3 students)	11	69	6
Talk loudly (>3)	11	8	82
Actively disobey (<3)	0	61 (head down)	29
Actively disobey (>3)	0	8	36

Note. The category of actively disobeying the teacher during group work includes activities such as putting one's head down, turning away from the group, or getting up from one's seat to socialize.

analysis revealed that a third feature of this classroom was the dramatic shift in the patterns in students' participation.

These shifts took places along several dimensions (see Tables 3 and 4). First, active resistance among the students increased over time. To provide greater clarity on this process, changes in student participation is broken out into whole class discussions and group work. The activities that comprised resistance during the whole class discussions included engaging in nonmathematical talk and actively disobeying the teacher (e.g., turning away from the board for an extended period of time or talking to a neighbor). To illustrate the breadth of student opposition, classroom interaction is also categorized in terms of fewer or greater than three students engaged in a particular activity at any one time. The results indicate that while it was common for three or fewer students to talk quietly 19% of the time during the whole-class discussions early in the year, this figure had risen to 35% by February. Even more striking is the fact that by that time, three or more students loudly interrupted class discussions 12% of the time.

As mentioned previously, a small number of students were easily identified as overtly oppositional by November, which is also supported by the fact that the percentage of time they engaged in intense socializing rose from 8% to 60% by February. However, the evidence also indicates that active resistance had also become more widespread, as this occurred among more than three students 18% of the time.

One of the reasons for analytically separating students' activities in class discussions from group work was that among less oppositional students, resistance first showed up in the groups. The results indicate that when given the opportunity to begin their homework in class, over time, an increasing number of students chose to use the time to socialize. As mentioned previously, socializing in this classroom could include passing notes, yelling across the room to a friend, and getting up and walking over to where the friend was seated. By February, loud, non-task-related talk during group work became a *routine practice* for three or more students 82% of the time, and 36% of the time, they were also actively disobeying the teacher. The students' tendency to be disengaged from mathematical practices during group work was also reflected in the nature of their mathematical work. As reflected in Episode 2, students relied heavily on getting answers from the teacher or from select peers, which the teacher reinforced. When they were stuck, students often waited 5 to 10 minutes to get the help from the teacher, instead of trying to work it out on their own.

The lackadaisical attitude that permeated this low-track classroom was reflected in the troubling perceptions some students held of themselves as mathematics learners. When asked in interviews to compare themselves with students in the higher mathematics track, a majority of the students reported that they (or their classmates) were "slow" and "lazy" with respect to their peers. In terms of academic performance, while official data were not collected on students' final grades, periodic checks of their homework and quiz scores suggested that most were scoring below average. In an offhand comment to me toward the end of the school year, the teacher predicted that the majority of students were going to fail his class. What these patterns indicate is that while the teacher gradually curtailed opportunities for authentic mathematical engagement, the students also took advantage of the ones made available to them less and less.

What it meant to be competent. From the analysis above, one could argue that the presence of opposition in mathematics classrooms is simply a result of poor teaching, coupled with poor learning identities. However, I have argued in the introduction that opposition may also be related to the negotiation of cultural and social practices. Apart from the fact that low-track classrooms tend to be disproportionately composed of groups of students from nondominant backgrounds, this argument does not address the relation between opposition to students' racial and cultural backgrounds. Nor does it account for the increase in frequency and number of students that became involved in oppositional events in this classroom over time. Why is it that opposition became popular?

To understand why bids for opposition increased and escalated among the students, it is important to consider what constituted oppositional activity and who had the authority to decide this. As described above, one of the discourse practices positioned as disruptive with the classroom was a ubiquitous form of discourse popular among students on the playground. Students particularly skilled at this discourse were often popular among their peers. I argue that it is the dual meaning that *performance talk* came to take that made it possible and likely that students would have the opportunity to build status among their peers, while inflaming opposition.

As a practice locally constituted within the culture of this school, this form of discourse did not reside solely among students from particular racial or ethnic backgrounds. However, it resembled aspects of hip hop culture, popular among this local community of students, in the manner of speech and gesture and in turn indexes a historical community made up of politically active African Americans and Puerto Ricans who began a counterculture movement against white privilege (Alim, 2004). Thus, it has ties to particular racial and ethnic communities and indexes these communities in the local contexts in which is it transacted. It is also often inaccurately positioned by society as something belonging to kids that is antithetical to academic engagement (Carter, 2005).

In a sense then, *performance talk* lends itself to situations in which nondominant groups of students feel oppressed and want to assert their power and worth—for example, in a low-track mathematics classroom. In this case, the practice initially leaked into the low-track mathematics classroom as students engaged in classroom activity. Over time, however, as the teacher increasingly marginalized it, students took it up more frequently. I argue that students deliberately enacted *performance talk* to assert their power, to show allegiance to their peers, and to maintain their status in a classroom that, more often than not, diminished it. Further research is needed to better capture the nature of this discourse, its connections to mathematical reasoning, and its links to local and broader cultural communities.

Discussion

Constructing opposition in mathematics classrooms is a multifaceted endeavor—one that involves coordinating activities and meanings at multiple levels and across multiple social and cultural spaces. Analysis of the instances of opposition in one low-track mathematics classroom revealed a set of features acting in concert that made it prone to the development of oppositional activity. The co-construction of opposition is conceptualized as a way of negotiating these features such that individuals eventually engage in activities that are incongruous with each other. In this classroom, the teacher's goal was to create a productive and distraction-free learning environment in which students could focus on the mathematics. The students' goals were less apparent, but they were clearly negotiating ways of participating in the classroom that maintained some semblance of competence. These goals competed with and fed off of each other, as the teacher's need to vet inputs to the learning environment was counteracted by the students' need to maintain status around ambiguous and increasingly rote mathematical activity. Of course, the participants in this classroom did not premeditate the opposition that was constructed. Rather, it emerged over time, as the teacher and students negotiated for their goals and needs to be met by one another.

While research has characterized opposition as a relational and staged phenomenon (D'Amato, 1996; McFarland, 2001, 2004; Stinson, 2006), few studies have analyzed classroom opposition at this grain size to reveal how it is negotiated in classroom moments and draws participants into it. The analysis revealed three features that fostered the co-construction of opposition in this classroom community: (a) diminished access to mathematical sense-making, (b) a polarized participation structure, and (c) the weak mathematical practices and identities of some of the students. The organization of these opportunities became routinized over time, thus fueling a culture of opposition. While sociocultural accounts of learning often presume that becoming a member of a community of practice is a natural phenomenon, my effort in this article has been to complicate this account and to describe and capture tension and conflict that naturally arise in this process.

There are several limitations of this study that suggest the need for further research. One limitation is that I examined only one classroom and one teacher. It may be that this teacher was particularly overwhelmed with differences in knowledge, motivation, and focus that seemed to emerge in this class. This is not to say that these differences were characteristic of the students themselves but that they manifest in this particular classroom environment. The teacher and students in this class also constituted a particular demographic makeup. A different group of students might have prompted a very different reaction from the teacher, and vice versa. With respect to the mathematics, the curriculum that was used presented one approach to conceptually driven mathematics. A different text might have provided different avenues and supports for students' mathematical engagement. Additionally, while common, it is not always the case that mathematical reasoning is undermined in low-track mathematics classrooms (Chazan, 2000; Gutstein, 2005), nor is it the case that didactic instruction and the inhibition of students' informal discourse leads to open rebellion. Finally, in reporting on the classroom structures, I include only four episodes of classroom interaction and by doing so offer a restricted view of nature of this class over the course of the year. As a result of these limitations, I argue that it is important to investigate the co-construction of opposition across a variety of classrooms and teachers. For example, it would be interesting to analyze the emergence of opposition in a classroom within a mathematics department that has been detracked or in one in which the teacher draws explicitly on students' informal or cultural discourse practices.

That said, this study reinforces the idea that by labeling forms of behavior in ways that participants may find problematic, the polarized participation structure by its very nature creates more structures and meanings to oppose. This is in contrast to the flexible participation structure, in which distinctions in participation are less pronounced and often negotiated by participants, that thus support the development of hybridized or third spaces (Gutiérrez, Baquedano-López, Alvarez, et al., 1999; Gutiérrez et al., 1995; Moje, Ciechanowski, Ellis, Carrillo, & Collazo, 2004). I contend that organization of a flexible participation structure might have significantly the narrowed the opportunity for opposition to take root. For example, in Episode 4, Frank's move to draw a red mark across the worksheet could have been positioned as his way of *getting to the mathematics*, instead of moving him further away from it. The teacher could have jokingly asked what the mark represented mathematically, or simply ignored it and challenged Frank to make sense of the mathematics. Instead, his chose to *oppose* Frank's participation (by threatening to take away the pen) and thus moved Frank further away from mathematical engagement. More research is needed on how mathematics teachers can facilitate respectful and productive participation in their classrooms while concurrently providing opportunities for students to negotiate ways of participating that are meaningful to who they are and want to become (Cobb & Hodge, 2002; Nasir & Hand, 2008).

What is compelling about the features identified in this study is that they are related to the system of competence in the classroom, or what counted as productive mathematical participation. For students in this class who brought weak mathematical practices yet elevated social status, the authorized system of competence may have been unacceptable. Given broader social and structural inequities in mathematics education today, why should it be? Tracked into opportunities to learn mathematics that negated their intellectual capacity and inhibited college entrance, I view the students' organization of an alternative system of competence as a logical (albeit very detrimental) move against a system that marginalized them and their chances for success. From the teacher's perspective, however, the students' decline into unproductive behavior perpetuated their academic failure, thus reproducing social and racial inequities. In one sense, then, the teacher's desire to ensure his students' success by maintaining strict control over their behavior meant that he *began to resist them*. Sadly, these perspectives played off of each other to deepen the culture of opposition.

What this study suggests is that we need to look more closely at how the particular moves of classroom participants (both teachers and students) organize a frame of reference that entails resistance. Diamondstone (2002) supported this alternative notion of opposition as a meaning-making activity linked to classroom hybridity and structures of power that give rise to points of tension in today's diverse classrooms (Cobb & Hodge, 2002; Engeström, 1987; Gutiérrez, Baquedano-López, Alvarez, et al., 1999; Wenger, 1998). It may be important for teachers to recognize that they have the choice of whether to treat the eruptions resulting from these tensions as acts of meaning or opposition (Diamondstone, 2002; Gutiérrez, Baquedano-López, & Tejada, 1999; Hand, 2003; Nasir, 2004). However, teacher preparation programs rarely prepare teachers to recognize these choices.

Despite the limitations of generalizing from the study of one classroom, this article offers a principle for the design of learning environments that may offset the downward spiral into opposition. In mathematics classrooms, classroom hybridity is manifest both in the way that *mathematical activity is organized* and also in the way that *participants get organized to do mathematics*. With respect to the former, research shows that it is important to provide all students with opportunities to engage in making sense of the mathematics and to be recognized as authoring and justifying mathematical ideas that hold sway within the classroom community (Boaler & Staples, 2008; Cobb & Hodge, 2002; Gresalfi & Cobb, 2006).

The latter suggests, however, that for students to *feel invited* to participate in mathematical inquiry, it is equally important to consider what it takes for students to be engaged in the mathematics. In our current system of mathematics education, this necessarily implicates issues of identity, community, power, and privilege (Apple, 1995; Diversity in Mathematics Education Center for Learning and Teaching, 2007; Martin, 2007; Moses & Cobb, 2001). One strategy advocated by researchers is to develop stronger connections to and awareness of students' cultural backgrounds by living in their neighborhoods or by visiting their families, communities, and other contexts of their daily lives (Foote, 2006; Gonzalez, Moll, & Amanti, 2005; Ladson-Billings, 1994, 1995; Murrell, 2001). One drawback to this approach is that it may require either a substantial life change (moving) or a significant amount of time (visiting) on the part of a teacher. A second approach that is related to the first is to become familiar with the repertoires of practices (Gutiérrez & Rogoff, 2003) or funds of knowledge (Moje et al., 2004; Moll, Amanti, Neff, & Gonzalez, 1992) that students bring from various contexts in support of their mathematics learning (Brenner, 1998; Rogoff, 2003; Taylor, 2009). One limitation of this approach is that it may be difficult to extract mathematical concepts from these practices and funds beyond those taught in elementary and early middle school. A third strategy is to use a curricular framework that motivates students' sense of fairness and justice with respect to local and broader communities (Cochran-Smith, 2005; Gutstein, 2005). One example of this is to engage students in social problems and situations that can be explored using mathematical tools (Bartell, 2006; Frankenstein, 1990; Gutstein, 2003, 2005). More research is needed on the conceptual underpinnings of teaching for social justice and the implementation of these tasks in concert with a demanding mathematics reform curriculum.

What all of these strategies have in common is a potential *blurring* of the lines between what constitutes cultural versus domain activity (Nasir, Hand, & Taylor, 2008). For teachers to acknowledge what their students bring from the communities in which they live, to "notice the mathematics" in students' informal discourse practices, or to embed students' sociopolitical realities in mathematics is to challenge dominant "cultural models" (Chazan, 2000) about the relation of mathematics learning to culture and power. These models guide assumptions about the different forms mathematics learning can take. They also imply what is required to invite students from various social, cultural, and racial backgrounds to hold an identity as mathematics learners. Theoretically, the results of this study also suggest that researchers need to attend more closely to the overarching participation structures that guide classroom activity. By attending to these broader structures, we can begin to document how successful teachers negotiate what does and does not count as productive mathematical activity with their students.

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