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Black Girls' Perspectives of Instructional Strategies in Urban Middle-School Mathematics Classrooms

ABSTRACT

This study reports Black girls' (n=208) perspectives of instructional strategies in their urban middle-school mathematics classrooms. Black feminist epistemologies and intersectionality framed the data since Black girls suffer from scholarly neglect in mathematics education research. Results showed that Black girls experienced traditional and student-centered instructional strategies in their math classes. The majority of Black girls in the study reported not liking the traditional strategies but liking all but one of the student-centered strategies. Themes that emerged during focus group and interview discussions of why they liked particular instructional strategies were that a strategy helped them learn, built their confidence or increased their interest. Overall, Black girls' experiences and views should inform efforts to increase the instructional opportunities for all students.

OBJECTIVES

Black girls' mathematics learning, development, and participation are invisible in mathematics education research, policy, and practice (Authors, 2016; Gholson, 2016). Their experiences are invisible in part because mathematics education researchers rarely center Black girls in their research and also because the field lacks epistemological resources for making sense of Black girlhood in the context of mathematics (Gholson, 2016). One way of centering Black girls in education research is to place them as subject, rather than object; to elevate their voices. The purpose of this study then was to give Black girls an opportunity to report on various instructional strategies that occurred in their mathematics classrooms, which of these strategies they liked and why. This study asked and answered the following research questions:

1. What instructional strategies do middle school Black girls report occur in their mathematics classrooms?
2. Of the instructional strategies that occur in their mathematics classrooms, which ones do they report liking?
3. What themes emerge from Black girls interviews and focus groups about why they like particular instructional strategies in their mathematics classes?

The current study focused on instructional quality in mathematics classes because these factors are under the teachers' control and have potential to disrupt teachers' deficit views of low-income Black girls attending urban schools. A common narrative is that Black girls' difficulties learning mathematics happen because of personal traits and/or deficits in their families and communities (Authors, 2016; Jackson, Gibbons, & Sharpe, 2017).

THEORETICAL FRAMING

Centering Black girls' perspectives to better understand what instructional strategies they like and why in mathematics classes requires an epistemological frame that seeks to illuminate complexities Black girls face in society and in schools specifically. We use Black feminist epistemologies (BFE) and intersectionality (Collins, 2000; Crenshaw, 1993; hooks, 1989) to frame our focus on Black girls' voices. These frameworks contend that Black girls' perspectives, thinking, and knowledge are legitimate for analyses in understanding their oppression in society, especially educational spaces. Black girls suffer from scholarly neglect in mathematics education research in large part because of the tendency in our field to treat race, gender, and other socially constructed identities as mutually exclusive categories of experiences. Hull et al. (1982) advanced an argument that when we have discourse, for example, about women's issues or minorities generally, *all the women are white and all the Blacks are men*. This is what Crenshaw (1993) calls single-axis analysis. This single-axis analysis is

especially pervasive in mathematics learning and experiences research. Black girls' experiences are multidimensional and the danger of single-axis analyses is that they distort their full humanities, leaving Black girls hidden in plain sight. The literature is clear: broad pedagogical interventions to help all girls, or all Black people in general, are not specifically empowering or changing the conditions and life outcomes for Black girls. Therefore, since it is well-known that mathematics is a white-male, patriarchal dominated context whereby Black girls remain invisible (Authors, 2016), there is a need to situate our results within this broader context. BFE and intersectionality affords transformative, disruptive, and innovative tools for illuminating the intersectional experiences of Black girls.

METHODS

Data Sources

The current study included 208 middle-school Black girls who were from a large urban school district in the South and who were a part of a larger longitudinal study (n = 466) focused on mathematics knowledge development. The Black girls had initially been recruited from 57 pre-kindergarten classes at 20 public schools and 4 Head Start sites in a large urban city in Tennessee, all of which served children who qualified for free or reduced priced lunch (family income less than 1.85 times the U.S. Federal income poverty guideline).

Data Collection

The girls first individually identified which instructional strategies they had experienced in their math class and which of those strategies they liked via card sorts, inspired by q-sort methodology (S. R. Brown, 1996). Each student sorted a stack of pictures that contained both photographs and brief descriptions of eight instructional strategies in math classrooms, two teacher-centered strategies and six student-centered strategies, described in Table 1. Then, the girls discussed why they liked the strategies they had selected. The girls met individually or in small groups of 2-5 students at their schools with a facilitator. Sessions were audiotaped and a note taker recorded students' responses in real time. After the session, the note taker reviewed the audio file and revised and expanded the notes as needed. We extrapolated from the larger study 11 focus groups and 16 interviews that included all Black girls (n = 46). Additional details about how sessions were facilitated will be provided in the presentation.

Data Analysis

We tallied whether students experienced each strategy in math class and whether they liked the strategies they had experienced. The girls' discussions of what they liked about selected instructional strategies were coded through an iterative process. First, two people reviewed the session notes for themes in the discussions and identified a set of potential themes for why they liked particular instructional strategies that emerged across strategies. Then, inter-rater reliability was established, with a team of people independently coding four sessions and then meeting to come to consensus on the presence of each theme in the discussion, creating master codes for the sessions. New coders needed to match at least 80% of the master codes for these lessons before they began coding new sessions. A total of 4 people coded the discussions of middle-school math strategies for common themes. Because many girls used terms like "working in a group," the small-group work without a teacher and small-group project instructional strategies could not be distinguished and were coded as a single instructional strategy. Too few groups discussed why they liked teacher lecture for this strategy to be coded. Finally, a group received a code even if only one student shared that opinion.

RESULTS

As shown in Table 2, Black girls reported experiencing both of the traditional instructional strategies in their math class. Almost all of the Black girls also experienced some student-centered instructional strategies. A large majority of students reported small-group work without a teacher, showing work on the board, small group work with a teacher, and students comparing solutions with peers. Small group projects and games were experienced by about half of the Black girls. Students reported experiencing an average of 4.35 of the 6 student-centered instructional strategies.

A small percentage of Black girls liked traditional instructional strategies and a majority liked all but one of the student-centered instructional strategies (see Table 2). The one exception was that only about half of Black girls liked students comparing solutions.

The girls' discussions during the focus groups or interviews helped illuminate why they liked particular instructional strategies. The three most common themes that students mentioned are described in Table 3 and the percent of groups in which each theme was mentioned is presented in Table 4. The most common reason for liking an instructional strategy was that it helps them learn. Helping them learn was most often mentioned when discussing small group with a teacher and students comparing solutions. For example, one girl said "I feel like teachers can't explain it like other people. We are helping each other." In contrast, games were most often said to improve enjoyment, but helping learning was not mentioned. Building confidence was occasionally mentioned, most often when discussing why they liked showing work on the board and students comparing solutions. For example, one girl said: "like to show people how to do it my way and for people to say mine is the easiest and everyone starts doing it my way. Makes you feel like you're accomplishing something." Additional details will be provided in the presentation.

SIGNFICANCE

The current study contributes to efforts to understand Black girls' mathematics experiences in urban classrooms. Student-centered instructional strategies were often experienced and liked by the girls and were perceived by them as helping them learn, building their confidence and/or increasing their enjoyment. In contrast, they had less positive views towards traditional instructional strategies such as worksheets. Girls were not asked how often the different strategies occurred, but past research suggests that traditional instructional strategies may be more frequently used than student-centered ones (Hiebert et al., 2003). Black girls' positive perspectives on student-centered instructional strategies are in line with evidence that Black girls prefer collective learning and inclusive pedagogies that embrace shared power between the teacher and students and add urgency for efforts to increase the use of student-centered instructional strategies in middle-school math instruction (Authors, 2019).

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Table 1: Eight instructional strategies that were presented with a photograph of the activity (using images found online) and a printed description of the activity on the back of the card.

1. Students are doing worksheets (with picture of students sitting at desks in rows, doing a worksheet)
2. Students are listening to the teacher lecture (with picture of teacher in front of class explaining information projected on the board)
3. Students are working in small groups (with picture of four students at a pod of desks working on a math problem on a white board)
4. Students are comparing different ways to solve a problem (with picture of posters of student work for a problem displayed on the wall. Four students are watching a 5^{th} student explain one of the solutions).
5. Students show their work on the board (with picture of three students writing solutions on the board, each solving a different arithmetic problem).
6. Students are working in a small group with the teacher (with picture of four students sitting at a pod of desks looking at a teacher, who is explaining something).
7. Students are doing projects in small groups (with picture of three students in the foreground working on the floor with index cards and shapes. Other groups are in the background).
8. Students are playing games (with picture of students playing a board game (Settlers of Catan) in small groups).

Table 2

Percent of Black Girls Who Reported Each Instructional Strategy Happens in Their Math Class and Liking Each Instructional Strategy That Happens in Their Math Class

Instructional strategy	Happens	Like
Traditional		
Worksheets	98	31
Teacher lecture	92	29
Student-Centered		
Small group without teacher	94	73
Students show work on board	86	59
Students comparing solutions	80	45
Small group with teacher	74	60
Small group project	56	68
Games	45	77

Note: Only students who reported that an instructional strategy happened were asked whether they liked the strategy.

Table 3

Common Themes in Discussions of Why Students Liked Instructional Strategies

Theme	Description	Sample quote
Helps Learning	Helps you learn (e.g., have a better understanding, shown how to get the right answer).	"I like working in groups because if you don't understand a problem, sometimes another person in your group can explain."
Builds Confidence	Makes you feel good about what you know; shows the class or the teacher what you know.	"Like working it out on the board because I feel like the teacher when I'm working it out, 'cause I'm like explaining it and writing it."
Improves Enjoyment	Improves your enjoyment because it is fun, interesting, not boring, etc.	"Working in groups for me is fun."

Table 4

Percentage of Groups with All Black Girls that Mentioned Each Theme When Discussing Instructional Strategies, with Percentage of the Groups that Discussed Each Strategy in Final Column

Instructional Strategy	Helps learning	Builds confidence	Improves enjoyment	Discussed
Traditional				
Worksheet	38	0	0	30
Student-Centered				
Small group without teacher or small group project	47	6	12	63
Students show work on board	38	15	0	48
Students comparing solutions	67	17	0	22
Small group with teacher	90	0	0	37
Games	0	0	50	37

Note: Percentages in the first three columns are number of groups receiving the code divided by the number of groups that discussed the strategy. Teacher lecture was rarely discussed, so it was not included.