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Normalizing Black Girls' Humanity in Mathematics Classrooms

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In this article, Nicole Joseph, Meseret Hailu, and Jamaal Matthews argue that Black girls' oppression in the United States is largely related to the dehumanization of their personhood, which extends to various institutions, including secondary schools and, especially, mathematics classrooms. They contend that one way to engage in educational equity and social-justice-focused education is to teach Black girls in the classroom in a way that is humanizing. With this idea in mind, they explore relationships between Black girls' humanity and mathematics teaching and learning. Using interviews with ten Black adolescent girls representing varying levels of engagement in mathematics and enrolled in middle and high school math courses, the authors argue that inclusive pedagogies can be used to humanize this marginalized student group.

Keywords: Black girls, math teachers, humanizing pedagogy

The colored girl is not known and hence not believed in; she belongs to a race that is best designated by the term "problem" and she lives beneath the shadow of that problem which envelops and obscures her.

—*Fannie Barrier Williams, "The Colored Girl" (1905)*

'Cause they [White people] always be like, "Oh, you are gonna get pregnant, Black girls always wear a weave, y'all don't have long hair." Like they always giving us a downfall. Like they always pushing negativity toward us more than positive. So you have to like overcome those things, you have to show them like not every Black girl wears weave or not every Black girl is going to be pregnant at sixteen.

—*Zoe, ninth-grade study participant, 2015*

Although 110 years have passed between these two utterances, they both encapsulate the historic and contemporary plight that Black¹ women and girls face in the United States. While much has changed by way of legislation (e.g., *Brown v. Board of Education*), the undergirding hierarchies and systems of social exclusion remain largely the same. Yet, while Black girls have the same right as others to receive a high-quality mathematics education, they still are positioned as “outsiders” to mathematics learning and knowledge production (Gholson & Martin, 2014; Joseph & Alston, 2018). Moreover, a critical understanding about adolescent Black girls’ experiences in secondary mathematics classrooms (and what those reveal about their self-perceptions, beliefs, and attitudes about mathematics) is essentially nonexistent in education scholarship. Through this study we contribute core knowledge about Black girls’ classroom, school, and learning experiences by highlighting the role of critical and inclusive pedagogies (IP), particularly in mathematics classrooms, and how these teacher practices can normalize Black girls’ humanity. Accordingly, we investigate how Black girls in secondary mathematics classrooms describe their experiences with teachers and consider what we can learn from their experiences to better understand how inclusive pedagogies normalize their humanity.

We define Black girls’ humanity as a composite of their personal experiences, backgrounds, histories, languages, intellect, personalities, bodies, and physical and emotional well-being. Echoing Cox (2015), we argue that “the ability to experience a creatively self-defined life is a basic human right—an entitlement” (p. viii). Although they have been subjugated and stripped of the rights and privileges often afforded to others (Crenshaw, 1989; Crenshaw, Ocen, & Nanda, 2015; Harris-Perry, 2011; Kendi, 2017), Black girls are human and therefore have the same inherent rights as others (Evans-Winters & Esposito, 2010). Black girls’ humanity makes them real—alive, political, and complex.

Black Girls’ Humanity in the US—a Right Yet to Be Realized

The subjugation of Black girls is rooted in the devaluation of Black women throughout history (Butler, 2004; Collins, 2000). Their experiences with chattel slavery defined not only the economic hierarchy but also their femininity (Kendi, 2017; King, 2005). During chattel slavery, “because the children of Black women assumed the status of their mother, slaves were bred through Black women’s bodies. The economic significance of this form of exploitation of female slaves should not be underestimated” (Harris, 1993, p. 1719). This physical exploitation characterized Black women as polluted and White women as pure, while also positioning Black women as inferior and lacking intellect (Kendi, 2017; King, 2005). In turn, this age-old devaluation of Black women’s and girls’ humanity has contributed to contemporary narratives that continue to shape and affect their educational, professional, and social out-

comes (Annamma et al., 2016; Crenshaw et al., 2015; Joseph, Viesca, & Bianco, 2016; Morris, 2016; Patton, Crenshaw, Haynes, & Watson, 2016). We situate Black girls' life and educational outcomes within broader social contexts of marginalization faced by Black families and communities. Specifically, we demonstrate how racism (a form of dehumanization), housing segregation, and inequitable schooling are inextricably linked and perpetuate racist ideologies.

Today, housing segregation and school zoning policies are a backdrop for urban Black girls' dehumanization (Evans-Winters & Esposito, 2010; Hannah-Jones, 2016). In US urban public education, a school's quality is related to the neighborhood it serves (Milner & Howard, 2004). In US urban centers, Black people are more likely to live in poorer neighborhoods with lower property values, and their children are more likely to attend underresourced schools (Groeger, Waldman, & Eads, 2018; Logan & Burdick-Will, 2016; US Department of Education, 2015). Because schools' financial resources are linked to their educational quality, housing segregation (and, by extension, de facto school segregation) frequently keeps Black students out of equitable learning environments (Rothstein, 2015).

In underfunded urban public schools, students often lack access to services and structures that support learning, including nutritious food (Sturm, 2008), green space (Ware, 2002), low counselor-to-student ratios (Tsoi-A & Bryant, 2015), advanced mathematics courses (Office of Civil Rights, 2018), substantial budgets for parent-teacher associations (Clark, 2015), and safety from violence (Voight, Hanson, O'Malley, & Adekanye, 2015). Most importantly, Black students in urban schools have limited access to high-quality teachers. Decades of K–12 education scholarship shows that teachers have the single most important impact on students' experience and academic performance (Achinstein & Ogawa, 2011; Carroll Massey, Vaughn Scott, & Dornbusch, 1975; Lankford, Loeb, & Wyckoff, 2002; Weiner, 1993; Winfield, 1986). Nonetheless, Black students are often taught by teachers with little experience (Clotfelter, Ladd, & Vigdor, 2010), limited professional development (Ladson-Billings, 2000), and minimal awareness of critical, reflexive pedagogy (Matias & Zembylas, 2014).

Moreover, schools, as institutions, enact racist and dehumanizing policies and practices (Patton et al., 2016). For example, nationally, Black girls are six times more likely to be suspended than White girls (Crenshaw et al., 2015); Black girls make up just 8 percent of the student population in K–12 schools but 13 percent of the suspended students (Epstein, Blake, & González, 2017). And when Black girls employ strategies for coping with this inequitable disciplinary practice—such as speaking loudly or firmly to teachers who harass them—they often get punished even more severely (Annamma et al., 2016; Koonce, 2012; Morris, 2007, 2016; Troutman, 2010). Some scholars suggest that disproportionate punishment for Black girls is driven by “adultification,” the term Epstein, Blake, and Gonzalez (2017) introduced to name the phenomenon that effectively “removes the consideration of childhood as a mediating factor” (p. 2) for Black girls' behavior. Instead of giving Black girls the

benefit of the doubt that they are acting like adolescents, educators interpret their disruptive behavior as more serious because they view them as adults. Cumulatively, these dimensions of schooling work together to harm Black girls. This is not accidental; the education system is designed to function in this way (Labaree, 2012; Schmidt & McKnight, 2012).

Black Girls' Experiences in Mathematics Classrooms

As a discipline, mathematics is particularly susceptible to inequities in the classroom because it is shrouded in a myth of objectivity. The popular idea that “numbers are universal” leads educators to assume that mathematics classrooms are uniform in their curriculum and pedagogy. While some argue that mathematics content is empirical and free of bias, critical scholars acknowledge that the teaching of math is a political activity (Aguirre et al., 2017; Clark et al., 2014; Gutierrez, 2013). Indeed, the mathematics classroom is one of many schooling spaces where Black girls suffer (Dumas, 2014; Gholson & Wilkes, 2017), are taken for granted, and dehumanized (Gholson, 2016; Gholson & Martin, 2014; Jones, 2003).

Teachers' mathematics instruction can reproduce oppressive systems, such as racism, sexism, classism, and xenophobia. Related to this, mathematics is often constructed as a White, male, and exclusionary institutional space. And because of this, it can be challenging for Black girls to understand themselves as math learners (and develop robust “math identities”) and difficult for teachers to have a vision for how the space changes when Black girls are in the classroom (Gholson & Wilkes, 2017; Hottinger, 2016; Joseph, Hailu, & Boston, 2017; Nasir, 2011). The impact of this systemic exclusion is evidenced through Black girls' and women's low participation and achievement in mathematics. The National Assessment of Educational Progress shows that only 16 percent of Black girls are proficient in mathematics by eighth grade (NCES, 2015). National Science Foundation (2014) data show that Black women earned only 7.09 percent of all bachelor's degrees in mathematics or statistics awarded to women in 2004, and a decade later the proportion of Black women had decreased: by 2014, Black women made up only 5.48 percent of women with a bachelor's in mathematics or statistics. The dearth of Black girls and women in mathematics is due to the exclusionary structures and systems that consistently push Black girls and women off mathematics education pathways (Booker & Lim, 2016; Borum & Walker, 2011, 2012; Joseph et al., 2017).

As with all students, Black girls' identities come partly from what they think of themselves and partly from how their parents, teachers, and counselors position them. West-Olatunji and colleagues (2007) argue that Black girls “see themselves as positioned outside of mathematics and science excellence in the way that resources are allocated to low-income and culturally diverse students at their school” (p. 221). More specifically, middle school Black girls were aware of their schools' support (or lack thereof) of math learning, teach-

ers and counselors were aware of Black girls' social positioning but were not always actively advocating to positively transform their mathematics experiences, and educators underutilized parents' knowledge about their daughters.

Francis (2012) used data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–1999 to estimate the relationship between student racial background and teacher perceptions of attentiveness and disruptiveness in class. She then extended the evaluation to relate teachers' behavioral perception of students to the likelihood of the teacher recommending that student for honors classes. Francis's results provide important evidence about the relationship between Black girls' race and mathematical participation. She found that math and science teachers perceived Black girls as less attentive and more disruptive. For example, the teachers were less likely to see the Black girls as "never" disruptive and more likely to see them as disruptive "some of the time" and were also less likely to characterize them as attentive "all of the time" and more likely to see them as attentive "some of the time." After controlling for academic performance and socioeconomic status, differences in perceptions of attentiveness—but not disruptiveness—among Black girls were mediated. Disruptiveness is a common trope connected to Black girls, and previous research has found that teachers often use this subjective behavior label to describe Black girls (Annamma et al., 2016; Epstein et al., 2017; Morris, 2016). Francis also found that White girls were 19 percent more likely to be recommended for honors classes than Black girls. Teachers' tendency to view Black girls as more deviant and intellectually incompetent than their peers shows how Blackness is often pathologized in mathematics and science classrooms.

Moreover, Campbell (2012) found that Black girls' cognitive and noncognitive behaviors play an important role in teachers' decisions to place them in advanced mathematics courses. Using base year surveys from the Education Longitudinal Study of 2002, Campbell examined factors that influence advanced course recommendations for Black girls. Descriptive statistics showed that although 91 percent of the Black girls in the sample believed that people could learn to excel at math, only 53 percent believed that they themselves could master skills taught in math classes. Given that confidence in one's own math ability is an important aspect of mathematics identity development, this finding about Black girls being more confident in others' math competencies than their own is jarring. In many ways, Black girls are socialized to believe that they are intellectually incapable of learning and mastering mathematics content. Educational institutions frequently communicate ideologies of cultural deficiency to students of color (Battey & Leyva, 2016; Bonilla-Silva & Forman, 2000). Other striking findings from Campbell's study revealed that 46 percent of Black girls believed they would attend or graduate from college, and 48 percent believed they would go on to attend graduate or professional school, yet only 5 percent of their teachers expected them to attend graduate or professional school. Again, this study gives evidence that teachers' subjec-

tive beliefs critically influence Black girls' access to mathematics learning and their likelihood of persisting in mathematics.

As we consider new possibilities for research about Black girls in mathematics, we need a better understanding of what they themselves value in the classrooms. Black girls are rarely included in discussions about mathematics teaching and learning (Gholson & Wilkes, 2017; Joseph & Alston, 2018; Malloy, 1997). Instead, mathematics teachers assume they know what students should know, and the students' perspective and motivation should fit that agenda (Martin, 2012). Often, what mathematics teachers think about their students differs from what those students think about themselves.

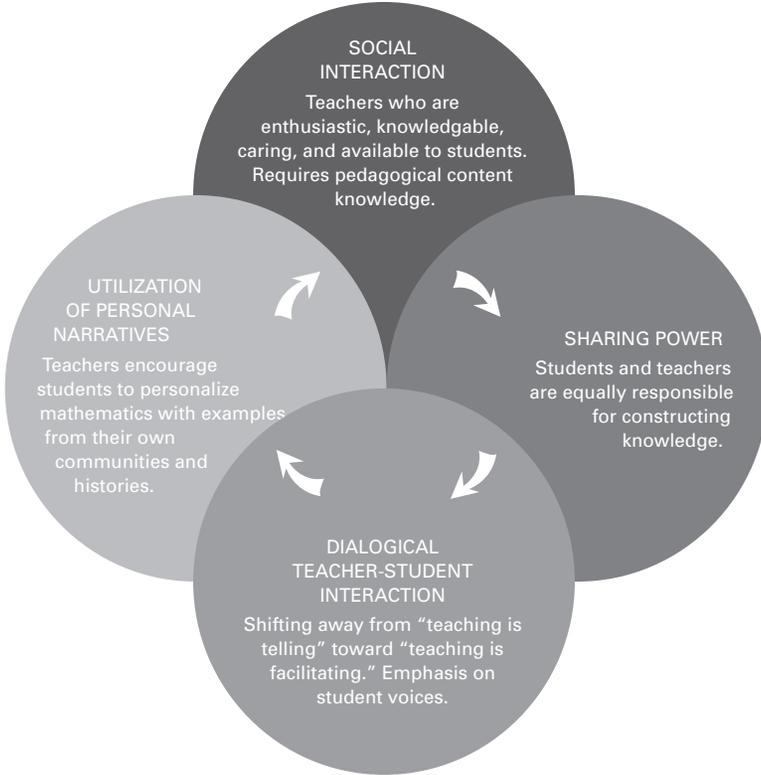
Malloy (1997) warned decades ago that "mathematics educators have little knowledge of how African American students perceive themselves as mathematics students, how they approach mathematics, or the role of culture in their perception and mathematics performance" (p. 23). Yet current research still has not sufficiently addressed this, particularly in examining how Black girls perceive themselves as mathematics learners and how those perceptions contribute to their success or failure. Therefore, we investigate what Black girls think, need, and want from their mathematics experiences to generate evidence-based theory about math pedagogies that better attend to their humanity.

Theoretical Framing

We sought to explore adolescent Black girls' experiences in secondary math classrooms and what those experiences reveal about them as mathematics learners. The ten Black girls in this study discussed mathematics teaching practices that they valued. Notably, their descriptions of their teachers' pedagogies aligned with aspects of what Tuitt (2003) calls "inclusive pedagogy." Although Tuitt's (2003) seminal essay was aimed at educators seeking to improve their teaching in racially diverse college classrooms, he drew from K–12 literature to conceptualize IP models, synthesizing work by scholars such as Banks and Banks (1997), Gay (2010), and hooks (1994). Figure 1 summarizes all four aspects of inclusive pedagogies that can be used to inform mathematics teachers' practices. For this article, we use two specific components from Tuitt's (2003) essay to frame our findings: *social interaction* and *sharing power*. These aspects of IP help us interpret the girls' narratives.

First, teachers who encourage social interactions between students and themselves understand these interactions are foundational for a positive teacher-student relationship (Baker, 1998) and can become opportunities for perspective-taking and empathy, an ongoing process and act of knowing taken up by teachers (Warren & Robinson, 2018). Teachers who are enthusiastic, knowledgeable, caring, and available to students in and outside of the classroom have more positive social interactions with their students than those who are not (Baker, 1998; Gay, 2010; Ladson-Billings, 2009). This type of teacher-

FIGURE 1 Transformative pedagogical models in mathematics classrooms



Source: Tuitt (2003).

student connection eases the process of constructing knowledge because there is space to develop trust, care, and listening (Noddings, 1995). Some scholars suggest that teachers need to conceptualize mathematics not just as a school subject but as a tool to empower Black students to address their social realities (Martin, 2009).

Second, when teachers make it clear that both they and their students are equally responsible for constructing knowledge, they share power and demonstrate the value of everyone's presence. This disrupts the traditional mathematics classroom that valorizes procedural exercises (memorization, step-by-step rules, using equations without understanding them) which signal that only the text and teacher hold legitimate mathematical knowledge. hooks (1994) suggests that there must be ongoing recognition that everyone influences the classroom dynamic and that these contributions are resources to be used in an open learning community. Staples (2007) provides an example of hooks's idea in her description of a high school mathematics teacher's role in supporting collaborative inquiry mathematics practices with low-attaining students. Some

practices are “in the moment,” while others develop over longer periods of time but include practices such as expanding what counts as a contribution, extending students’ ideas, and requesting and pressing the students to build on each other’s ideas. Such acts are grounded in an ethic of care (Noddings, 2012), because teachers who are willing to relinquish some of their power do so in service of their students and to disrupt mainstream ways of teaching mathematics.

While they have less explanatory power in our study, the third and fourth characteristics of IP are what Tuitt (2003) calls “dialogical professor-student interaction” and the “utilization of personal narratives.” To create dialogical professor-student interaction, instructors must activate students’ voices. A key goal of inclusive critical pedagogy, according to Darder (1996), is for diverse voices to become centered in the dialogical process rather than remain at the periphery. Furthermore, when teachers use students’ personal narratives in the classroom, they provide contexts for students to meaningfully locate their own lived experiences in the curriculum and personalize the subject matter (Tuitt, 2003). In other words, personal narratives help leverage the “already acquired knowledge as a process to unveil new knowledge (Freire & Macedo, 1996, p. 208).

When utilized synergistically, these pedagogical practices can normalize the humanity of Black girls in mathematics classrooms. Specifically, such pedagogy can address Black girls’ intellectual needs, recognize how education spaces are politicized and often damage their academic confidence, and cultivate their personal and cultural values. These concepts also reinforce the idea that mathematics teachers aiming to create equitable classrooms must view adolescent Black girls’ identities as central to the teaching and learning of mathematics. This study adds to existing literature and the IP framework in multiple ways. We use the IP framework as an analytic tool to theorize about an understudied and underserved population in K–12 contexts. Most importantly, we contribute to the field by showing how aspects of inclusive pedagogy—social interactions and sharing power, specifically—are key practices for repositioning Black girls in mathematics discourse.

Methodology

Our study reports findings using data from a larger longitudinal and mixed-methods investigation conducted by coauthor Jamaal Matthews (2018) that examined the underlying issues surrounding mathematics learning and participation among Black and Latinx students, as well as the factors that influence the development of their identities as mathematicians.

Data Sample

Five secondary schools participated in the initial phases of the larger research project, three high schools and two middle schools. Matthews developed a

working relationship with the teachers and administrators in these schools prior to and during formal research activities. These relationships were developed through one-on-one support of and partnering with individual teachers in their classrooms, as well as by connecting the schools with university resources and developing a student mentorship program at two of the schools. Matthews, the principal investigator, solicited and obtained permission to conduct formal research from the district, his home university, and the five schools' administrators.

All the schools were part of a large urban district in New Jersey where greater than 90 percent of the students were eligible for free or reduced-price lunch, and three of the schools were over 90 percent Black in racial composition. Students were recruited through in-person announcements in all the math classrooms (grades 5, 6, 7, 9) of the participating schools, for a total of thirty-one math classrooms. During the recruitment announcements, the study was described to students; to participate, they had to return signed guardian consent forms. The response rate in the larger study was approximately 64 percent, resulting in a final sample of 419 students across all five schools.

Of this larger sample in the broader research project, thirty-seven Black and Latinx boys and girls participated in follow-up interviews (Miles & Huberman, 1994). Maximum variation sampling provided an opportunity for heterogeneity—to understand mathematics teaching and learning experiences as understood by different Black and Latinx youth. These participants were selected according to their mathematics engagement (high, moderate, or low). Selection started during classroom observations, with coders noting participation trends across students in their classrooms (e.g., attentiveness, completion of classwork, and answering/asking questions). Once students were selected as representative of the three different strata of engagement, those students' names were taken to their teacher for endorsement. Teachers were then asked to recommend additional students who represented high, moderate, or low engagement. Final interview selection decisions were made to balance the representation of females and males and Black and Latinx students across the five school sites.

During the academic year 2014–2015, trained research assistants conducted sixty-to-ninety-minute semistructured interviews with each participant. The interview protocol was designed to capture the intricacy of how the students made sense of their math classroom experiences, their beliefs about mathematics, and their ideas of themselves as doers of mathematics. The interviewers were trained to use the prepared protocol in a flexible manner, changing the sequence and presentation of questions to allow participants to tell their stories and to allow the interviewer to follow up on themes and responses of interest (Kvale, 1996). The interview protocol focused on topics such as attitudes and beliefs around mathematics, perceived math ability, school and classroom environment, racial attitudes and centrality, and family academic attitudes and experiences (Matthews, 2018).

For our study, we selected all the Black girls ($n = 10$) in the subsample of thirty-seven students who were interviewed and had completed a secondary qualitative analysis. We chose to focus on this group because Black girls and their experiences in mathematics contexts are virtually absent from the literature. Mathematics education research rarely, if at all, centers on Black girls, other than to report large statistics about their gaps in achievement (Joseph, Hailu, & Boston, 2017).

The following introductions to the ten Black girls we studied provide brief descriptions of each girl's racial identification, grade level at the time of the study, mathematics engagement, and personality, as described by the student herself or by researchers' observations. (Table 1 provides additional information about the mathematics courses they were enrolled in at the time of the study.) Participants included Ari, Melisa, Monica, Ozaria, Sandra, Tatiana, Tyanna, Tina, Nia, and Zoe.²

Ari, a freshman who identified as Black, was enrolled in mainly honors classes in her school. While she admitted that mathematics was not her favorite subject, her experiences with a skilled, hands-on mathematics teacher helped her appreciation for mathematics grow over time. With a genuine soul and a loving attitude toward all her friends and classmates, Ari sought to be respectful to all adults in her life.

Melisa, who identified as Black, was enrolled in all general education courses as a freshman. She admitted to struggling to pay attention and stay focused in mathematics. She prided herself on her honesty and viewed herself as the clown in class who enjoyed making others around her laugh.

Monica self-identified as Haitian American. Despite being enrolled in a low-performing ninth-grade mathematics class, she demonstrated great investment in improving her academics, as evidenced by her hard work ethic. She valued family and wanted to make them proud through her academic and personal successes.

Ozaria, a Black and Hispanic freshman, had moved from Finland. As a student athlete who had to balance sports with school, she strove for success in her academics and related in a positive way with her mathematics teacher. Ozaria valued relationships with adults who she could confide in and learn from, as well as genuine friends who supported her goals.

Sandra, a freshman, identified as a mixed-ethnicity person with Black, European, and Guyanese ancestry. She had a positive relationship with mathematics, evidenced in how she enjoyed playing with numbers and learning mathematics in her early years. At the time of study, she excelled in her math class and hoped to proceed to higher-level courses in the next years. Sandra liked to laugh and preferred to spend time with her small, close-knit group of friends rather than be part of a crowd.

Tatianna, a freshman, identified as Black. Struggling with mathematics classes, she often resorted to disengagement behaviors, such as putting her head down on her desk or giving up when she was frustrated by mathematics

TABLE 1 Study participant profiles

Name	Grade (at time of study)	Math course (at time of study)	Age (at time of study)	Self-identified racial makeup
Ari	9	Honors Algebra 1	16	Black
Melisa	9	Gen. Ed. Algebra 1	15-16	Black
Monica	9	Gen. Ed. Algebra 1	17	African (e.g., Ghana, Nigeria)
Ozaria	9	Honors Algebra 1	16	Mixed Black & Hispanic
Sandra	9	Gen. Ed. Algebra 1	16	European & Guyanese
Tatianna	9	Gen. Ed. Algebra 1	16-17	Black
Tyanna	9	Gen. Ed. Algebra 1	16-17	Black
Tina	6	6th-grade gen. ed.	13	Black, Hispanic, & Indian
Nia	6	6th-grade resource level	12	Black
Zoe	9	Honors Algebra 1	14	Jamaican & Trinidadian

procedures or the instructor’s teaching style or pace. Tatianna had previously cited math as a favorite subject.

Tyanna identified as Black. A freshman, she hoped to one day become a mathematics teacher, although she struggled greatly with the subject and preferred to receive one-on-one attention from her instructors. She shared that she tended to “overthink” when she was frustrated by mathematics, which served as a trigger for feelings of anxiety and self-doubt. Tyanna understood the value of hard work and wanted to see herself and her peers be successful in their high school careers.

Tina, a sixth-grade student, identified as racially mixed Black with cultural linkages to Puerto Rico and the Dominican Republic. She demonstrated a general lack of active involvement in her academics, particularly in mathematics, which she attributed to laziness and a lackluster enthusiasm about her studies. Tina described herself as someone who talks a lot and is highly opinionated.

Nia, a sixth grader who identified as Black, expressed a high confidence in her ability to achieve in mathematics, even while performing at an average or below-average level and struggling to stay focused in class. A shy student, she liked to stay close to her friends.

Zoe, a ninth-grade student of Jamaican and Trinidadian heritage, found her mathematics teacher frustrating but also recognized the value of the class and

her overall experience at her current school. She described herself as a hard-working student. Zoe aspired to be a psychologist.

Data Analysis

To reach a consensus on the codes, patterns, and themes of these data, we individually and collectively analyzed the interviews using the constant comparative (Glaser, 1994) and consensual qualitative research methods (Hill, Thompson, & Williams, 1997). By engaging in individual and collective processes, as well as continually checking the data to affirm our findings, we significantly increased inter-rater reliability. Three coders did line-by-line readings of the ten interviews and used both open and closed coding schemes.

As we considered our research question, we looked for the elements of IP as conceptualized by Tuitt (2003) but also remained open to other ideas or patterns that emerged from the data. Our first level of readings produced several codes that were close to the actual data. Some of those included things like “students appreciate help” or “teacher takes time with each student.” The second round of coding included reorganizing the first-level codes into broader categories. For example, we labeled “students see mathematics utility, but it is at a low level” to describe the patterns shown in the girls’ responses to why mathematics is important. The final round of coding included creating theoretical themes that best described the meaning of the experience across all the interviews. For instance, a key theme was the inextricable links between Black girls’ performance and participation in mathematics and the patience and approachability of their mathematics teachers. Overall, our findings reflect the experiences of all ten participants.

Findings

With this study we explored how Black girls describe their experiences with teachers and what we might learn from these interactions to better understand how inclusive pedagogies can normalize their humanity. Many Black girls’ humanity has been undervalued in the US; in many ways, their experience in school has been and continues to be negative, which ultimately limits their life, general educational, and mathematics outcomes (Cox, 2015; Crenshaw, 1989; Crenshaw et al., 2015; Harris-Perry, 2011; Morris, 2016). What we know from previous research is that some Black girls are very aware of their marginalization in schools, and particularly in mathematics classrooms (West-Olatunji et al., 2007), so it is crucial to hear what they have to say about what can make a difference for them.

We found that Black girls’ math learning experiences are complex. Their experiences in secondary mathematics classrooms included a wide range of descriptions, from viewing themselves as capable mathematics students to perceiving classroom procedures as illogical and therefore a hindrance to learn-

ing. Most of their descriptions centered on what their math teachers do that they value and perceive as supportive of their engagement and learning of mathematics. Considering how we already know that Black girls view themselves as outsiders in math spaces, our study's findings are important because they provide insight into how teachers can help shift Black girls' thinking about their place in mathematics classrooms.

What "Good" Math Teaching Looks Like to Black Girls

Ari explained why she thought she liked mathematics more than she used to:

My teacher, like, I can give her the problems. Like, I'll call on her and she'll actually sit down and—Well, not sit down, but she'll use her brilliance at a snap of a finger, and I'm like, "Oh. I got it. Never mind." And I'll get it . . . When I was younger it was more students in a class. It was hard [to get it]. You just sit by this person and then [the teacher] gotta race to this person after you. And you don't get it yet. So I think honors is good for me. It's less kids, and the teachers could have more time to go around the room and help you out.

Her statement suggests that she desired or needed one-on-one time with her math teachers to better understand key concepts. While, on the surface, this statement may be true for any student, what makes it distinct is the compounded oppression and marginalization many Black girls are likely to face in math classrooms, particularly those situated in urban public schools (Gholson & Wilkes, 2017; Jones, 2003; Joseph et al., 2017). Thus, more than just understanding concepts and ideas is needed. Ari sensed an ethic of care (Noddings, 2006) and inclusion when her math teacher stopped to pay attention to and address her needs. Some Black girls also tend to be intellectually and emotionally invisible in math classrooms (Joseph, 2017), so when math teachers give them dedicated time to explain math ideas, teachers are also acknowledging the girls' vulnerability as children and adolescents.

Monica discussed the reason she viewed her mathematics teacher as "good" when she noted:

Because, like I said before, you know he doesn't yell at you for the wrong answer. He yells, you know, if you don't be quiet and he's trying to, like, help people or anything. Like, he's just a really cool teacher. Like, laid back. He tries to help you and sometimes he makes jokes, which kind of, like, makes you feel better and more relaxed. Because you're like, "Oh, you know he's cool and maybe, like, I can even talk to him if I have a problem."

In defining a good math teacher as someone who does not yell at her for having the wrong answer, Monica described an experience that promoted positive social interaction (Tuitt, 2003), basic care, and dignity—all of which disrupt what seems to be a normative pedagogy many Black girls encounter in schools. When teachers adhere to the preferences of students like Monica, they are recognizing the value of positive social interaction. When this is

applied consistently to their pedagogy, teachers are better positioned to shift how Black girls view themselves in mathematics classrooms. Monica's description also implies that she has had other classroom interactions that have been more negative, even instances in which teachers have yelled at her for giving a wrong answer. This type of punitive teacher behavior, when expressed to Black girls, who already face dehumanization in the classroom, can further exacerbate their perceptions of being outsiders in math.

Monica also talked about how the beginning of ninth grade was a turning point for her in becoming more skilled at mathematics:

I think it's because of Mr. Q. Because he kind of, like, takes his time to go to, like, each student who has a problem. And when you say a wrong answer, he doesn't say like, "Oh my god you're not like paying attention or whatever." He just, like, really explains himself and goes back to what you don't understand and stuff. So I think that's what helps me.

Her math teacher aimed to humanize challenges that can arise in mathematics classrooms related to students' misunderstandings with different mathematics concepts. Engaging in humanizing practices is seminal for many Black girls because they are a part of a largely oppressed group that dominant US society views as subhuman. Dumas and Ross (2016) contend that anti-Blackness refers to a "broader antagonistic relationship between blackness and (the possibility of) humanity" (p. 430). As IP models point out, teachers who "see" a Black girl's personhood and dignity call on her holistic self to support the end goal of mathematics learning, thereby disrupting patterns of hegemonic exclusion and anti-Blackness. When asked to elaborate about how Mr. Q's explanations helped her, Monica said:

Because it makes me feel more relaxed. Like, I don't have to be like, "Oh my god, I got the wrong answer." Like, you know, I'm not as smart as the other kids and stuff. Like, I can just say what's on my—the answer I think is right. And if it's right, it's right. And if it's just wrong, he just helps.

Monica's experiences suggest that her performance and attitude toward mathematics are inextricably linked to the quality, patience, and approachability of her teacher. Her comment that "if it's just wrong, he just helps" suggest how her previous experiences may have been dehumanizing. More pointedly, these experiences can be dehumanizing in ways that can discourage even Black girls who have the courage to ask or answer questions in math. Monica's narrative also complicates popular notions of "smartness," a discourse in mathematics that privileges students who solve problems quickly and without extended effort. Students, like Monica, who take longer to complete a problem or display comprehension in different ways, are often perceived as less intelligent. Critical scholars like Gholson and Martin (2014) and Hatt (2007) push back on such narrow notions about what makes a student "smart" in mathematics. More broadly, mathematics classrooms are spaces where attri-

butes like patience and approachability are pivotal. Ari and Monica both pointed out these qualities as important for shaping their attitudes toward and performance in mathematics.

Similarly, Tyanna described why she thought her mathematics teacher was good: “By him explaining to us. By him being there to even teach us math . . . Knowing that we have a math teacher that really knows his math so we know he’ll help us get it. He’ll break it down to us and everything . . . He’ll teach us everything we need to know.” Again, explaining mathematics content in ways that Black girls can understand it was important to the participants in this study. Tyanna alluded to the necessity of a teacher having extensive math content knowledge and skillful delivery for students like her to really “get it.” From an IP perspective, math teachers should integrate Black girls’ voices and experiences with rigorous content knowledge to ensure that meaningful learning takes place. Essentially, the Black girls in the study preferred when robust mathematics content knowledge was couched in social interaction with their teachers.

Ozaria pointed out that learning should be fun, and she liked that her math teacher was funny and not uptight—“’cause it’s more fun to learn something, because you don’t want to be in a boring class where you just have to sit and listen. You want to actually laugh and have fun.” Her comment suggests that she learned better when her environment was more relaxed and pleasant. In such low-stakes settings, students may be better positioned to co-construct dialogical mathematics knowledge. Ozaria’s view of her classroom underscores the need for dialogical teacher-student interaction, a fundamental component of IP. By incorporating learning exercises that students find enjoyable, teachers can facilitate richer discourse and cultivate a learning environment that students want to be in. Black girls, especially, can benefit from this type of robust teacher-student interaction, since they have historically been perceived as disruptive and deviant.

Collective Learning Contributes to Collective Struggle

Our analysis suggests that the Black girls in the study are *collective* learners; they appreciate and find meaning in learning with others. Tatianna contended that what made a mathematics classroom good is not just a good teacher but also students who are willing to learn in group settings. Similarly, Tyanna discussed the benefits of solving math problems in teams, noting that “it’s better to work as a team . . . Because if you don’t have it you can go to your teammates and ask them how did they get this? And they’ll work with you basically like as a teacher assistant.” Zoe, too, explained how communal work was valued among her mathematics classmates: “I feel like we actually doing something. Like we actually understand it, we all have one understanding, or if somebody doesn’t know we help them out. So I feel like we are doing our parts as students too. We are helping each other out learning what it is.” This demonstrates aspects of shared power as promoted through inclusive pedagogical models, where

students are in the struggle together rather than figuring out math problems alone. Similarly, in describing aspects of a classroom that make it good, Monica also highlighted her classmates: "I would say sometimes, like, your classmates because you might not know something and, like, they know it, and you ask them for help and then they help you." These comments suggest that Tatianna, Tyanna, Zoe, and Monica viewed their classmates as resources for helping them understand mathematical ideas. Their perceptions are aligned with Walker's (2006) finding that student-of-color peer groups foster mathematics success.

Sometimes, however, working in groups can be challenging, as Monica shared:

Well, since we're in a group kind of like—now there's one student who when he has to practice we're kind of like helping each other, but I like to do my work first to see if I got the right answer so I can help others. And he was waiting for me to help him, but he never, like, tries to do anything and he's like, "Oh my god I hate math." And he started cursing, saying how much he doesn't like math and stuff. And I was just kind of like—I didn't want him to be in my group because that's negativity. I'm trying to pass the test. I don't want to hear somebody say how much they hate something because you want to do good in math to pass. Not even in math. In all your classes in general.

Even though Monica's conceptualization of success is rooted in more traditional understandings ("passing the test"), her anecdotes help us understand how and why she sees the importance of group work. The Black girls in this study not only enjoyed group work, but sometimes used group tasks to curate a positive space for themselves to learn mathematics and increase the likelihood of success. Considering previous research about collectivism in Black culture, the experiences of these girls reinforce the need for a certain type of interaction in mathematics classrooms. Boykin and Bailey (2000) and O'Connor (1997) explain that collectivism is a part of the Black ethos in the US and is also incongruent with mainstream White culture and school culture that are based on individualism and solitary talent. The salience of collectivism in Black students' education, especially for Black women and girls, is evident within the context of mathematics (Borum & Walker, 2012; Perna et al., 2009; Walker, 2006).

These girls' views of their classrooms underscore the third tenet of IP—sharing power. When teachers disrupt traditional, hierarchical activities in classrooms and instead utilize strategies that allow for collaborative inquiry, they share their own power with their students and show how they are not the only holders of valid mathematics knowledge. For the Black girl who is often ostracized and made to feel like she is not intelligent enough to master mathematics content, sharing power through collaborative, team learning is one way to normalize her humanity and disrupt a historically White institutional space.

What we learn about these ten students' experiences with their secondary mathematics teachers is that Black girls perceive engagement in and learning

of mathematics as a process that extends far beyond a teacher's strong content knowledge. Additional knowledge, skills, and dispositions about who they are as humans are needed. In response, we posit that inclusive pedagogies are one of many possible models for making a Black girls' personhood matter in a mathematics classroom. Math teachers' deep understanding of mathematics content coupled with commitments to learn about and problematize Black girls' historical and contemporary realities of marginalization can provide a rich context and set of tools for empowering Black girls to experience a creatively self-determined and self-actualized life—a basic human right.

Discussion

Given that these ten girls represented varying levels of mathematics engagement and attended public schools in a major urban metropolitan area with high percentages of racial minorities, we think their experiences are not qualitatively or quantitatively different from most Black girls' in similar school settings. While the girls in this study provide us a glimpse of what many other Black girls in the US may contend with, we recognize that Black girls enrolled in rural and suburban schools may encounter very different experiences.

Overall, how adolescent Black girls experience mathematics classrooms, what they perceive about themselves as learners and doers of mathematics, and what type of mathematics teaching practices influence and shape their participation are all understudied lines of inquiry. Analogously, the adolescent Black girls in this study described their experiences in secondary mathematics not only as places to learn mathematics but also as spaces they place in high regard when their mathematics teachers are approachable and help them understand concepts they are unsure about and do not shame and ostracize them for not knowing the material. These experiences challenge mathematics teachers to be more equity focused in order to humanize Black girls. This study enriches the education field's understanding of the important role of teachers in shaping Black girls' interest, motivation, participation, and achievement in mathematics, which we argue can only be realized when the complexities of Black girlhood are not divorced from teaching and learning, the core processes of the academic enterprise.

Moreover, we theorize that Black girls in similar demographic and contextual situations need to be viewed and understood holistically within the context of their mathematics experiences. Our data suggest that Black girls should be encouraged to learn collaboratively with others while being treated as respected and valued members of the mathematics classroom. Our findings also suggest that Black girls need to bond with skilled mathematics teachers in fun and relaxing ways while also engaging in rigorous mathematics problem solving. This study provides a glimpse of the type of pedagogy that normalizes Black girls' presence in mathematics spaces. What Black girls in this study valued most were their mathematics teachers' practices that established

and maintained meaningful relationships with their students. The most effective teachers, in their eyes, were the ones who could exhibit patience when students did not get the correct answer right away, facilitate group learning activities, and promote holistic learning in which their full personalities were welcomed.

As education researchers advance their understanding of the relationships between Black girls' phenomenological experiences in mathematics contexts (both in and outside of schools), inclusive pedagogical practices, and educational equity, we put forth two important ideas for encouraging future research. One area to explore is how Black girls' experiences in secondary mathematics classrooms might advance transformative, equity-focused, pedagogical models, such as Tuitt's (2003) IP framework. Our analysis shows beginning understandings of the construct of *accountability to self*, which is the notion that students have a personal standard that they hold themselves responsible to. Future ethnographic studies of Black girls' experiences in mathematics could provide additional insights into this emerging idea of Black girls owning their mistakes, being accountable to themselves and others, while simultaneously understanding that they know their potential. As this emerging idea is investigated further, we caution against the conflation of accountability to self with adultification (Epstein et al., 2017). While the Black girls in this study demonstrated an awareness of their shortcomings in mathematics performance, this self-awareness should not be used as a substitute for historicizing the systemic barriers to Black girls' mathematics achievement. Given the history of teachers in the US subjecting Black girls to disproportionate disciplinary measures and violence (Annamma et al., 2016; Morris, 2016), teachers aiming to realize inclusive pedagogies should be careful not to make accountability to self a mechanism for further dehumanization of Black girls.

A second area for further research is the idea of humanizing Black girls by *creating a space for play*—a place for them to be happy, gregarious, social, and “goofy” (an adjective one of the participants used). Our emerging analysis illuminates that when the Black girls in this study were afforded the opportunity to be both serious and silly, they were more engaged in mathematics learning. To this end, one participant described “in-between time,” when being playful is appropriate in the classroom: “We know how to have fun and get the work, the job done. We do it in-between, like we’ll be doing work with a joke here and there but still we understand and get the work done.” This participant continued to describe how she is a goofy person but allowed how being goofy does not get in the way of her learning mathematics:

I am a goofy student. But I do put my work before anything. There's always a time and place to act goofy, and that time is when I get my stuff done already. I get my work done then I act goofy until she gives me more. Then I go back to my alone mode unless I ask a team member or her for some help, then I go back to doing my work and then I act goofy.

Emergent data suggest that some Black girls in this study see learning mathematics as an integrated act; it allows them to bring their whole personalities and preferred communication styles to mathematics classrooms. When we put this idea in conversation with Black girls' marginalization in schooling and society more broadly, the concept of play might be one strategy for protecting their innocence—and, by extension, their humanity. As the literature has demonstrated, Black girls are treated more harshly than other girls; they tend to be overpoliced, hypersexualized, and physically violated. To put it simply, they are not cared for in the same way as other children in society. By allowing play in the classrooms, teachers may be able to restore some of the innocence that has been socially stripped away. While the data are not substantive enough to confidently assert these claims, we see these as auspicious areas for future inquiry.

Conclusion

Ultimately, this research helps us theorize about Black girls' learning in mathematics within the social and historical context of the United States. The narratives of the girls in this study help us think about what it can feel like to be a Black girl in mathematics classrooms, when those classrooms are politicized, racialized, and gendered. More pointedly, the girls in this study give us insight into how to resist inequitable mathematics education when education systems have been politicized, racialized, and gendered to oppress Black girls. Subjecting Black girls to pedagogy that does not reflect this critical awareness is a rejection of their personhood because it fails to address the ways in which Black girls have been dehumanized in society broadly and in mathematics classrooms specifically.

The need for affirming and supporting this student group in scholarship and practice is especially apparent in our current, uncertain political times. As King (2005) has argued, many aspects of US social policy indicate progress toward social and economic equity; however, the extant literature shows that Black children, particularly girls, are rarely centered in public policy debates or initiatives (Crenshaw et al., 2015; Morris, 2016). To achieve the democratic ideals of equity and justice in which education reforms are anchored, we must pay attention to the needs of Black girls. As we imagine ways of moving closer to educational equity for Black girls in similar contexts as this study's participants, we realize that equity reform can happen through a variety of avenues, such as pipeline programs, the recruitment of racially diverse teachers, school leadership, policy development, and redistribution of federal funding. However, we contend that inclusive pedagogy is the most immediate way toward helping Black girls shift their understanding of themselves as qualified and competent mathematics learners. Thus, understanding the experiences of Black girls and the role of humanizing pedagogies is one way we can begin to dismantle the dehumanization of Black girls in US society.

Notes

1. *Black* refers to individuals of the African diaspora multigenerationally born and raised in the US.
2. All names are pseudonyms.

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