

Black Girls and Mathematics Learning

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Though the formal and informal mathematics learning experiences of Black girls are gaining more visibility in the literature, there is still a paucity of research around Black girls' mathematics learning experiences. Black girls face unique challenges as learners in K–12 educational spaces because of their marginalized racial and gender identities. The interplay of race and racism unfolds in complex ways in Black girls' learning experiences. This interplay hinders their development as mathematics learners and limits their access to transformative learning. As early as elementary school, Black girls are labeled as having limited mathematics knowledge and are often disproportionately placed in “lower level classrooms” devoid of any rigorous and transformative learning experiences. Teachers spend more time socially correcting Black girls rather than building on their brilliance. Even though Black girls value mathematics more and have higher confidence in mathematics than their White counterparts, they are still held to lower expectations by their teachers and are less likely to complete an advanced mathematics course. Nationally and globally, mathematics serves as an academic gatekeeper into every avenue of the labor market and higher education opportunities. Thus, the lack of opportunities Black girls have to engage in rigorous and transformative mathematics potentially locks them out of higher education opportunities and STEM-based careers. The mathematics learning experiences of Black girls move beyond challenges in K–12 spaces to limiting life choices and individual and community progress. To improve the formal and informal

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mathematics learning experiences of Black girls, we must understand their unique learning experiences more fully.

Keywords

Black girls, mathematics, informal STEM learning, equity, schooling experiences

Introduction

This article provides an overview of research on Black girls' experiences in educational settings in general and mathematics classrooms specifically. Due to the authors' expertise, the primary focus is on Black girls in the United States. The article begins with a description of Black girls' experiences in traditional educational contexts. It then describes the barriers and dehumanizing experiences Black girls face in traditional educational settings, followed by a discussion of ways to redress Black girls' learning experiences. Though the formal and informal mathematics learning experiences of Black girls are gaining more visibility in the literature, there is still a paucity of research around Black girls' mathematics learning experiences. To improve the formal and informal mathematics learning experiences of Black girls, we must more fully understand their unique learning experiences.

Educational Context: Being Black and a Girl

In this section, we provide an overview of Black girls' experiences in schools in general, followed by a discussion of their experiences in mathematics classrooms. The section ends with a discussion about the contradictions between the master narrative around Black girls as mathematics learners and how Black girls view themselves as learners.

The policing of Black bodies is nothing new to the ever-growing American saga of discrimination and racial bias. Within public and private sectors, being Black has always come with an added dimension of being aware of the politics of being compared and subjugated to the White norm. The physiological aspects of racism and White supremacy in America have for more than four centuries shaped a toxic culture wherein people of color are often forced to forsake sacred communal practices that express their human personality and adhere to social constructs that seek to tame or dehumanize them. This is not a statement of dogmatic uncertainties. Conversely, this is but a snapshot of what it means to be Black in America. This is why the great African American poet Paul Lawrence Dunbar (1913) wrote the words to his famous poem,

“We Wear the Mask” –

We wear the mask that grins and lies,
It hides our cheeks and shades our eyes,—
This debt we pay to human guile;
With torn and bleeding hearts we smile,
And mouth with myriad subtleties.

Unfortunately, these realities are no different within education, particularly as it pertains to the perceptions and experiences of Black girls.

There are issues of racial injustice in U.S. public schools for Black girls (Joseph, Viesca, & Bianco, 2016). These injustices stand as barriers between Black girls and access to educational and economic opportunities (Smith-Evans, George, Graves, Kaufmann, & Frohlich, 2014). And often, when Black girls have access to educational and economic opportunities, they are opportunities subpar to their White counterparts. Even though this synthesis centers on Black

girl's racial and gendered identities, the authors understand that Black girls' multiple identities extend beyond gender and race.

Throughout history, the educational experiences of Black girls have been marred by racist stereotypes and perceptions deeply rooted in the history of slavery and perpetuated by mainstream media (Townsend, Neilands, Thomas, & Jackson, 2010). Therefore, Black girls are stereotyped before they cross the threshold of the school building (Joseph et al., 2016; Smith-Evans et al., 2014). Black girls are often seen as "loud," "rude," "hypersexual," "having an attitude," "confrontational," and lacking the fundamental social graces for success (Morris, 2007). These perceptions are not held only by individuals, but these cruel and unjust labels are also systemic and frequently upheld by biased institutional schooling systems.

Negative stereotypes impact the perceptions held by school administrators and staff resulting in the differential treatment of Black girls. One would think that performing well academically is enough to excel in school. But as Morris (2007) points out, while Black girls in predominantly minority schools perform well academically, their manners and behaviors are often questioned by educators. The negative perceptions of Black girls often leave teachers and staff with the assumption that Black girls need social correction, which often translates into increased discipline referrals (Smith-Evans et al., 2014). Black girls are disciplined at six times the rate of White girls and are 10 times more likely to be suspended than White girls (Crenshaw, Ocen, & Nanda, 2015).

Many Black girls are often unfairly the target of shameful rhetoric that seeks to demonize behavior traits that are often exemplified by their White peers. Such labeling and unfair targeting creates a hostile and unjust learning environment for Black girls and creates even more significant barriers to their academic success. In essence, what is created is a psychologically

oppressive learning environment wherein one is either made to conform to the White norm or settle into the reality that they are unwelcome, incapable, or deeply flawed.

Being Black and a Girl in Mathematics Classrooms

Within and outside the field of education, there exists a notion that certain people are capable and are gifted to learn and master mathematics. When mathematics is viewed from this perspective, it fuels an environment of elitism. In this environment, those who are not deemed as gifted or capable are shut out. An elitist attitude toward mathematics, coupled with stereotypical views of who can and cannot do mathematics, catalyzes inequities (Boaler & Dweck, 2016). Black girls are particularly susceptible to mathematics inequities. “Indeed, the mathematics classroom is one of the many schooling spaces where Black girls suffer, are taken for granted, and dehumanized” (Joseph, Hailu, & Matthews, 2019, p. 135).

Given that mathematics is structured as a White and male space, Black girls often find themselves excluded (Campbell, 2012), making it more difficult for Black girls to see themselves as mathematics learners (Joseph et al., 2019). Teachers also find it difficult to see Black girls as intelligent and capable learners. Mathematics teachers are more likely to perceive Black girls as deviant and less competent learners and are less likely to recommend Black girls to honors classes (Francis, 2012). From a very early age, Black girls receive messages aimed at socializing them to believe that they cannot do math (Joseph et al., 2019).

As early as elementary school, Black girls are labeled as having limited mathematics knowledge and are often disproportionately placed in “lower level classrooms” devoid of any rigorous and transformative learning experiences. Teachers spend more time socially correcting Black girls rather than building on their brilliance. Even though Black girls value mathematics

more and have higher confidence in mathematics than their White counterparts, they are still held to lower expectations and are less likely to complete advanced mathematics courses (Smith-Evans et al., 2014). Nationally and globally, mathematics serves as an academic gatekeeper into every avenue of the labor market and higher education opportunities. Thus, the lack of opportunities Black girls have to engage in rigorous and transformative mathematics potentially locks them out of higher education opportunities and STEM-based careers, limiting life choices and individual and community progress.

The Contradiction

The master narrative around Black girls positions them as loud, boisterous, hypersexual, controlling, to name a few, which is misaligned with the school norms of White femininity (Smith-Evans et al., 2014). The misalignment with the school's norm of White femininity causes educators and administrators to position Black girls as "unteachable," unapproachable, and ultimately responsible for their limited educational opportunities. The treatment and perceptions of Black girls in educational spaces run antithetical to perceptions that Black girls hold about themselves as human beings and their academic abilities.

Morris (2007) found that teenage Black girls have higher self-esteem and confidence than their counterparts. Many positive and productive attributes of Black girls as learners are viewed as a hindrance to their learning. When White girls exhibit some of the same qualities, they are considered a positive catalyst for learning and a demonstration of leadership skills (Morris, 2007). Black girls and women have historically held leadership roles. Recent survey data showed that they have a higher aspiration for serving in leadership roles than any other group of girls. Black girls are also more likely to have leadership experiences and view themselves as leaders

(Smith-Evans et al., 2014). Still, when Black girls are candid and independent, they are seen as troublemakers rather than leaders (Archer-Banks & Behar-Horenstein, 2012).

Additionally, Black girls often hold positive views of education, take pride in their academics, and great pride in their schoolwork. When looking specifically at academics, research shows that Black girls have higher confidence in mathematics and valuing of mathematics than their White counterparts (Else-Quest, Concetta, & Higgins, 2013). Black girls also have higher career aspirations than their White and Latina counterparts, but the systemic and structural obstacles coupled with low teacher expectations and the stereotypes about Black girls hinder their access to higher level mathematics courses (Joseph, Hailu, & Boston, 2017).

When talking with Black girls about how they see themselves as learners, they most often describe themselves as highly ambitious and driven (Neal-Jackson, 2018). In studies of high-achievers, Black girls thought very highly of their cognitive abilities and had high aspirations for their future educational and career outcomes (Neal-Jackson, 2018). In their work with mixed-ability students, Morton and Smith-Mutegi (2018) found that Black girls viewed themselves as confident learners in general and mathematics specifically.

The interplay of race and racism unfolds in complex ways in the mathematics schooling experiences of Black students. This interplay stymies their mathematics education (Spencer, 2009). Since teacher perceptions often mediate the type of opportunities provided to learners, it is likely that Black girls will not have access to rigorous, relevant and high quality learning opportunities because teachers and other school officials don't believe in Black girls' brilliance and academic potential (Hill, 2010; Joseph, 2017; Neal-Jackson, 2018; Smith-Evans et al., 2014).

These decontextualized and depersonalized learning spaces are dehumanizing and often cause Black girls to become indifferent and uninterested in mathematics (Gholson, 2016), which

increases the likelihood that they will not pursue more advanced mathematics classes and STEM-based careers. Historically, Black girls in general and Black girls from low-income neighborhoods, in particular, are underrepresented in mathematics and science-related careers (National Science Foundation, 2003 as stated in West-Olatunji, Shure, Pringle, Adams, Lewis, & Cholewa, 2010). The National Science Foundation (2017) reported a decline in Black women's share of bachelor's degrees in computer sciences, mathematics and statistics, and engineering. Black women were awarded 5.1% of all undergraduate STEM degrees. When looking specifically at mathematics and statistics degrees, only 2.3% were awarded to Black women. About 5% of master's STEM degrees and less than 1% of master's mathematics and statistic degrees were awarded to Black women. About 3.5% of all STEM doctorates and less than 1% of mathematics and statistics doctorates were awarded to Black women (National Science Foundation, 2017).

Barriers and Dehumanizing Experiences

“Ultimately, educators’ perceptions of Black young women often involve racial and gender stereotypes—and this undermines their potential for success” (Smith-Evans et al., 2014, p. 6).

In this section, we explore barriers faced by Black girls as learners in K–12 spaces and how these barriers can catalyze dehumanizing experiences. We discuss the impact of cultural disconnections, course placement practices, and discipline on Black girls’ opportunities to learn mathematics.

Cultural Disconnect

It is difficult to define culture since it is the essence of one's being (Hollins, 1996). Culture encompasses patterns of knowledge, skills, behaviors, beliefs, attitudes and the frameworks used to make sense of the world (Phally, 1997). Most traditional K–12 settings are rooted in a Western European culture orientation. Therefore, teaching and learning occur from a Western European perspective (Malloy & Malloy, 1998). When Black girls enter most K–12 learning spaces in general and mathematics specifically, they walk into spaces governed by White, middle-class cultural values and norms. These cultural norms are positioned as “essential, legitimate and objective indicators of one's academic potential” and appropriate ways of being (Lim, 2008, p. 81).

The cultures of many mathematics classrooms value individual rather than cooperative work. Limited movement and structured modes of communication are valued above free expression of verbal communication, and a communal and holistic approach to learning expressed by many Black students (Boykin & Tom, 1985). Many White teachers, the majority of the teacher force, create their lesson plans within the frame of their own cultural experiences that can further alienate Black learners (Berry, 2003). The personal and cultural knowledge of Black girls may conflict with the culture of the school and the ways of knowing in which knowledge is validated. Therefore, the essence of Black girls and their culture is often devalued, problematized, and ignored (Morris, 2007; Neal-Jackson, 2018; Valoyes-Chavez & Martin, 2016).

Teachers' assessment of students and the expectations they hold for students are often predicated on these same White, middle-class values and dispositions (Lim, 2008), leading to Black girls being held to lower expectations and labeled as less competent or unteachable, which

further perpetuates disparities in Black girl's mathematics achievement and overall educational outcomes (Joseph et al., 2017).

Course Placement

“One source of mathematics inequities is the high school course placement decision-making process. In the United States, the classes that a student takes from ninth grade onward determine, in part, the opportunities they will receive for the rest of their lives” (Boaler & Dweck, 2016, p. 96).

Schools reproduce society's discriminatory practices through systems of tracking. Black girls are often disproportionately placed into tracks that cripple their chances of gaining access to higher education (Archer-Banks & Behar-Horenstein, 2012). Boaler and Dweck (2016) call the filtering into lower level mathematics classrooms a “clear case of racial discrimination” (p.97). This filtering into lower level classes is evident in AP enrollment numbers. Black girls make up 5% of AP math and science students compared to 8% of basic math and science students (Smith-Evans et al., 2014).

When Black girls enroll in AP or international baccalaureate programs, they sometimes chose to leave these spaces because they experience racism, exclusion, and deficit views of their intelligence. Black girls are the least likely to graduate high school with college credits or earn high scores on college entrance exams (Smith-Evans et al., 2014). This exclusion from advanced courses also occurs because classes are not offered at their schools. Only one quarter of high schools in the United States with the highest percentage of Black and Latino students offer Algebra II. Additionally, only 57% of Black high school students have access to Algebra I, Geometry, Algebra II, and Calculus (Smith-Evans et al., 2014).

Discipline

The disproportionate school discipline rates for Black students are well known (Skiba, Michael, Nardo, & Peterson, 2002). The Children's Defense Fund (1975) initially brought this problem to the forefront when it reported that Black students were twice as likely as their White peers to receive exclusionary discipline. While significant research has been dedicated to examining the disparities between Black and White youth, with a particular focus on Black boys (Skiba et al., 2002; Wallace, Goodkind, Wallace, & Bachman, 2008), the race gap is much higher among Black girls (Wallace et al., 2008). Black girls are more likely to have their educational experiences interrupted by exclusionary discipline (Epstein, Blake, & Gonzalez, 2017; National Women's Law Center, 2015).

Although researchers continue to bring attention to the disparities that overwhelmingly render Black girls vulnerable to harsh and punitive discipline policies (Annamma et al., 2016; Blake, Butler, Lewis, & Darensbourg, 2011; Epstein et al., 2017; Paul & Araneo, 2019; Wun, 2016a), little progress has been made to change this reality (Children's Defense Fund, 1975; Paul & Araneo, 2019). According to data presented by the U.S. Department of Education Office for Civil Rights (2014), Black girls are suspended and expelled at higher rates than girls of any other race or ethnicity and most boys. During the 2011–2012 school year, 12% of Black girls between pre-K and 12th grade received out-of-school suspensions, compared to only 2% of their White female peers. Another study (Paul & Araneo, 2019) examining out-of-school suspension and expulsion among Black girls in New Jersey public schools found that the extent of overrepresentation of Black girls has worsened over time, particularly in New Jersey. Their analysis of data from the Civil Rights Data Collection revealed that in 2000 Black girls represented 13.44% of out-of-school suspension and 14.17% of expulsions, while only being

8.62% of the total population. During the 2011–2012 academic year, although Black girls' percentage of the population decreased slightly to 8.06%, their rate of out-of-school suspensions and expulsions increased to 15.76 and 20.95%, respectively. A study conducted by the African American Policy Forum and the Columbia Center for Intersectionality and Social Policy Studies (2015), concluded that 90% of girls expelled from New York Schools in 2011–2012 were Black, whereas none of the girls expelled were White. This disproportionately in discipline starts as early as preschool, with Black girls making up 20% of girls enrolled but 54% of girls suspended from preschool (National Women's Law Center, 2015). In addition to receiving formal exclusionary punishment, Black girls are also more likely to be referred to the office (Wallace et al., 2008) and subjected to more informal discipline infractions, such as getting sent out of class, classroom embarrassment, and feeling scrutinized continuously (Wun, 2016b).

Researchers suggest that these disparities are not due to Black girls' tendency to commit more school infractions, but instead rest on the explicit and implicit biases and stereotypes of school administrators and staff (Carter, Skiba, Arredondo, & Pollock, 2017). Researchers have identified instances in which teachers' judgments about Black students are influenced by racially conditioned stereotypes (Ispa-Landa, 2013; Neal, McCray, Webb-Johnson, & Bridgest, 2003). As a result, Black girls are more often reprimanded for gendered transgressions viewed as “unladylike” and in need of social correction (Morris, 2007). Stereotypes of Black femininity, including being hypersexual, boisterous, and aggressive are imputed on Black girls (Epstein et al., 2017). As a result, disproportionalities are most prevalent in mostly subjective discipline categories, such as defiance, willing disobedience, and being disrespectful (Annamma et al., 2016; Epstein et al., 2017; Wun, 2016a, 2016b). Behaviors categorized as defiant or disobedient included having “attitudes,” a “smart mouth,” or “talking back” (Wun, 2016a). Similar behaviors

by non-Black girls do not receive the same reproofs (Blake et al., 2011; Morris, 2007). Analysis from Morris and Perry's (2017) study within a school district in Kentucky indicated that compared to their White peers, Black girls were twice as likely to be disciplined for minor infractions, such as dress code violations, inappropriate cell phone use, or loitering. Additionally, they were two and half times more likely to be disciplined for disobedience and three times more likely to be punished for disruptive behaviors (Morris, 2007).

Schools should be settings that promote a safe and productive learning environment. However, for many Black girls, they are sites of racialized and gendered forms of violence, manifested in inequitable school discipline policies and practices (Annamma et al., 2016; Wun, 2016a, 2016b). Black girls' defiance of traditional white constructs of femininity and girlhood result in them being hyper-surveilled and overdisciplined (Wun, 2016a, 2016b). These negative school experiences increase Black girls' risk of school classroom disengagement and limit their academic success possibilities. Teachers' perceptions of Black girls as more disruptive and less attentive negatively impacts the probability of Black girls being placed in advanced courses (Campbell, 2012). Discipline disparities also result in Black girls losing valuable instructional time, which impacts their grades, test scores, and long-term educational outcomes (Francis, 2012).

Both Fordham (1993) and Wun (2016b) found that one strategy Black girls utilized to survive in their hostile school environments was to reduce their school visibility. As one participant stated in Wun's (2016b) study, she withdrew from class and refrained from asking questions when needed to finish the course with minimal interaction with the teacher. Morris (2016) documents in *Pushout: The Criminalization of Black Girls in Schools*, the devastating effects of school discipline on Black girls' academic, social, and emotional lives. Ultimately,

Black girls are pushed out of the educational system due to explicit and implicit biases and the underlying racial and gender stereotypes that fuel them.

Opportunities to Learn Mathematics

Despite several research studies showing that Black girls have higher mathematics career aspirations than their White and Latina counterparts (Riegle-Crumb, Moore, & Ramos-Wada, 2011), desire to do well in school, participate in advanced course work, and attend college (Archer-Banks & Behar-Hourenstein, 2012), they are often impeded from pursuing opportunities to learn rigorous, relevant, and rehumanizing mathematics (Morton & Mutegi, 2018).

Morton and Smith-Mutegi (2018) found that Black girls often define their mathematics learning experiences as pretty routine when talking with Black girls about their mathematics experiences. Their day-to-day experiences typically involved checking homework, listening to a lecture, taking notes, getting new homework, and repeating. In these spaces, the knowledge that Black girls bring is not valued, they are not represented in the curriculum, and Black girls are not taught how mathematics can be used as a tool for personal and social change. (Morton & Smith-Mutegi, 2018). Experiencing mathematics teaching and learning in this manner can lead to developing a disinterest in the subject.

When examining the experiences of a high-achieving Black girl from a working-class background, Lim (2008) found that Stella, only one of three Blacks girls in her classroom, experienced a high level of anxiety. Stella's concern was in part due to the disconnection between the mathematics classroom and her lived experiences in the world outside the school. "She depicted her home as a place of freedom, full of warm emotion, where she was accepted as she was" (Lim, 2008, p. 308). Stella perceived her mathematics classroom as a "dangerous place

where the teacher was ‘always on your back,’ continually monitoring and controlling her behavior” (Lim, 2008, p. 308). Stella’s experiences in her mathematics classroom hindered her opportunities to gain the instrumental value of mathematics to her future career aspirations (Lim, 2008).

Some suggest that we live in a colorblind society and that young people must fend for themselves and achieve success in this newfound euphoric ideal of the American melting pot. When Black girls were asked to define racism in schools, their definitions centered on prejudice, discrimination, differential treatment, stereotypes, and low teacher expectations (Joseph et al., 2017). This means that not only are social constructs at play but students of color are deeply in tune and aware of the social forces and racialized obstacles they face. Students are not blind in any way to the harmful and unfair treatment they experience. Therefore, when a Black student says, “I don’t like math” or that a particular subject “is not for me,” there is often a myriad of forces that he or she is processing to cause them to make such a statement.

Redressing Black Girls Experiences

“[T]eachers need to help Black girls come to know themselves as creators of new thoughts, problem solvers, and individuals with imaginations able to recognize and appreciate different perspectives” (Joseph & Alston, 2018, p. 56).

As it pertains to Black girls, we as educators must become more deeply committed to creating equitable learning environments where the innate womanhood and brilliance of Black girls can both strive and thrive. No students ought to endure a learning environment wherein they are continuously bombarded by social restrictions and educational hurdles from teachers and peers. This sort of commitment has to do with the way that curriculum is selected, how teachers

are prepared to engage diverse student populations, and educators realizing that adding negative stereotypes to Black girls and the ways they express themselves can be profoundly scarring and cause damage that may last a lifetime. This is why the creation and support of informal learning spaces are critical. Such environments offer a counterspace wherein students are nurtured and enriched in a more affirming and holistic environment.

In this section, we explore ways to redress Black girls' educational experiences. We discuss the benefits of informal STEM learning and offer recommendations for formal mathematics learning spaces.

Informal Learning

Research has shown that informal STEM learning is one approach to making mathematics and science more accessible to a diverse body of learners (King, 2017). Informal STEM learning spaces positively impact learners' interest and desire to be persistent in STEM subjects (VanMeter-Adams, Frankenfeld, Bases, Espina, & Liotta, 2014). This is especially true for programs that center and value students' culture and lived experiences (Martin, 2012). Sahin and Adiguzel (2014) found that informal STEM learning programs promote collaboration and a stronger sense of ownership and community among participants. When looking specifically at girls of color, Barbara Kerr and Sharon Robinson-Kurpius (2004) found that participating in a supportive, informal STEM learning program increased STEM achievement and exploration of STEM careers. Research has also shown that informal STEM learning experiences contribute to the retention of Black girls in STEM disciplines.

Informal learning spaces can also serve as a counterspace for Black girls, where they feel love and care. Joseph and Alston (2018) state that for Black girls, the real gap is a "love and

caring gap” (p. 61). Black girls greatly benefit from inclusive learning environments that take into account their lived and social realities both inside and outside of school (Joseph & Alston, 2018; Morton & Smith-Mutegi, 2018) and intentionally take on the pathos of the village. The village is a realm where elements of love, support, care, and stimulation are coupled with academic rigor. In this way, the village is more than a mere emotional escape from the harsh and isolating realities of the formal classroom; it is a nucleus shaped around the principles of empowerment, enrichment, and exposure, such that the holistic betterment of the student is the ultimate goal. Programs of this nature have been proven successful and offer much more than sterile academic modules and irrelevant evaluations. Within these spaces, culturally relevant and socially transformative curriculum is used to provide exposure to mathematics learning that engages more than just the mind but also the heart, hands, and imagination of the student (Morton & Smith-Mutegi, 2018). Informal STEM learning spaces hold the potential to address mathematics inequities and broaden the participation of Black girls in STEM-related courses and careers (King, 2017).

Formal Learning

It is imperative that rigorous, relevant, empowering, and transformative mathematics learning occurs in both formal and informal learning spaces. Within traditional mathematics learning spaces, Black girls must have the freedom to grow interpersonally and intellectually and not be bound to the norms of White femininity (Morton & Smith-Mutegi, 2018). Black girls should be equipped with the critical thinking skills necessary to understand how oppressive structures and systems impact their lives (Joseph & Alston, 2018) and how to use mathematics as a tool for personal and social change against oppressive structures (Morton & Smith-Mutegi, 2018).

In their work, Joseph and Alston (2018) offer the following recommendations for teachers to help create more humanizing experiences for Black girls. It is important to note that Joseph and Alston (2018) state that a moral conviction for humanization is the first step. The recommendations provided can help redress the experiences of Black girls in mathematics classrooms through the rehumanization of Black girls' mathematics experiences. The first recommendation is to rely less on traditional teaching methods and create a democratic class where Black girls are valued and treated with dignity and respect. Second, teachers should let go of some of their power to better support Black girls to become producers of knowledge. Third, teachers must help Black girls understand what oppressive structures are at play in their everyday lives and that they have the power to challenge those structures. Fourth, teachers should move away from the textbook, allowing Black girls to generate powerful mathematics ideas. Embracing and implementing these practices, dispositions, and beliefs can serve as vehicles for helping Black girls feel valued and a sense of belonging in mathematics classrooms (Joseph & Alston, 2018).

Morton and Smith-Mutegi (2018) offer recommendations that align with the practices, dispositions, and beliefs offered in Joseph and Alston's (2018) work and the work of Aguirre, Mayfield-Ingram, Martin, 2013). Morton and Smith-Mutegi (2018) believe that teachers must build a "strong and sincere" rapport with Black girls (p. 34) and their families and communities. Black girls should be encouraged to see themselves as learners and creators of mathematics. The curriculum implemented in the classroom should be one that values and centers Black girls' experiences, interests, history, and the histories of their communities (Morton & Smith-Mutegi, 2018).

Morton and Smith-Mutegi (2018) have found that through a socially transformative STEM curriculum approach, Black girls are provided learning opportunities that allow them to see themselves as learners, doers, and creators of mathematics. Black girls also gain a more robust understanding of how to use mathematics to improve their social condition and their communities. The environment in which a socially transformative approach to mathematics teaching and learning is implemented should be one that exudes comfort, love, and care. The classroom should be a supportive environment that values and affirms Black girls' multiple identities. This environment should foster collaboration and enhance critical thinking skills. It is also imperative for teachers and other school personnel to establish rapport and authentic partnerships with families and communities.

Concluding Thoughts

Black girls are not naive to the stereotypical views held by the educators who should support and foster their academic growth. The interactions Black girls daily encounter are a constant reminder that who they are as Black girls are not valued in educational spaces (Evans-Winters, 2011; Lim, 2008). Black girls recognize that negative perceptions held by teachers and other school officials are a large part of the reasons they are shut out of educational opportunities in their schools (Neal-Jackson, 2018). Current educational policies and practices are overwhelmingly engaging in approaches that do not take a serious stance on issues of race, racism, or racial injustices. Issues and policies are treated as "colorblind" and are not capable of overcoming serious racial injustice issues in school and society. Black girls are often overlooked in schools due to colorblind approaches ignoring their intersectional identities of race and gender. Educational leaders and policymakers should pay explicit attention to race and its role in

educational equity and inequity to improve the educational opportunities and outcomes for Black girls (Joseph et al., 2016).

Black girls continue to excel in education when given a chance despite the multiple barriers placed before them (Joseph et al., 2017), but these barriers should not exist. Educators must work to dismantle the oppressive structures that hinder Black girls' development as learners in general and mathematics specifically. As educators, we cannot turn a blind eye to Black girls because they continue to persist despite the odds. We must continue to work to understand what it means to be a Black girl learning mathematics in formal and informal learning spaces and take actions based on what we learn.

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