"I Can Overcome That": Counterstories of Black Secondary Science Teachers' Positional Identities

Sonia M. Howard

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The Dissertation Advisory Committee and the student’s Department Chairperson, as representatives of the faculty, certify that this dissertation has met all standards of excellence and scholarship as determined by the faculty.
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ABSTRACT

This study presents the positional identities of six Black secondary science teachers – three who identify as women and three who identify as men – with 74 years of collective science teaching experience. The purpose of this study was to explore the lived experiences that inform Black secondary science teachers’ positional identities and how they position themselves in their school contexts. Critical race methodology grounded this research to highlight the ways in which lived experiences inform the construction of positional identities – or one’s relative positioning as informed by social markers and by relative power and agency in given cultural contexts – and how these positional identities are reflected in their current school contexts. Data sources include three semi-structured conversations with each teacher. Throughout each conversation, the teachers and researcher engaged in interactional narrative analysis, a process where narrative knowledge was co-created and then harnessed to create for each teacher a counterstory of their positional identities. The Black secondary science teachers primarily shared stories relating to becoming scientists and observing racial discrimination within the schools in which they work.
Theorization across the counterstories also revealed that the Black secondary science teachers mainly positioned themselves as teachers of students of color and as caregivers for students for color. Research implication of this study include the need for science education research to purposefully include the perspectives and expertise of Black secondary science teachers if the field is truly serious about creating science education spaces and opportunities that are equitable and inclusive. Additionally, practical implications include the need for schools to evaluate their science learning spaces to ensure that they are creating spaces that are facilitative science learning contexts that support and encourage their students of color to fully engage in and learn science at high levels, so that they will be able to access postsecondary science learning opportunities.

INDEX WORDS: Black teachers, science teaching, counterstories, critical race theory, identity, science teaching
“I CAN OVERCOME THAT”: THE NARRATIVE CONSTRUCTIONS OF BLACK SECONDARY SCIENCE TEACHERS’ POSITIONAL IDENTITIES

by

SONIA HOWARD

A Dissertation

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in

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in

the College of Education and Human Development

Georgia State University

Atlanta, GA

2019
DEDICATION

To Viola, Laurence, Angela, Regina, Michael, Daniel,

I’m honored that I was able to learn from each one of you, and I am forever grateful for the knowledge you’ve shared. It has already changed my teaching practice for the better, and I can’t wait for the world to learn from you all. Thank you!
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Mom and Dad, thank you for *everything* – and I do mean, *everything!* Your daughter has a doctorate now, and I couldn’t have done it without all that *everything* you all provided for me at the right times.

To the rest of the Howards (and the spouses) – Quiana, Mike, Sam(mie), Kelley, Sydney, Tyler, Alani, Brooke, and Third – I told you I’d shout you out, so here you go (I love you all!).

To my chair – Dr. Natalie King, my scholarship (and life) is all the better for working with you. Thank you for your unwavering belief in me and my work, even when my own belief in myself faltered. I hope you’re proud of this work as the first dissertation you chaired.

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To the great Black leaders that I’ve worked for in my career – Dr. Gilbert, Mrs. Wiley, Dr. Treadwell, Dr. Taylor, and Mr. Williams, I literally owe my career to all of you. Between modeling what leadership looks like to taking the chance to hire me in the first place, thank you all for the support over the years. I wouldn’t be the teacher or the scholar I am today without it!
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LIST OF DEFINITIONS

Black teachers – teachers who identify as Black and/or are of African descent

Critical race theory (CRT) – theoretical framework foregrounding race as a salient element in framing of research questions, data collection, and data analysis. Within this framework are five themes: the intercentricity of race and racism with other forms of subordination; the challenge to dominant ideology; the centrality of experiential knowledge; a transdisciplinary approach; and a commitment to social justice (Tate, 1997)

HBCU – acronym for historical Black colleges/universities

Identities as narratives – theoretical framework that defines identities as narratives about individuals that are “reifying, endorsable, and significant” (Sfard & Prusak, 2005)

Positional identities – theoretical framework that views identities and their formation in the context of social markers (e.g., race, class, gender). (Holland, Lachicotte Jr., Skinner, & Cain, 1998; Mensah, 2016)

Secondary science teacher – Grades 6-12 science teacher

Students of color – Black, Latinx, and/or Indigenous K-12 students (Milner, 2012)
1. Introduction

“There are lessons that I have learned from a long teaching career that are useful for teachers who are teaching today. A lot of things have changed, but a lot of things haven’t. Isn’t there an expression, ‘The more things change, the more they stay the same’?” – Ora Benson (Foster, 1997, p. 20).

Ora Benson, one of many voices in Foster’s (1997) portraiture research, *Black Teachers on Teaching*, was born in New York in 1911 to immigrant parents from Jamaica. As Foster noted, she grew up during a time in New York known for the increasing multiculturalism of the area that was caused by an increased number of immigrants coming to the United States. Her teaching career started in the 1930s, the decade known for the Great Depression. Her career continued well through the 1960s, the decade known for the Civil Rights Movement. As Ms. Benson herself noted, her long career as a teacher, along with other life experience, imbued her voice with authority and credibility to speak about issues in education in the past and how they were still relevant in the 1990s, when Foster’s book was published. Ms. Benson was right – a lot of things have changed in education over the course of her lifetime, and others have changed very little, if at all.

One of the biggest changes in education for Black people in the U.S. was the *Brown v. Board of Education of Topeka* (1954) Supreme Court decision that legally reversed the notion of “separate but equal” and required the desegregation of public schools. Throughout *Black Teachers on Teaching* are the stories of Black teachers who either experienced desegregation as adults trying to continue teaching to the best of their capabilities, or experienced desegregation as students trying to figure out the then-new paradigm of public schooling. In theory, desegregation lead to public schools that were spaces for all races and ethnicities to receive equal
access to quality education and the opportunities such an education can grant to students. Indeed, both solutions – public school integration and the end of Jim Crow laws – should have benefited Black students and other students of color, whether they stayed in their original schools or integrated into predominantly White schools. In reality, the Brown Supreme Court decision came with a price at the expense of Black teachers and Black students (Foster, 1997). Black teachers were pushed out of their jobs, and Black students endured biases and discrimination without the support and advocacy of their former teachers. Concurrent with desegregation efforts was a renewed push for higher quality science education, thus igniting reform efforts aimed toward producing students capable and willing to go into STEM-based careers. In alignment with the discriminatory treatment Black students faced during desegregation, many science reform efforts ignored the issues Black students faced and left them out of various STEM spaces (Mutegi, 2011).

This is a part of what Ms. Benson was talking about when she said “A lot of things have changed, but a lot of things haven’t” (Foster, 1997, p. 20). Inequities in the public education system have persisted for students of color despite desegregation and the elimination of Jim Crow laws. About these persistent issues, Ms. Benson offered a brief lesson for teachers today:

I don’t know if we did a good job back then dealing with the problems. But if this society plans to continue, then all of us, and this includes schools and teachers, will have to face whatever problems there are and deal with them. We can’t keep blaming someone else and passing the problems on to someone else. Today’s problems belong to all of us.

(Foster, 1997, p. 21).

Ms. Benson rightfully asserted that we collectively own the persistent inequities in U.S. public schools, and particular to this study, those in science education. However, she specifically
centered teachers as the primary recipients of her knowledge developed over a lifetime spent in classrooms with students of color before and after desegregation. In this research, I too center teachers, specifically Black secondary science teachers, as crucial figures toward righting the longstanding wrongs that are still borne by students of color in public schools. In the next section, I first frame these longstanding wrongs as decisions and policies that over time contributed toward an ever increasing education debt, as conceptualized by Ladson-Billings (2006). Then, I argue that, teachers, given the amount of influence they have on enacted curriculum in classrooms, are crucial figures in paying down, and eventually eliminating, the education debt owed to students of color.

The Education Debt

“*My philosophy of education is that you have to treat the whole child...If they become bad, it’s because of something that society has done wrong...My view of what should go on in school also has a lot to do with my personality, because I can’t live in a dead place, and too often school is deadly.*” – Ethel Tanner (Foster, 1997, p. 81)

The population of the U.S. is drastically different from what it was a century ago; it is more racially and ethnically diverse than ever before, and accordingly, the U.S. public school population is just as diverse. This is due in large part to the increased population of the U.S. overall, and more specifically, a still increasing number of immigrants moving to the U.S. (Lee & Luykx, 2007). This means the U.S. is becoming less White and more multicultural. However, in spite of this increasing multiculturalism, White people are disproportionately wealthier and represented in positions of power (Gorski, 2013; Parsons, 2014). In education discourses, White students perform better on national standardized test achievement measurements than students of color (Gorski, 2013; National Center for Education Statistics, 2018; National Commission on
Excellence in Education, 1983; National Research Council, 2011, 2012; National Science Foundation, 1980). When achievement is expanded to include graduation rates, number of students labeled as “gifted”, or number of students enrolled in higher level and Advanced Placement (AP) courses, White students are still disproportionately doing better than students of color (Milner, 2012; Solórzano & Ornelas, 2004). Looking specifically at STEM education, students of color – defined for this study as Black, Latinx, and/or Indigenous students – are disproportionately left out of higher level and AP STEM courses (Solórzano & Ornelas, 2004). These disparities in STEM continue past high school as reflected in the numbers of Black and Latinx students receiving STEM degrees in comparison to their White peers – as of 2016, about only 7% of all STEM degrees awarded went to Black American students (National Center for Education Statistics, 2019).

Discussions of the achievement gaps behind these disparities became ubiquitous over the last 30 years, even though these discussions have existed in some form since the post- Brown 1960s (Coleman et al., 1966; Ladson-Billings, 2006). After the rise of the term achievement gap in the discourse about students of color came the problematization of the term and its focus on enumerating and reiterating the particular gaps between these students and their White peers. Ladson-Billings (2007) pointed out the semantic issues with the term, namely the suggestion that one set of students is doing fine while the others need to catch up. This assumes that the “fine” set of students will remain static and wait for the others to catch up. However, given that the achievement gap is defined by its focus on annual achievement markers, this makes catching up a gargantuan, if not impossible, task to accomplish for the sets of students who are behind. The second semantic issue with achievement gaps is that it flattens the issues that students of color face into a singular student achievement issue, as if social contexts play no role in student
achievement (Gutiérrez, 2008; Ladson-Billings, 2006, 2007; Milner, 2012). For example, a part of what keeps students of color away from STEM is the lack of access, not the lack of ability. Black students are often tracked into lower level classes (Oakes, 1995; Solórzano & Ornelas, 2004). As a result, they are denied access to more rigorous college preparatory STEM courses. Removing contexts from the conversation means that student achievement becomes an issue of the students themselves – they are solely responsible for their success or failure. Gutiérrez (2008) went further and explained the dangers of what she called gap-gazing, or the fixation on reiterating racial and ethnic inequities in achievement markers:

Most dangerous are analyses that merely document the existence of the gap…Deepening our knowledge in this arena is unlikely to advance the cause of marginalized students. Of lesser concern are researchers trying to document factors associated with the gap because they have the goal of reducing it. Even those researchers, however, could benefit from carefully considering whether the costs outweigh the benefits.” (p. 358).

While so-called achievement gaps do exist and are problematic, they are only symptoms of larger, systemic issues and accordingly, viewing and then addressing these issues holistically gives us a better shot at understanding and then eliminating them.

**From Gaps to the Education Debt**

In lieu of framing inequities within U.S. public schools as achievement gaps, Ladson-Billings (2006, 2007) proposed viewing them as an education debt that is owed to students of color. This education debt holistically accounts for the historical, economic, sociopolitical, and moral decisions, or “debts”, that have accrued over time to result in the inequities across race, class, and gender in public schools today (including achievement inequities). The historical debt refers to the history of the subjugation of particular racial, class, and gender groups in the U.S.
since its foundation. The economic disparities between racial, class, and gender groups due to historical debts and modern policies comprise the economic debts. For example, the increase in school funding as the number of White students increases counts as an economic debt towards the collective education debt. Sociopolitical debts refer to the disenfranchisement of marginalized communities from political processes in the U.S. Ladson-Billings (2006) noted that voting issues still exist and Black, Latinx, and Indigenous people in the U.S. have disproportionately lesser amounts of political capital in comparison to White people. The moral debt Ladson-Billings (2006) referred to is “the disparity between what we know is right and what we actually do.” (p. 8). These historical, economic, sociopolitical, and moral debts considered as a whole comprise the education debt.

Once we frame inequities as an education debt rather than mere achievement gaps, it becomes clear that: a) achievement gaps are logical outcomes of the education debt; b) existing gaps are not gaps of achievement, rather they are opportunity gaps that have resulted from the numerous debts owed to students of color, and c) gaps are symptoms of larger systemic issues that negatively affect students of color (Gutiérrez, 2008; Ladson-Billings, 2006, 2007; Milner, 2012). What this means for K-12 STEM education is that framing the underrepresentation of students of color in STEM spaces as mere disinterest or lack of ability is ahistorical, apolitical, and immoral. The more credible framing views the disparities and underrepresentation in STEM as opportunity gaps from debts owed to students of color in science education.

Ladson-Billings (2006) argued re-framing inequities as the education debt is not enough. Following this re-framing, researchers and practitioners need to address three things in relation to the debt: 1) how the debt informs education today; 2) how the debt is related to past research on educational inequalities and inequities, and 3) the implications of the debt on solutions and ways
forward for students of color. I aimed for this study to contribute towards addressing Ladson-Billings’ third point: the implication of the debt on solutions and ways forward for students of color. In U.S. public education, there are many characters involved within it and affected by it, but as a researcher and a science teacher, my main focus was the classroom-level. Within most stories about traditional classrooms in the U.S., there are two categories of main characters – the students and the teachers. Of the two, teachers hold the advantage in the power differential, and as implied by any perspective using the education debt, students cannot pay themselves back what they are owed. Therefore, I focused on teachers. While one teacher alone cannot contribute a significant amount towards the education debt, a collective of teachers can. Teachers, taken as individuals, are not the most powerful figures at any level of U.S. public education given their general lack of influence and control over laws and policies that govern the many aspects of public schooling (including official curriculum and standards). However, inside the classroom, I argue that teachers maintain a great deal of power in their ability to implement curriculum in ways that fit within each individual’s beliefs, values, and life experiences, among other personal factors.

**What Teachers Owe Students: The Enacted Curriculum**

“When you ask most high school teachers what they teach, they will respond with a subject: science, mathematics, English. High school teachers don’t talk much about teaching students. But in order to teach effectively, teachers have to teach more than their subject.”

– Millicent Byard Gray (Foster, 1997, p. 114).

To begin my argument, I must first answer the following question: Who develops the curriculum that teachers use in their classrooms? The short answer is mostly not teachers; they are typically left out of official policy development and implementation of curricula and
associated instructional practices and materials to be used in their classrooms (Januszyk, Miller, & Lee, 2016; Popham, 2004). Experts from academia (National Educational Association Committee of Ten on Secondary School Studies, 1892) and from the workplace (National Science Foundation, 1980) tend to take teachers’ place in official policy making and as a result, they have a significant influence on intended curriculum, which refers to sets of knowledge, skills, and dispositions students should acquire through education as provided to teachers by non-teacher developers (Glatthorn, 1999).

The exclusion of teachers from curriculum development was established during the inception of curriculum studies as an academic discipline. Franklin Bobbit, one of the first curriculum studies researchers, supported moving towards “science-based” methods of curriculum development that involved enumerating skills and behaviors of top performers of various vocations (Bobbitt, 1918/2013). In Bobbit’s system, teachers were provided curriculum by a specialized group of curriculum developers tasked with developing curriculum for teachers with the input and guidance of academics and in-field professionals from varying vocations. (Flinders & Thornton, 2013). This was justified by the notion that academics and top in-field professionals knew more about students’ future needs than teachers in the classrooms. This is still evident in today’s science classroom in the science standards documents produced by state or local districts that guide what and how science teachers teach (Windschitl & Stroupe, 2017).

In the years since the origination of Bobbit’s (1918/2013) ideas on transferring responsibility of curriculum and support tools development to curriculum specialists, other researchers and thinkers have put forth alternative ideas. Indeed, teachers have more of input in official curriculum development and policy decisions today. However, their input remains comparatively small (Januszyk et al., 2016).
Despite their absence from the conversation on curriculum development, teachers still assert some control over its implementation. As Thornton (1989) wrote, “The operational curriculum – the curriculum that is actually provided in the classroom – is, on a daily basis, constructed by the teacher” (p. 4). Teachers construct this operational curriculum, because they are the executors of the intended curriculum. As used in here, the concept of enacted curriculum is similar to Thornton’s (1989) definition of operational curriculum. However, enacted curriculum refers to how a curriculum is implemented in a classroom of students compared to the intended curriculum. Curriculum developers maintain full jurisdiction over intended curriculum but maintain little control over how it is enacted. Frequently, teachers determine if, when, and how they use curricular materials packaged with an intended curriculum (Lysaker, 2012). Additionally, teachers demonstrate a tendency to incrementally modify even the most stringent of scripted curricula and instructional packages to meet the needs of the students in their classrooms (Lysaker, 2012). Even miniscule changes from the intended curriculum can make a difference in the classroom, so any changes teachers make at the classroom-level are significant to the enactment of scripted curriculum.

**Why Teachers’ Influence Over Enacted Curriculum Matters**

Teachers have a personal frame of reference (hereafter, referred as frames) that informs how they receive information from their classrooms and how they operate within their classroom. Here, frames are described as, “teachers’ beliefs about schooling, his or her knowledge of the subject area and of available materials or techniques, how he or she decides to put these together for classrooms” (The National Science Foundation, 1980, p. 5; Thornton, 1989). Teachers across different levels and subject areas have different beliefs of education, knowledge sets, and outlooks that make for a wide variety of perspectives of what and how to
teach. These frames are largely the reason for the distinction between the intended and enacted curricula. Because of these frames, teachers see parts of the intended curriculum differently from their peers. As a result of different personal frames, teachers develop different perspectives of the intended curriculum, which affects the enactment of the curriculum. Considering the collective number of teachers (thus the number of frames), curriculum potential is extensive (Ben-Peretz, 1975). While there may not be huge differences in the classroom experiences of teachers of the same level or subject area, subtle differences in teachers’ frames make a difference in curriculum enactment (Thornton, 1989).

Individually and collectively, teachers are important figures in education. Individually, each teacher operates from a frame that informs how they perceive their classroom of students and the curriculum and how they enact the curriculum for their particular group of students. Collectively, teachers have the ability to pool their individual knowledge of their contexts towards a larger body of knowledge about students and communities that potentially can have a profound influence on students. Indeed, education in the U.S. is one of few tools of social, political, and class empowerment (Freire, 2000). It acts as a gatekeeper in U.S. society, or an instrument that grants or limits access to opportunities to students as they traverse K-12 education and beyond into adulthood (Basile & Lopez, 2015; Douglas & Attewell, 2017; Gorski, 2013; Stinson, 2004). Understanding who influences the curriculum students experience in the classroom on a daily basis helps to understand a part of how and why opportunities are granted or limited to particular students. Teachers have the most direct connection to students, which puts them into a singular, powerful position to use their positions responsibly to the benefit of all students, especially the most vulnerable students in U.S. public schools: students of color (Foster, 1997; J. J. Irvine, 1990; Parsons, 2005; Walker, 2000). This has special implications for
STEM education, a stubbornly un-diversified space as the U.S. becomes more diverse (Parsons, 2014; Walls, 2016). Unfortunately, vulnerable students have not been able to reap the benefits of their teachers’ collective power, in part because of cultural mismatches between students and their mostly White teachers.

**Listening and Learning from Black Teachers**

“Black kids need teachers who can understand and appreciate something about Black communities. Too many White teachers don’t understand Blacks and don’t want to understand us, yet they expect us to be able to understand them…Why is that?“

– Bernandine B. Morris (Foster, 1997, p. 61)

The National Center for Education Statistics (2018) reported that during the 2015-16 school year, 80.1% of public school teachers in the U.S. were White. Comparatively, the U.S. Census Bureau (2016) estimated that the 62% of the population is non-Latinx White. While the nation becomes increasingly diverse, the population of teachers consists primarily of White women (National Center for Education Statistics, 2018). To be clear, I do not imply that White women or White men cannot be effective teachers of students of color; Ladson-Billings (2009) and Parsons (2005) strongly insisted that White teachers committed to enacting social justice in their classrooms through culturally relevant pedagogy and culturally relevant caring to successfully teach students of color. However, these culturally relevant White pedagogues are in the minority of White teachers. Many White teachers (and even some teachers of color) perceive the race and class identities of their students of color as deficits that must be surmounted before these students are successful (Prime & Miranda, 2006). Additionally, many White teachers avoid discussions about racial disparities in education or how race matters at all in education (J. J.}

…the reluctance of teachers and administrators to discuss race and race-related issues like ethnicity, culture, prejudice, equality, and social justice. This color-blind philosophy is linked to educators’ uncomfortableness in discussing race, their lack of knowledge of the cultural heritage of their students and the students’ peers, and their fears and anxieties that open consideration of differences might incite racial discord or perhaps upset a fragile, often unpredictable, racial harmony. (p. 26).

As a result of this cultural aversion, teachers and other school officials remain comfortable by not confronting and dealing with the inequities students of color face, thus deepening the education debt owed these children.

J. J. Irvine (1990, 2003) and Foster (1997, 2001) suggested two divergent yet related imperatives for school officials and researchers to combat the cultural aversion documented in public schools. J. J. Irvine’s (1990, 2002) imperative focuses on racially diversifying the teacher population to match the diversity in the student population. Villegas and Irvine (2010) examined three main arguments in favor of the goal of increasing racial diversity among teachers and the literature to support these three arguments. The three themes of the arguments are rooted in how teachers of color are leveraged in schools: 1) teachers of color as role models; 2) teachers of color as advocates for students of color; and 3) teachers of color as faculty in understaffed schools.

Related to these arguments for increasing teacher diversity is Foster’s (1997, 2001) imperative to learn from teachers of color as keepers of cultural and generational knowledge of their students of color. Both Foster (2001) and Villegas and Irvine (2010) acknowledged that
even though the “teachers of color as role models” argument is well-intentioned, it is relatively shallow in context of the history of teachers of color overcoming seemingly insurmountable hurdles to successfully teach their students of color. Additionally, the argument of “teachers of color as faculty in understaffed schools” reduces teachers of color to mere physical bodies in front of classrooms without any frames of reference that guide them and inspire them to work in understaffed schools. However, Foster (2001) and Villegas and Irvine (2010) agreed that while what teachers of colors do for their students is well-documented, including acting as role models (Stanford, 1998), what is not as well documented in current research are the stories behind what teachers of color do. As Foster (2001) lamented:

…although there is considerable evidence that African American teachers were discriminated against both before and following the Brown vs. Board of Education of Topeka decision, we know very little about the philosophy and practice of contemporary African American teachers. Do African American teachers have a distinct educational philosophy? If so, how does this affect their practice? To what extent do social class, age, gender, geographic region, and type of teacher-training institution attended shape the attitudes, behavior, philosophy, and practice of African-American teachers? (p. 578).

Understanding teachers’ frames and the philosophies that ground them is important to understanding how they conceptualize their work as teachers knowing that these frames influence thoughts about race, class, and gender among other cultural and social identities (Moore, 2008; Southerland et al., 2011; Thornton, 1989). However, the current body of research about how these frames and philosophies inform teachers’ work is primarily race-neutral, and therefore fails to account for how this informs teachers of color in any tangible way. This study aimed to approach Villegas and Irvine’s (2010) argument of “teachers of color as advocates” as
well as heed Foster’s (2001) call for research that is “an analysis of any unique characteristics, pedagogy, or philosophy of education believed to be possessed by African American teachers” (p. 574) through centering the voices of Black science teachers about who they are and how their identities inform their work

**Purpose of the Study and Research Questions**

The purpose of this study was to explore the lived experiences that inform Black secondary science teachers’ positional identities and how they position themselves in their school contexts. Guiding this research were the following research questions:

1. What lived experiences inform Black secondary science teachers’ positional identities?
2. How do Black secondary science teachers position themselves in their school contexts?

**Conceptual Framework**

This research was a qualitative study, which means that the overarching goal was to explore the “qualities”, or particularities, of knowledge under the assumption that knowledge creation and how meanings are assigned to knowledge is a fully human endeavor (Denzin & Lincoln, 2011). More specifically, this study explored the particularities of the lived experiences of Black secondary science teachers and how they positioned themselves in their schools. Qualitative research is grounded in and guided by at least one theoretical framework. In this research, I melded together elements from three theoretical frameworks into a single conceptual framework. Conceptual frameworks can be thought of like soups. Typically, the broth provides the base flavor of the soup. Added to the broth are various ingredients with characteristics of their own that when brought together with the broth provides a unique and more in-depth flavor that cannot be achieved by any single ingredient alone. Indeed, the conceptual framework of this study, as shown in Figure 1, came together from three theoretical frames to make a unique,
In the next section, I discuss the three theoretical frameworks that comprise the conceptual framework: positional identities (Holland et al., 1998; Mensah, 2016); identities as narratives (Sfard & Prusak, 2005); and critical race theory (Tate, 1997). Then, I explain the elements from each theoretical framework used in the conceptual framework and the affordances of each element.

**Positional Identities**

To continue the soup analogy here, if the conceptual framework is the completed soup, then the positional identities theoretical framework is the broth of the soup that provides a base for all of the other ingredients to be added. The positional identities framework was originally coined by Holland et al. (1998) as “positional identity”. Holland and colleagues (1998) presented this framework to explore identity and agency within cultural contexts and defined positional identity as views of self in a particular context based on “a sense of relative social position”
Moore (2008) first used this theoretical framework in her exploration of how the positional identity of Black science teachers informed where they worked and how they approached professional development. She operationally defined positional identity as “the relative positionings the teachers occupy, such that race, ethnicity, class, gender, age, and religion, among many others, intersect[ing] in multiple ways, allowing individuals to acquire knowledge of science and themselves and to define who they are in unique ways.” (p. 687). Of the decision to employ positional identity as a framework, Moore noted that “for science education particularly, we are not sure to what extent [positional identity] influences actual teacher development, social and professional identities, and science teaching practices” (p. 687).

Similar to the reasons Moore used to justify positional identity as a credible framework, this study combined the two versions to operationalize positional identity as the relative positioning one occupies as informed by social markers (e.g., race, class, gender) and by relative power and agency with given cultural contexts (e.g., classroom, school building, community).

The positional identity framework by itself accounts for relational and intersectional aspects of social marker identities (e.g., race, gender, class) in the development of other identities (e.g., science teacher identity) in addition to how relative social power informs positionings in a given context. However, there are two critiques to be made of the positional identity framework in the context of this study. First, as suggested by Moore’s (2008) description of the positional identity framework, teachers can and do often occupy multiple positions all at once. For example, within a classroom, teachers may hold higher social positioning than their students, but in this same context, they are likely positioned lower than administrators in the building, and this is without accounting for various social identities possessed by the teachers, students, and administrators. Second, as with all frameworks rooted in examining identities, the positional
identity framework is at risk of being “unreachable” without a grounded definition of identity (Avraamidou, 2014; Sfard & Prusak, 2005). Using elements of the identities as narratives framework, as described by Sfard & Prusak (2005), rectifies both critiques to add depth to the complete conceptual framework.

**Identities as Narratives**

Sfard & Prusak’s (2005) identities as narratives framework developed out of the need the authors saw for more concrete and stable conceptualizations of what constitutes identities. Prior to their framework, they argued that discussions of identity rarely came with an explicit description of what was meant by the word “identity”. From this need for explicit description and an analysis of the two most prominent discussions of identity by Gee (2000) and Holland et al. (1998), the identities as narratives framework emerged. Sfard & Prusak (2005)’s identities as narratives framework defines identities “as collections of stories about persons or, more specifically, as those narratives about individuals that are reifying, endorsable, and significant.” (p. 16). The element centered in this study from the identities as narratives framework is the definition of identities: reifying, endorsable and significant narratives about an individual. Given the importance of the three descriptors of narratives within this definition, an explanation of the terms “reifying, endorsable, and significant” is important to understanding how the definition fits into the conceptual framework.

The reifying description refers to stories that are grounded, to some degree, in socially constructed reality. For example, consider the brief story: “I am good at science, because I made a 90 on my chemistry test.” This identification of “being good at science” is reified by the reality of making a 90 on a chemistry test, and grades of “90” are generally agreed to be good in the U.S. education system. The reification of identities in narratives happens throughout the
narratives in the form of supporting details and explanations for the identities being discussed. “Endorsable” refers to the credibility of narratives being told about identities. For example, consider the story of Rachel Dolezal, the former president of the Spokane, Washington chapter of the NAACP (Brownson, 2018; Oluo, 2017) who lost her position and her job as an African Studies professor after it was revealed that even though she identified as a Black woman, she had no African ancestry. In the documentary, *The Rachel Divide* (2018), she described her childhood with her White parents and White biological brother, along with her adopted Black siblings. She justified her identification as a Black woman through stories about developing an increasingly maternal relationship to her adopted Black siblings to protect them from familial abuse. She further grounded her Black woman identity in her experience attending a historically Black college (HBCU) and in her experiences being in romantic relationships with Black men resulting in children with African ancestry and who also identify as Black. Indeed, there is narrative knowledge within Rachel’s stories but none of it is of inhabiting a “Black woman identity” because her stories about her Black womanhood are neither reifying nor credible based on the details and explanations she provides in her stories (Oluo, 2017). Lastly and most succinctly, “significant” narratives about identities are regarded as those that are crucial to the narrators in conveying identities. By default, it is assumed that if the narrative is important enough to share, it is likely a significant narrative. As Sfard & Prusak (2005) noted about significant narratives, “The most significant stories are often those that imply one’s memberships in, or exclusions from, various communities” (p. 17).

The definition of identities from the identities as narrative framework adds depth to the conceptual framework by adding two dimensions to the positional identity framework. First, inherent in the name “identities as narratives”, the framework recognizes that there are varying
stories that describe a multitude of identities – or, it recognizes that identities are multiple and intersecting. Therefore, instead of using “positional identity”, I recognized a multitude of positionings in any given context by using the phrase, “positional identities”. The second dimension added by the identities as narrative framework is that it grounds understanding one’s identities in listening to, understanding, and learning from the stories people tell about themselves.

**Critical Race Theory**

The last dimension of the conceptual framework comes from the tenets of critical race theory (CRT). CRT emerged in the late 1980s as a theoretical framework in response to major criticism of *critical legal studies (CLS)*, which itself originated in the 1970s (Brown & Jackson, 2013). The emergence of CLS followed a string of court decisions that signaled a legal ideological tide change that shifted from the original view of the court system as a means toward civil rights to the current view of the court systems as an institutional civil rights blockade. CLS scholars challenged the legal discourse that upheld legal reasoning (and court systems) as neutral and objective, and therefore, uninfluenced by social, cultural, and political forces and ideologies. While many significant insights and pieces of scholarship originated from CLS, many legal scholars of color felt the CLS movement failed to adequately address the direct role of race in legal decisions and the resulting fallout put upon mostly people of color (Crenshaw, Gotanda, Peller, & Thomas, 1995). As a result, these legal scholars of color developed CRT to explore the role of race in legal decisions and to challenge hegemonic ideas of objectivity with the legal system. Ladson-Billings and Tate (1995) argued that the same principles of CRT could be used to explore inequities in throughout the multiple dimensions of education in the U.S. and to
challenge practices, policies and structures in the education systems that marginalize and oppress students of color.

In his literature review of CRT scholarship, Tate (1997) summarized five tenets of CRT scholarship. The first tenet, the intercentricity of race/racism with other forms of subordination, understands the endemic nature of racism in U.S. society and how it permeates socially, culturally, and inevitably, psychologically (Tate, 1997). This implies that when examining questions about race and schooling, racism is imbedded within public schools and requires consideration. The second tenet, the challenge to dominant ideology, views research using CRT as a means to produce scholarship that unearths, creates, and displays epistemologies that counter dominant epistemologies that view people of color from deficient lenses (Solórzano & Yosso, 2002). The third tenet is the centrality of experiential knowledge and context in understanding how racism permeates into different structures in the U.S. This means that a more complex understanding of Black teachers can be achieved through understanding their experiences (and the knowledge within them). The fourth tenet of CRT is the transdisciplinary approach taken to studying issues of race and racism. Within CRT, one can reasonably find several epistemological and theoretical lenses (e.g., feminism, critical theory, and intersectionality) that are equipped to handle the nuances and complexities inherent to a comprehensive analysis of the experiences, knowledge, and identities (among other facets) of people of color (Ladson-Billings & Tate, 1995). The fifth, and last, tenet of CRT is the commitment to social justice through scholarship. The ultimate goal of research utilizing CRT is to use findings and new knowledge toward constructing an equitable, inclusive, and just society (Parker & Lynn, 2002). While all of the tenets are implicit in CRT scholarship, every tenet may not be the center of focus in a particular research study. This is indeed the case of this study;
implicitly, all five tenets of CRT informed this study. However, this study explicitly centered the following tenets:

1. *The intercentricity of race and racism to other forms of subordination:* This study foregrounded race as a salient identity among other identities in the analysis of lived experiences and the narrative construction of positional identities.

2. *The centrality of experiential knowledge:* Implicit in the identities as narrative framework is the idea that experience, as shared through narrative, plays a role in the development of identities. Experiences cannot be fully conveyed through narrative, but the narrative telling of an experience unearths narrative knowledge, which is blend of experiential knowledge and knowledge about who the narrator is (Clandinin & Connelly, 2000; Sfard & Prusak, 2005).

**Significance of the Study**

This study centered the voices of Black secondary science teachers, because their voices remain at the margins of conversations about students of color and about themselves as holders of cultural knowledge. Black science teachers, specifically, remain in the margins of science education spaces, which are spaces where they should be fully embraced and valued given that progress toward inclusivity in science education has remained stagnant since the 1980s (Basile & Lopez, 2015). The knowledge of self shared by these teachers will go towards better understanding the lived experiences of Black secondary science teachers and their unique identities and perspectives. In turn, this knowledge can be used to better support Black secondary science teachers, and perhaps other Black science teachers through providing more visibility and acknowledgement to what Black teachers bring to science education and STEM spaces. The
ultimate goal of this study was to unearth and develop knowledge that can be used to support students of color in science classrooms.

**Researcher Biases**

In addition to being a researcher, I am also a Black woman secondary science teacher. In claiming these identities openly, I am noting that this research was personal for me – as a researcher, this was scholarship that deeply intrigued me, and as a Black woman secondary science teacher, this scholarship reflected a lot of my realities in the classroom. As a result, the research questions asked, the literature reviewed for this study, the methodology chosen, and the findings and conclusions written were grounded in my biases. My biases acted as cultural resources that I harnessed to bring a unique lens to this work. For example, because I understand the diversity through the African diaspora, I did not assume that my lived experiences and identities would completely align with those of my teachers. I decided to do this study specifically because I assumed that there are subtle differences in the positional identities of Black secondary science teachers, both at the individual and contextual level that inform their positional identities. I also assumed there were similarities between the teachers that would make for complex yet nuanced counterstories of what it means to be a Black secondary science teacher, in addition to other identities. Owning and displaying my biases allowed me to turn down the volume on my microphone while turning up the volume of the microphones in front of the teachers. As Pamela Otis Ogonu, one of the teachers profiled in Foster’s (1997) *Black Teachers on Teaching*, stated, “As Black teachers, we have got to make our presence felt. We owe it to Black children to speak up on their behalf and to keep other teachers honest.” (p. 126). Through this research, I showed just how present Black secondary science teachers are in science education spaces.
2. Literature Review

Kim (2016) likened the literature review to the “plowing before sowing” to ensure that the groundwork is set for productive, fruitful research. A good literature review is one that “[engages] in a deep discussion about existing research” through synthesizing and interrogating relevant, existing content area, theoretical, and methodological literature (Kim, 2016, p. 92). In Chapter 1, I discussed the necessity of teachers – and Black science teachers, particularly – in paying down the education debt owed to students of color in science education and argued that there is much to be learned from the lived experiences and identities of Black science teachers that can go towards improving science classrooms for students of color. In this literature review, I begin by discussing the interwoven histories of U.S. science reform efforts post-World War II (WWII) and the aftereffects of the Brown vs. Board of Education of Topeka (1954) U.S. Supreme Court decision. Within this historical context, I focus my lens on Black teachers – their work for Black students before and after desegregation; their poor treatment and dwindling numbers post Brown; and where they currently stand in modern general education spaces and in science education spaces. After setting the historical stage, I review and synthesize literature about the cultural assets of Black teachers. Next, I explain critical race theory and its benefits to asset-based scholarship about Black teachers. Finally, I complete my plowing by discussing relevant science education research on identity development and how critical race theory can augment identity research within science education to produce more asset-based scholarship about Black science teachers.

The Interweaving Timelines of U.S. Science Reform and The Aftereffects of Desegregation

Our timeline begins right before desegregation, because the work of Black teachers began well before desegregation and even though modern science reform efforts have taken on
different forms, the overall ethos behind these efforts is grounded in post-WWII nationalism. The decade after WWII marked an increase in U.S. nationalism that was reflected among those in science and in science education but not in the concerns about the education of Black children. Prior to the 1950s, and especially through WWII, the U.S. maintained high status in the world, in part, for its reputation for scientific and technological advancements (Hurd, 2002). However, the war took a major toll on science education from which, arguably, it has not yet recovered (National Commission on Excellence in Education, 1983). Within this same context, the Brown (1954) Supreme Court decision marked the beginning of a new, supposedly more progressive paradigm in U.S. public education by ending “separate but equal” Jim Crow laws that kept Black students and teachers from sharing spaces with White students and teachers.

**Black Teachers Pre-Brown: Advocacy Inside & Outside the Classroom**

The theme of stock stories – or readily available stories from the perspective of dominant members of society (L. Bell, 2010) – about Black segregated schools is inferiority: the use of raggedy, leftover resources from White schools; and impoverished Black students overcrowded into dilapidated classrooms with underqualified, subprofessional Black teachers leading them (Foster, 1997; Walker, 2000, 2009). Thankfully for the Black students served in Black segregated schools, these narratives present only a sliver of reality about what schooling in segregated schools was actually like. Walker’s (2000) literature review of research about Black teachers, principals, parents, and communities pre-Brown indicated that in legally segregated schools in the southern U.S., all of these groups came together to provide the best education possible for Black students. Additionally, Black teachers, alongside the students, principals, parents, and community members, saw value in doing the best they could with the leftover resources and dilapidated school buildings that are commonly shared in stock stories.
For example, Walker discussed research depicting the high expectations and caring behaviors of the Black teachers towards their students, in addition to their frequent travel during summers to visit local chapters of Black teacher organizations, such as the Negro Teacher Association, for professional development opportunities. Walker (2000) found that:

What emerges is a portrait of African American teachers who were professional educators steeped in an understanding of philosophies about children and teaching, but also committed to the development of the particular children they served and having their own set of beliefs about how the children should be motivated to achieve…the very nature of teaching in the segregated school appears to have been transformed by the educators who expanded the dominant ideology with their own commitments to the elevations of a people. (p. 266).

Rather than being the subprofessional teachers stock stories depict them to be, Black teachers actively worked to ensure Black students learned the same content as White students in addition to culturally specific content aimed at providing students the sense of cultural competence they needed to survive and thrive as Black people in the U.S. (Foster, 1997, 2001; Ladson-Billings, 1995b; Walker, 2000).

Black teachers also worked collectively as advocates for Black education in the two decades prior Brown. Walker’s (2013) historical ethnographic study of the role of Black educators as advocates before Brown analyzed the records of two Black organizations, the Georgia Teachers and Education Association (GTEA) and the National Association for the Advancement of Colored People (NAACP). Walker found that by expressing their beliefs in justice and equality through collective organizations, Black teachers were still able to be active while having the protection of an organization from individual retribution. While the NAACP
provided national attention and resources to organize future legal action, the GTEA developed early educational advocacy plans that “[provided] a more expanded vision of educational needs” and utilized local and national strategies in enacting their plans (p. 216). Walker described a co-dependency of the groups to accomplish the mutual goals of local and national equality in education that eventually led to the *Brown* decision in 1954.

**Science Reform Post WWII through the 1960s**

While Black educators were concerned with achieving equality and justice for Black children, science education reform efforts began to ramp up in response to the launch of the Soviet Russian satellite *Sputnik I* during the fall of 1957. During the late 1940s and early 1950s, science educators dealt with continued demands to better prepare skilled workers for scientific, industrial, and technological careers (Wissehr, Concannon, & Barrow, 2011). The increased industrial and technological needs continued postwar as the need for the U.S. to be recognized as a superpower remained critical throughout the political tension with Soviet Russia (Yager, 2000). To help these efforts, President Harry S. Truman established the President’s Scientific Board (Hurd, 1986). Among the board’s first actions was the establishment of the National Science Foundation (NSF) with the expressed purpose of providing grants to universities and colleges for scientific research (Hurd, 1986, 2000).

While government-based aid for science and science education was being put into place, the U.S. largely considered itself a leader in science and technological advancements until the launch of *Sputnik I*. According to Wissehr et al. (2011), the launch of *Sputnik I* concerned the U.S. for both scientific and militaristic reasons. Among the science community, the Russians succeeded in an advancement that the U.S. had not yet accomplished, but this particular accomplishment was attached to a real militaristic concern: being able to launch a rocket meant
that Russians could also carry atomic weapons over long distances. Soon after the launch of
*Sputnik I*, the U.S. double-downed on its commitment to science reform efforts and in short
order, turned its attention to addressing teacher development and improving science curriculum
(Hurd, 2002; Wissehr et al., 2011; Yager, 2000).

**The Immediate Consequences of Brown and Sputnik**

During the late 1950s through the 1960s, the NSF devoted its time and money towards
curriculum development and teacher professional development programs and research in the
hopes that better teachers and better science education programs would interest students and the
public and entice top students towards careers in science. In turn, these students would contribute
to helping the U.S. be in the forefront of space, technological, and scientific advancements
(Hurd, 1986). During this time, curriculum development was primarily the responsibility of in-
field scientists, and accordingly, the science curricula focused on goals such as quantitative
interpretation, “thinking like a scientist”, and preparation for college-level science.

Science courses were structured around discipline-specific content and modes of
thinking, which left no room for discussing the role of science in human affairs and culture
(Hurd, 1986). Textbooks and science teachers were instructed to remove mentions of technical
career options. As a result, discussions of technical careers became the sole domain of
vocational-tracked classes only (Yager, 2000). Given the high demands of the scientist-
developed science courses on teachers, science teacher development in the 1960s focused on
ensuring teachers had the ability to teach these high-level courses for college preparatory-tracked
students. At the same time, curriculum developers created “teacher proof” curricula with
textbooks, step-by-step laboratory activities, and supplemental materials that would mitigate any
mistakes the science teachers made as they attempted to teach using these materials (Yager, 2000).

Most of the science teachers learning how to teach high-level science classes were White. Meanwhile, many Black teachers lost their jobs and the ones who remained were assigned to teach general-level or remedial-level classes. The Brown (1954) Supreme Court decision legally reversed the notion of “separate but equal” set forth by the post-Civil War Plessy vs. Ferguson (1896) Supreme Court decision and supposedly opened public schools to all students, thus allowing Black students access to the same standard of education White students received. Desegregation should have benefited Black students whether they stayed in their original school or integrated into a predominantly White school. However, in lieu of equitably resourcing predominantly Black schools, many of these schools were closed in favor of moving Black students into predominantly White schools (Walker, 2009, 2015). When Black schools closed as a result of desegregation, many of the Black teachers staffing these schools were not allowed to teach in the integrated schools.

For the few Black teachers that followed their Black students into integrated schools, they were often assigned to teach the poorly supported “technical”-track classes that contained many of the Black students in the school (Atwater, 2000; Oakes, 1987, 1995; Oakes, Ormseth, Bell, & Camp, 1990). Academic tracking, or the segregation of students by ability groups, became a more prominent feature in public schools throughout the 1950s and 1960s. Curriculum developers of the time developed science curricula for the higher, college preparatory tracks, not the technical tracks. As a result, many schools had disproportionate numbers of Black students tracked into lower-level, lower-quality science classes if they took any science classes at all (Oakes, 1995). These lower-tracked groups had less access to resources that students in “high-
ability”, “gifted”, or “college preparatory” groups had, such as updated science laboratories (Atwater, 2000; Oakes, 1995; Payne, 2008; Walker, 2009). Unfortunately, even with the few Black teachers teaching the lower-tracked technical classes, Black students largely did not benefit from the increased attention and importance given to science education, because at the time, science education was for students on the higher, college preparatory tracks.

That the immediate aftereffects of the launch of Sputnik I and even desegregation failed to significantly benefit Black students and teachers was no surprise. D. A. Bell (1980) wrote about the interest convergence principle, which rationalized that integration mainly served the interest of White people. According to the interest convergence principle, civil rights legislation and policies that are seemingly successful for people of color result from White interests being served within the implementation of these laws and policies (Brown & Jackson, 2013; Tate, 1997). For example, desegregation acted as a counterpoint during the Cold War against Russian communism. For developing countries that had not yet aligned with either the U.S. and its allies or Russia in the Space Race, integration was a message that all citizens, including people of color, had the ability to be free within U.S. society, including in the education system (Tate, 1997). However, the appearance of freedom and equality was far different from the reality for Black students and teachers.

The Declining Numbers of Black Teachers

Throughout the 1970s and 1980s, the number of Black teachers further declined from the numbers present in public schools since desegregation began post Brown (J. J. Irvine, 1988). Prior to the 1970s and 1980s, the decline in the number of Black teachers was primarily attributed to them being pushed out of public schools. The further decline in the number of Black teachers can be attributed to long-term veteran teachers who were able to keep teaching
beginning to retire and affirmative action policies at predominantly White universities that opened up new avenues for Black professionals, which in turn kept them from choosing teaching as a career. During the late 1960s and early 1970s, the immediate years after the passing of the Civil Rights Act of 1964, many court decisions continued to target the long term effects of Jim Crow laws and racial segregation and discrimination. Several court decisions attacked the numerous policies of many U.S. universities and colleges that discriminated against students of color and kept them from attending (Brown & Jackson, 2013). In response, affirmative action policies directed admissions officers to consider diversity in their decision-making, in addition to setting admissions quotas for students of color before this was banned by the *Regents of the University of California v. Bakke* (1978) Supreme Court decision. Though history would prove affirmative action policies to be a bandage and not a cure, a prevailing thought in U.S. society was that education would be the great equalizer (Ladson-Billings & Tate, 1995; Tate, 1997). As such, many Black students turned towards the few openings in universities and their programs that had the potential to raise their social and economic stature. These openings included access into science, engineering, and technology-based programs and careers that were much more lucrative and respected than teaching for many first- and second-generation Black college students (Atwater, 2000)

*A Nation at Risk of Stagnating Science Reform*

The 1970s marked a period of time where science education reform efforts were slowed, and in many cases, halted altogether. Science teachers began jettisoning scientist-developed curricula packages in favor of more personalization in their classrooms to meet the needs of their students (National Science Foundation, 1980; Yager, 2000). This aligns with the shift in 1970s towards more socialization and humanization in science education, according to Hurd (2002).
However, this shift towards incorporating human and cultural elements into science did not fix the perception that post-Sputnik science reform failed. In his retrospective of science education reform since 1950s, Yager (2000) described the bleakness of science education reform efforts in the 1970s:

[Science education] reforms faded by the mid-1970s. Public support for school science and the massive reform efforts of the preceding fifteen years were gone. Many people even blamed science for the political, societal, and environment crises that characterized the times. (p. 51).

While NSF funding was still intact for curriculum development focused on updating school science to reflect the “real world”, funding for teacher development programs ceased by 1974, resulting in the abandonment of many initiatives focused on helping science teachers (Hurd, 2002; National Science Foundation, 1980; Wissehr et al., 2011).

The stagnation of the 1970s did not go unnoticed by education policymakers and other stakeholders. The A Nation at Risk (1983) report was commissioned in 1981 by the U.S. Department of Education to “…help define the problems afflicting American education” (p. 6), and indeed, the report laid out several issues as perceived by the National Commission on Excellence in Education, the agency responsible for the report. The commission thought the issues of public education in the U.S. were so severe that,

If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war. As it stands, we have allowed this to happen to ourselves. We have even squandered the gains in student achievement made in the wake of the Sputnik challenge. (p. 13).
A Nation at Risk was, accordingly, unkind to science education, despite the acknowledgement that the so-called “Space Race” in the wake of the launch of Sputnik I inspired improvement in achievement data across all subject areas. Specific to science education, the report noted the following issues: the “desperate need” (p. 6) to increase support for science teaching that was less focused on rote learning; the lack of master science teachers’ input into material selection; the shortage of science teachers; the lack of credentialing in the current pool of science teachers; the lack of competitive pay for science teachers (among other teachers); the need for scientifically literate students; and the lack of teachers who were high achievers in high school and college. While most of the listed issues around science education centered on teachers, the solutions developed to counter these issues were largely grounded in cognitive science research instead of policy and economics (Yager, 2000). The NSF funded cognitive science studies in the hopes that studying how humans learn would not only improve student learning, but teacher learning as well. However, policymakers, administrators, and “teacher coaches” in teacher education circles were the target audiences of these studies, not cognitive scientists.

Science for All Americans: A Shift Towards Equitable, Inclusive Science Education?

The cognitive science trend continued through the end of the 1980s, which culminated with the evocatively titled Science for All Americans (1989). Science for All Americans was simultaneously a report about a proposed direction of the future of science education and the long reigning paradigm in science education preceding the development of today’s reigning paradigm, the Next Generation Science Standards. While A Nation at Risk (1983) centered most of its criticism about science education on teachers, Science for All Americans (1989) focused on science education curricula, specifically the need for more streamlined curricula based on
developing scientific literacy. Given how key the concept of *scientific literacy* is to understanding the *Science for All American* paradigm, an explanation of the term is warranted.

Historically, the term *scientific literacy* has been murky in what it is and what it refers to. In the context of the 1950s, scientific literacy referred to public interest and support for the advancement of science and science education in response to the launch of *Sputnik I* (Hurd, 1958; Laugksch, 2000). According to Laugksch (2000), the meaning and importance of “scientific literacy” diminished as a result of inconsistent interpretations and a lack of consensus in the science education community as to which interpretation was the best one. The lack of stability and consensus when referencing “scientific literacy” aligned with the overall lack of forward direction in science education in the late 1970s amid waning support and funding for science education research (Hurd, 2002; Wissehr et al., 2011).

A widely accepted conceptualization of *scientific literacy* comes from Driver, Leach, Millar, and Scott (1996) and is constructed of three components: a) understanding scientific inquiry, b) understanding the social nature of science, and c) understanding some aspects of science content. In essence, scientific literacy incorporates scientific content knowledge with understandings of the nature of science. The general consensus among science education researchers is that scientific literacy, in some form or another, is worth working towards, because scientifically literate students will contribute to an overall greater public understanding of science (Driver et al., 1996; Laugksch, 2000). This aligns with the description of scientific literacy from Hurd (2000):

Scientific literacy consists of policies related to intellectual skills for the rational utilization of science knowledge. These skills are associated with solving problems, forming judgments, making decisions, evaluating short- and long-term risks, and
recognizing the influence of ethics, values and, sometimes, morals when it comes to
using science knowledge in personal-social and social-civic contexts. (p. 285).

A greater public understanding of science produces many benefits for both society and
individuals. One of the arguments in favor of increasing public understanding of science is
democratic: Full participation in a democracy requires a basic understanding of science,
scientific knowledge, and how it produces this knowledge (Thomas & Durant, 1987). Other
arguments in support of increased scientific literacy speak to the social and economic anxieties
expressed in A Nation at Risk (NCEE, 1983). However, the democratic argument is most
interesting in the context of this literature review given that what exactly “Science for All”
means is not clear beyond pushing for scientific literacy and even this depends on how scientific
literacy is conceptualized (Thomas & Durant, 1987). This phrase could refer to the need for
inclusivity and equity in science education, which the democratic argument backs, or it could
refer to general dispositions and understandings of science necessary to achieve scientific
literacy. Mutegi (2011) argued that the malleability of the phrase “Science for All” is what led to
its overall inadequacy as the basis of socially transformative science curricula.

The Next Generation of Science Education: The Curriculum

Hurd (2000) noted two recommended research categories for science education curricula
moving forward into the 21st century: “[preparing] increasingly diverse student populations” and
 “[understanding] the nation’s changing demographics, the uniqueness of [our] times, and what
students need to learn in order to succeed and attain a high quality of life” (p. 287). Thirteen
years later, the Next Generation Science Standards (NGSS), which were published in 2013 and
based on the report, A Framework for K-12 Science Education (2012) which outlined the new
standards that would connect scientific knowledge and engineering practices with commonalities between different scientific disciplines, such as biology, chemistry, and physics, among others.

According to the National Research Council (NRC) (2012), two main factors prompted the production of its report and subsequently, the production of the NGSS. First, well over a decade passed since the last, sweeping nationwide efforts to audit science standards and update them to account for numerous advancements and developments in science. The NRC noted that research in the fields of science, science education, and cognitive science advanced enough in this span to justify the need for major updates and changes. Second, the NRC asserted that modern society increasingly required citizens to understand the interrelatedness of science, technology, and engineering knowledge and practices, and that standards of the time did not account for this. For example, science, technology, engineering, and mathematics education, collectively referred to as STEM education, has always been important to the U.S.’s economic prospects and its overall standing as a world power (National Commission on Excellence in Education, 1983; National Science Foundation, 1980). However, the vagueness and aimlessness of the “Science for All” paradigm governing the 1990s and 2000s alongside the demands of accountability from the passage of the No Child Left Behind Act of 2001 and momentum from the development of the Common Core State Standards in the late 2000s finally led to the development and publication of A Framework for K-12 Science Education (NRC, 2012). In turn, this report led to the establishment of a new paradigm, three-dimensional learning, which aimed to fundamentally change how science is taught and learned in U.S. schools in accordance with advancements made in the STEM (Wissehr et al., 2011).
Where Black Teachers Fit In The Next Generation

The National Center for Education Statistics (2017) reported that to this day Black students take fewer science courses than their White peers. In these science classes, many Black students were and still are subjected to instruction that excludes features recommended by many science education researchers and instructors, such as nature of science (NOS) instruction and inquiry-based practices (Atwater, 2000). In his argument about the failure of the “The Science for All” paradigm, Mutegi (2011) listed a variety of opportunity gaps demonstrated in science still affecting students of color, and Black students in particular, today: the underrepresentation in STEM degree programs (Atwater, 2000; Morton & Parsons, 2018; National Center for Education Statistics, 2018); the underrepresentation in science courses beyond the diploma-required courses (Solórzano & Ornelas, 2004); and the number of science courses offered in high schools serving predominantly students of color (Atwater, 2000; Parsons, 2014).

The marginalization of Black students in science education aligns with how Black science teachers are situated in science education today. In 2018, 91% of secondary science teachers and of middle-level science teachers, respectively, were White compared to the almost 81% of the overall teacher population meaning the science teacher population skewers Whiter than the overall teacher population and has remained so for while (Banilower et al., 2018; Banilower, Smith, Weiss, Malzahn, & Weis, 2013; National Center for Education Statistics, 2018). Black teachers account for 5% of secondary science teachers and 8% of middle-level science teachers compared to almost 7% of the overall population of teachers (Banilower et al., 2018). These numbers are about commensurate to the overall population of teachers. However, according to the U.S. Census Bureau (2018), about 13% of the population in the U.S. is Black, and this number leaves out people in the wider African diaspora (e.g., people who identify as
Afro-Latinx), meaning Black teachers still are not proportionately represented within the teacher population in the United States.

The NGSS purportedly address issues of equity and diversity in STEM education. Januszyk et al. (2016) explained:

The goal of this reform is to make all students ready to pursue STEM college degrees and careers and to be informed citizens. We would argue that this new wave of reform is more ambitious than that which followed the launch of the Soviet Union’s Sputnik—the first artificial satellite to orbit Earth—in 1957. While the “space race” education reform arguably targeted elite students with the potential to become future scientists, the new wave calls for all students to learn academically rigorous science, become college and career ready, and take part in the global community. (p. 47).

This goal of NGSS is laudable. However, I argue that based on the historical Whiteness of science education that continues today and the historical and continued marginalization of people of color in science education, it is difficult to meaningfully research and develop solutions for multicultural students in science until science teachers of color and their knowledges are brought to the forefront of science education reform efforts.

**The Cultural Assets of Black Teachers**

This next section forefronts Black teachers and the cultural assets that they bring to their school communities. Research centering Black teachers is limited in scope beyond two main themes. The first theme of past research about Black teachers is the declining numbers of Black teachers and postulations about this decline (Foster, 2001; J. J. Irvine, 1988, 1989; R. W. Irvine & Irvine, 1983). The second theme of past research are profiles about Black education that tangentially depict Black teachers as callous, harsh, and underqualified (Foster, 1997, 2001;
Walker, 2009). Foster (2001) called for research about Black teachers that explores their unique perspectives and the assets that they have provided to students in the past and can possibly provide for students today. While few research studies have heeded this call – and even fewer that center Black science teachers – the few that exist provide data that construct newer, asset-based profiles of Black teachers that can be used for further research about the strengths and knowledges that Black teachers can provide to students of color specifically and in educating for social justice generally.

**Black Teachers as “Cultural Translators”**

J. J. Irvine (1989) expounded upon the idea of Black teachers as “cultural translators” in her position paper arguing for expanding roles of Black teachers beyond functioning as role models:

> Teachers have to be cultural translators and cultural brokers, conduits through which culturally encapsulated monocultural minority youngsters become multicultural…These teachers of at-risk Black children must themselves be multicultural, positively oriented towards the Black (and Hispanic) culture as well as the dominant middle-class cultural norms, values, and expected behaviors of the school. Black teachers are more likely than their White counterparts to be prepared to assume this role of cultural translator. (p. 57).

Irvine (1989) further argued that the unique cultural features of Black teachers – such as their perspectives about the role of teachers, their teaching styles, and their use of cultural familiar mannerism – allow them to culturally synch with their students of color, and connect with them in ways most middle-class White teachers cannot (J. J. Irvine, 2003).

Stanford (1998) did a narrative exploration into what current Black teachers remember most from their own teachers and how these memories inform their current teaching practices.
Though she did not ask the teachers to note the race of their “remembered” teachers, she learned through the conversations with the teachers that most of these remembered teachers were Black as well. Stanford found that many of the remembered teachers acted as cultural translators for her participants, and in turn, these teachers acted as cultural translators for their own students. For example, one of the teachers named Alan recalled the amount of time his sixth-grade teacher spent getting to know students’ interests and how they were doing in other classes and used this information to forge relationships with both students and their families. In turn, a former student of Alan’s described his teacher’s own commitment to teaching, “‘He has always tried to help his students prepare themselves for the increased responsibilities that are a part of life in college or the working world.’” (Stanford, 1998, p. 232). Stanford found three common characteristics between the remembered teachers and the current teachers: their time and energy investments into their students’ success; their persistence in seeking out alternate pathways to success for their students; and their unyielding high expectation for their students to succeed through school.


The African American teachers described in the literature conceive of their role more broadly than that assigned them by the narrow, utilitarian purposes of schooling. Thus, while they accept the institutional goal of promoting cognitive growth, their personal definition of the teachers’ role is not confined to developing academic skills but includes as well the social and emotional growth of students…they are also aware of the structural
inequalities in society, and their practice evidences a ‘hidden curriculum’ of self-
determination designed to help students cope with the exigencies of living in a society
that perpetuates institutional racism while professing a rhetoric of equal opportunity.” (p.
576-577).

Broadly summarized, Black teachers who act as cultural translators are melding their
professional competencies as teachers with their personal experiences as Black people to
culturally synch with students of color and act as conduits to connect these students to the formal
school environment. In spite of their own trials and because of their own triumphs, Black
teachers hold high expectations of themselves and their students to successfully navigate schools
fraught with structural inequalities. To help their students meet the quite high expectations set for
them, Black teachers are generous of the time and energy given to their students, are willing to
act as gate-openers for their students, and actively link formal school content to the students’
personal experiences outside of school (Foster, 1993, 1997; Moore, 2007; Stanford, 1998;
Walker, 2000).

**Black Teachers as Builders of Cultural Competency**

Cultural competence is a one of the tenets of what Ladson-Billings (1995b, 2009)
described as *culturally relevant pedagogy* (CRP), a pedagogical framework “that not only
addresses student achievement but also helps students to accept and affirm their cultural identity
while developing critical perspectives that challenge inequities that schools (and other
institutions) perpetuate.” (Ladson-Billings, 1995, p. 469). CRP emerged from Ladson-Billings’
ethnographic studies of teachers nominated by predominantly Black communities as “good”.
Ladson-Billings (1995, 2009) profiled eight teachers, five Black women and three White women
and assigned each teacher a “culture of reference”, or a cultural group that teacher most closely
identified with based on their friends inside and out of the school, their social activities, and the places they frequented most. All five Black teachers and one of the White teachers had a Black culture of reference in addition to one White teacher having a bicultural reference (Ladson-Billings, 2009). The profiles of the teachers included their teaching philosophies, descriptions of their classrooms and the interactions that took place in their classrooms and around the school community. From this data, Ladson-Billings’ theorized that their teaching philosophies and their teaching practice are grounded in what she called CRP.

Ladson-Billings (1995b, 2009) did not claim CRP to be a framework for Black pedagogues alone; however, it is fair to say that CRP is grounded in the philosophies and practices of Black teachers, which is why building cultural competency is a running theme in asset-based research about Black teachers. Building cultural competency means helping students exist and take pride in spaces that affirm their own culture and provide opportunities to develop competency with other cultures as well. Foster (1993) did an ethnographic study of exemplary Black teachers nominated as such by Black communities in a similar fashion to Ladson-Billings (1995b, 2009). In the findings, Foster explained why the teachers featured in her study thought building cultural competency for and within their students was crucial:

These teachers are aware of how changes in society mitigate against easy success for African-American pupils. They understand how the rhetoric of equal opportunity – coupled with a preoccupation with materialism and assimilation into the larger societal values without parallel changes in the structural conditions of society – has limited the motivation and consequent achievement of African-American students. Moreover, they are also aware that cosmetic changes in society often camouflage ongoing structural inequalities… To confront these issues with their students, these teachers have
consciously fashioned philosophies and pedagogies that draw on lessons from their own childhood. They also incorporate classroom activities based on African-American community norms. (Foster, 1993, p. 380 & 384).

In a later literature review, Foster (2001) reaffirmed her findings in a synthesis of other literature. Black teachers build cultural competency through varying means, for example: incorporating familiar cultural speech patterns and mannerisms; helping students overcome negative images of themselves and setting them up for success in spaces novel to them; and acting as gate-openers instead of the dominant gatekeeping function of teachers (Foster, 1993, 1997; J. J. Irvine, 1990, 2002, 2003; Moore, 2007; Walker, 2000, 2009).

**Black Teachers as Advocates for Students of Color**

In the first two profiles about Black teachers from asset-based research about them – Black teachers as cultural translators and as builders of cultural competency – their work is directly with students. In this last profile – Black teachers as advocates for students of color – their work is still for students but is directed outside the classroom towards structures and entities. On top of their work helping students of color successfully navigate in public school spaces where there are implicit low expectations of them, Black teachers often resist and defy policies that work against their students in addition to speaking up for students in adult-only spaces, such as faculty meetings (J. J. Irvine, 1990). American-educated Black teachers likely faced racism in some form within their schooling experiences (Tate, 1997) and all Black teachers in the U.S. face racism as teachers. Because of these experiences, Foster (1993) postulated that Black teachers forge cross-generational solidarity and kinship with their students:

> All of these teachers, regardless of their religion of origin, expressed feelings of connection, affiliation, and solidarity with the pupils they teach. This solidarity was
evident in the use of kinship terms as well as in the metaphors the teachers employed to characterize their relationships with students. (p. 378).

Foster (1997) also documented Black teachers discussing how they step up for students outside of class in places like faculty meetings to protect them against structural policies, and even other teachers, that are actively harmful. Stanford (1998) shared narratives of Black teachers fighting through bureaucratic red tape to allow students to go on beneficial fieldtrips and engage in opportunities that would not ordinarily be available to them in formal school settings.

Specific to science, Moore (2007) studied three Black secondary science teachers to describe how they used their professional and personal experiences and knowledge to navigate teaching in what was considered a “low-performing school”. In accordance with the dominant standards of school ratings, the teachers’ work locations were high schools serving 98% Black students. Even though the three teachers worked in high schools facing gargantuan institutional, social, and economic forces working against the students and the teachers, Moore found the three teachers maintained their resiliency through their roles as advocates and that science education was the medium through which their advocacy happened. For example, one teacher entered his AP and Honors biology class in an engineering competition, and Moore spoke of the results:

Mr. O’Neal was able to help his students overcome negative self-images and to achieve academic success in learning science and competing in the statewide engineering competition. Their negative image was erased when they won the engineering competition. Students from Parks had competed against more affluent and predominantly White schools in the state. By preparing the students and working with them on learning the science and designing projects worthy of competition, Mr. O’Neal put his students in
a position to become successful. Winning the competition raised the status of the
students, the school, and the district. (p. 784-785).

The three science teachers also spoke about their advocacy through helping students help
themselves by equipping them with science knowledge that “cannot be stolen from you” (p. 786)
and helping students understand how scientific knowledge can combat injustices, such as water
contamination in the community.

**The Need for Asset-Based Studies of Black Science Teachers**

This section synthesized asset-based research about Black teachers into newer
understandings and profiles of the work of Black teachers along with a small glimpse into what
guided this work. All of this knowledge exists in the body of research literature because of the
intentional foregrounding of Black teachers and how their racial identity as Black informed their
work. As previously mentioned, this foregrounding does not happen as often as it should, but it
especially does not happen in science education research. I performed a keyword search for
“Black teachers” in three leading science education journals: *Science Education, Journal of
Science Teacher Education*, and *Journal of Research in Science Teaching*. This particular
keyword search resulted in 1 finding across the three journals: Atwater, Butler, Freeman, and
Carlton Parsons (2013)’s research centering Black science teacher educators. These educators are
an important group of people, as they teach the people who will be K-12 science teachers and are
certainly placed in the margins of science education academic space (Atwater, Butler, et al.,
2013). However, they are not the Black secondary and middle-level science teachers
underrepresented in science education. In disbelief of the results, I performed permutations of
keyword and title searches using the following terms: “Black teachers”, “African American
teachers” and “teachers of color”. In the six searches across the three journals, only five unique
search results turned up that actually focused on either Black teachers or teachers or color. Of those five results, only two centered Black science teachers that are currently in K-12 classrooms: Moore (2007) and Goldston and Nichols (2009).

My purpose for explaining the searches for Black teachers (or even African American and teachers of color) in the leading top science education journals was twofold. The first, and most obvious, purpose was to illustrate just how marginalized Black teachers (and teachers of color, in general) are in the canon of the most mainstream of science education research. The second purpose was to establish the need for critical race perspectives in science education.

Black science teachers are assets in our science classrooms waiting to be leveraged in the quest towards “science for all” in the “next generation”, but they are being ignored. As Walls (2016) noted in his critical race analysis of nature of science (NOS) research in major science education journals, most science education research takes a colorblind approach by not even collecting or reporting demographic information about the informants in these studies, and on the rare occasion that reporting does happen, informants are overwhelmingly White. In the next section, I explain critical race theory and its benefits to asset-based scholarship about Black science teachers.

**Critical Race Theory: Making Black Science Teachers Visible**

An essential part of understanding Black secondary science teachers’ identities is comprehending the societal context in which they are developed. Similar to the caution Southerland et al. (2011) gave about viewing students of color through the extreme lenses of either individualism or essentialism, Black science teachers also cannot be viewed as mere individuals taken out of social and cultural context nor can agency be completely ignored by viewing them as strictly positioned by social and cultural labels. Every science teacher, including
Black science teachers, performs their work from a unique frame of reference (J. J. Irvine, 2002); however, every one of these unique frames are influenced by the ubiquity of racism in U.S. society. The necessity of critical race theory (CRT) as a theoretical framework to examine racial issues and inequities is evident in the history of its development as a framework.

In the late 1980s, CRT emerged as a theoretical framework in response to major criticism of critical legal studies (CLS), which itself originated in the 1970s (Brown & Jackson, 2013). The emergence of CLS followed a string of court decisions that signaled a legal ideological tide change that shifted from the original view of the court system as a means toward civil rights to the current view of the court systems as an institutional civil rights blockade. CLS scholars challenged the legal discourse that upheld legal reasoning (and court systems) as neutral and objective, and therefore, uninfluenced by social, cultural, and political forces and ideologies. While many significant insights and pieces of scholarship originated from CLS, many legal scholars of color felt the CLS movement failed to adequately address the direct role of race in legal decisions and the resulting fallout put upon mostly people of color (Ladson-Billings & Tate, 1995; Tate, 1997). Notably, the CLS movement consisted of predominantly neo-Marxist and progressive White scholars. Given the frustrations with CLS and the overall political climate of the late 1980s (e.g., the election of conservative George H. W. Bush to succeed fellow conservative Ronald Reagan as President of the United States), legal scholars of color convened to plan scholarly investigations to understand how racism in the U.S. continued to oppress people of color through the legal system. Additionally, these legal scholars planned to develop solutions to combat racist legal decisions to ensure more equitable and just conditions for people of color.
The Tenets of Critical Race Theory

Through the years, an increasing amount of CRT literature within legal studies converged with a similar goal: the elimination of racial oppression as a means towards eliminating all other forms of oppression (Matsuda, Lawrence, Delgado, & Crenshaw, 1993). In his literature review of CRT scholarship, Tate (1997) summarized repeating tenets with the goal of connecting the tenets to how scholars think about educational inequities and solutions for them (Ladson-Billings & Tate, 1995).

The intercentricity of race/racism to other forms of subordination. The first tenet was that CRT scholarship understands the endemic nature of racism in U.S. society and how it permeates socially, culturally, and inevitably, psychologically (Tate, 1997). This means that racism is also endemic in the U.S. education system – including within all teachers. Accordingly, this study assumed that racism affects all Black teachers today. Additionally, the first theme intimates that Black teachers are working in environments steeped in covert White supremacist ideology and may have internalized this to some degree (Kohli, 2014).

The challenge to dominant ideology. The second tenet challenged the concepts of neutrality, objectivity, and meritocracy as deflections by self-interested, powerful persons, establishments and systems that maintain and gain status through these conceptions of value and access (Tate, 1997). This challenge to dominant ideology means that CRT scholarship purposefully embraces and employs alternate epistemologies, such as those from the worldviews of people of color, to engage in research with the purpose of providing counterstories of people of color to combat to dominant narratives (Solórzano & Yosso, 2002). This theme specifically undergirded the focus on Black science teachers, who are in the margins of science education research.
**The centrality of experiential knowledge.** Directly related to the last tenet, the third tenet Tate (1997) summarized was the idea that context, history, and experiential knowledge matters when understanding law and how it is applied. For an example in the context of education, the lack of historical context in education perpetuates deficit-based perspectives of Black students and Black teachers (Walker, 2009). However, a more complex understanding of the current conditions Black students and Black teachers face in public schools today is constructed after the full historical context of race-based narratives is considered. Additionally, we can better understand a fuller range of experiences (and knowledge) that reveal many deficit narratives as subjective valuations of Black students and teachers rooted in maintaining current conditions of denying power and access. Specific to this study, this tenet established the importance of historical context in understanding issues surrounding race – thus the emphasis placed on historical context in this chapter. Additionally, this tenet also established the importance of documenting the voices of Black science teachers in understanding who they are and what they do for students of color.

**A transdisciplinary approach.** The fourth CRT tenet was that CRT is not bounded by one particular epistemology (Tate, 1997). Within CRT, one can reasonably find several epistemological and theoretical lenses – for example, feminism, Marxism, and of course, critical legal studies. What this principle means for any education research focused on equity, inclusivity, or social justice is that theoretical and conceptual frameworks need to be fully equipped to handle the nuances and complexities inherent to a comprehensive analysis of the experiences, knowledge, and identities (among other facets) of people of color (Ladson-Billings & Tate, 1995). This study employed CRT alongside two other frameworks (i.e., identities as
narratives and positional identities) with the expressed purpose of understanding the intercentricity of race with other social markers in identities and how they informed practice.

**A commitment to social justice.** The last tenet of CRT that Tate (1997) summarized was the idea that civil rights laws have often been undermined and crippled prior to implementation, meaning that essentially, these laws were doomed remedies for racial inequality from the start. At the surface, this principle seems to have little connection to education. However, this idea of “doomed remedies” parallels the many remedies (or reforms) in education. For a brief example within science education, once again consider “Science for All.” As implied by the name, access to quality science education and opportunities for all students, including students of color, was a major goal. However, this goal was not met, neither by the metrics of achievement data nor by equitable access to science opportunities (Lee & Luykx, 2007). This failure was one of the justifications for the development of the NGSS (Januszyk et al., 2016). At the heart of the last tenet is the necessity to comprehensively examine potential limitations of systemic reform and movements within education that hinder their ability to bring about actual change for people of color.

In the previous section, I discussed the theoretical framework *critical race theory* and argued its utility in examining and challenging inequities Black science teachers faced in the past and still contend with today. Given the dearth of Black science teachers from the canon of science education research, I decided to begin my studies with simply learning about who some Black science teachers are, which lead me to identity theoretical frameworks. Research utilizing identity frameworks, or *identity research*, is relatively new in the canon of science literature research that has become more prominent over the last 25 years (Avraamidou, 2014).
Operational Definitions of Identity in Science Education Research

As with many new paradigms in science education since WWII, the increased attention on identity stems from calls for reform (Avraamidou, 2014; Luehmann, 2007). As Avraamidou (2014) explained:

There is a need for a particular focus on science teacher identity. Gaining an understanding of how science teachers develop their science teaching identities and shedding light on the factors influencing their development within various contexts are important for the design of teacher preparation programmes, especially in light of reform recommendations in science education around the world. (p. 147).

Reform, in most contexts, refers to how science is taught and expanding the purview of who can do science and who can be scientists; in the U.S., this view of reform is certainly relevant given the still existing inequities within science education (Atwater, 2000; Avraamidou, 2014; Luehmann, 2007).

In addition to using identity research as a means to improve teacher preparation and to aid efforts to diversify science and science education, identity research can be utilized to explore the identities of current science teachers and their needs. For example, Moore (2008) explored how the positional identities of Black secondary science teachers informed their perspectives of professional development and of their career goals. Indeed, this research fits within the particular view of identity research as a mechanism to learn about current science teachers – the purpose of this study was to explore the lived experiences that inform Black secondary science teachers’ positional identities and how they position themselves based on the stories they shared. Again, research using identity frameworks with science education is still relatively new (Avraamidou,
However, there is enough to get a general sense of how identity is operationalized with the various identity frameworks that have been used and created over the last couple of decades.

Overall, the operational definitions of identity (or identities) used in science education research are grounded in three assumptions: 1) identities are constructed within social contexts and within social interactions with others; 2) identities are not static creations; and 3) identities are multifaceted and interrelated (Avraamidou, 2014; Carlone, 2012; Carlone & Johnson, 2007; Gee, 2000, 2017; Helms, 1998; Mensah, 2016; Richmond, 2016; Sfard & Prusak, 2005; Zembal-Saul, 2016). The four operationalizations – identities via social recognitions, via performances, as discursive creations, and as narrative constructions – all manage, at least to some degree, to account for the paradoxical nature of examining any sort of identity (e.g., teacher, scientist/science person, science teacher) under the essential assumptions: individual agency versus social context; a snapshot of an identity within temporal frame versus the ever-changing nature of identity; focusing on one particular identity versus the interrelated nature of all of one’s identities (Clarke, 2009). This means that the four operationalizations are not mutually exclusive; each prominently features one aspect of grounding identity over others within the study, thus the names of operational definitions.

In this last section of my literature review, I review the four operational definitions of identity found within relevant science education literature. Then, I conclude by explaining why the definition chosen for this study – identities as narratives – best handles the examination of race.

**Identities via Social Recognitions**

Within frameworks that operationalize identities via social recognitions, identities are primarily constructed from recognition by others – implying that of primary importance is
understanding the social contexts and mechanisms through which one is aligned (or not) with a particular identity. Agency through self-recognition is a possibility with these operationalizations of identity, however, recognition by others weighs heavier over self-recognition. For example, Carlone and Johnson (2007) explored the science identities of women of color pursuing science careers. They did ethnographic interviews with the 15 women during their undergraduate years in college, and then followed up with them six years later to interview them again. To analyze their data, the researchers developed an initial model of science identity as shown in Figure 2. As shown in their initial model, they accounted for agency within their model through self-recognition, but recognition and performance (which is a form of recognition by others as I argue a little later) make up a greater part of science identity in their view, and accordingly, within their analyses of their data. From their analyses, they found three types of science identities – research science identity, altruistic science identity, and disrupted science identity – that are mostly determined by the type of recognition that the women received (or did not receive) from recognized members of the science community, such
as science professors and laboratory staff. Of their understanding of science identity, they noted, “A science identity is accessible when, as a result of an individual’s competence and performance, she is recognized by meaningful others, people whose acceptance of her matter to her, as a science person.” (p. 1192). Within this study, identity (and more specifically, science identity) is grounded in recognitions – by self, by meaningful others (who were mostly established “science people”) stating the membership of women of color, and by others recognizing their actions as the actions of “science people”.

The main affordance of using an identity framework that operationalizes identities via social recognitions is that this operationalization takes the role of social context seriously in how identities as constructed. In Carlone & Johnson’s (2007) study, they were able to better understand women of color and their journeys as scientists through exploring how their social contexts reified their personal sense of themselves as scientists. As they discussed,

The main factor that differentiated these women’s pathways through science was not competence in or commitment to science but recognition from others. From this we can learn both about the culture of university science and women of color who are interested in science. (p. 1209).

Even though the women of color were the focus on the study, the researchers learned a great deal about the university science communities in which the women work and how these communities either embraced, rejected, or ignored the women.

Conversely, while identities as social recognition takes the role of social contexts in identification seriously, this operationalization is constrained in its ability to account for individual agency in identification. For example, in Carlone & Johnson’s (2007) study, they
acknowledged that they were left with more questions about the women whose science identities were not reified by others but persisted through their programs and into science careers anyway:

despite the failure of their professors to recognize them as promising or legitimate science students, [the women whose science identities were disrupted] are all still pursuing science-related careers or study. What we learn from this group is that discrimination is not destiny. Yet there are important, lingering questions with implications for the culture of university science. Why did these women persist despite humiliation, frustration, and even encouragement to change majors? Was it their commitment to science? Was it the presence of others’ support or recognition that we were unable to document in this study? Was it positive experiences with science outside the university? (p. 1210).

Identities as social recognition is a good operational definition to ground identity in when interested in the role of social contexts into how one identifies or is identified by others. However, with studies centered on people of color and their identification, I argue that it is essential to adequately account for their agency (or lack thereof) in how they are identified either by themselves or by others and the extent to which existing power structures in the U.S. allows or disallows this agency.

**Identities via Performances**

Within frameworks that operationalize identities via performances, identities are primarily constructed via performances – or outward and observable behaviors and sequences of behaviors indicative of particular identities. For example, one might argue that those who inhabit or ascribed a “science identity” act in ways aligned with the identity, such as speaking about science in ways that already-established scientists do or using scientific instruments as a scientist
would. As previously mentioned, each framework is not mutually exclusive of other operational definitions. Identities via performances closely aligns with identities via social recognitions. However, identities via performances specifically grounds identity in recognized behaviors indicative of a particular identity, while identities via social recognitions broadens the definition to include recognizing more than behaviors. Within the identities as performances definition, others – and sometimes, self – must be able to observe behaviors of identity and recognize them as emerging or proficient performances.

This definition of identities is related to Wenger’s (1998) framework, *communities of practice*. According to Wenger (1998), communities of practice consists of groups of people who share a *domain* of interest interacting and practicing their interests. Being a member in communities of practices is largely defined by being an active participant in the community. As applied to becoming a science teacher, for example, this might mean that to become a part of a group of science teachers, one has to expressly want to be a part of the community of other science teachers, actively engage with other science teachers in the group, and engage in the practice of science teaching. This framework – and the definition of identities as performance – guided Proweller and Mitchener (2004)’s research of the teacher identity development of beginning middle school science teachers getting alternatively certified to teach in urban schools.

In their study, the researchers analyzed a year’s worth of interview data, field observation data, and prompt responses from 15 middle school science teacher interns. Through the finding, the teacher interns forged their new identities of “science teachers of urban kids” through various actions such as opening themselves to having their assumption about urban kids of color challenged; actively building relationship with students beyond academic interactions; purposefully designing lessons to leverage their expertise from prior careers to connect students’
lives to the content; bringing in professional contacts into their classrooms to expose students to
new people and experiences; and exposing students to community-based resources. All of these
actions are types of “performances” of science teachers of urban kids – or more elegantly stated,
“socially just science teachers”.

The main affordances of operationally defining identities via performance are that
behaviors are observable and in the process of engaging in practice, growth and learning occur –
meaning that this conception of identities is highly dynamic (Wenger, 1998). Proweller and
Mitchener (2004) found that, indeed, the middle school science teacher interns largely
transformed as they went about performing towards their socially just science teacher identities:

As the teacher interns built relationship with their students and came to know them in
more in-depth and intimate ways, they learned of the feelings of “powerlessness” that
many of their students brought with them into the classroom on a daily basis, and held
themselves responsible for, as one teacher intern observed, “trying to instill some type of
power [in them].” This observation captures the shift in thinking that the teacher interns
began to demonstrate as they crafted science education at the intersections or personal
and professional experiences with science, a growing awareness of the backgrounds of
urban youth from communities of poverty, and the sway of reform efforts currently afoot
in science education to prepare teachers able to teach diverse youth in culturally inclusive
and responsive ways. (p. 1057)

The researchers in this study were able to capture the shifts in their teacher interns’ teacher
identities through grounding their conceptualization of identities through their actions.

In turn, the main constraint of using this operational definition of identities is clarifying
the actions that embody identity. Similar to the identities as social recognition definition,
clarifying the performance of an identity in addition to judging versions of the same behavior is subjective and therefore, amendable to power and agency imbalances. For example, the Proweller and Mitchener (2004) study begs several questions about science teachers and socially just science teachers, specifically, such as what do they do and what should they be doing. These answers to these questions likely vary, but studies grounding their definition of identities in performance limit the answers that they receive to these types of questions and may even be limiting the possibilities of what the answers could be, depending on the power and agency of the actors involved.

**Identities as Discursive Creations**

Within frameworks that operationalize identities as discursive creations, identities are primarily constructed using Gee’s (2000) conceptualization of “big ‘D’” – or “Discourse” with a capital “D” – which deals with how combinations of language, behavior, and recognition are used to embody being a “kind of person” (p. 99) or recognizing others as embodying a particular identity. The Discourses governing particular identities are decided through hegemony; the most dominant factions of a society decide the criteria for recognizing particular identities or rejecting them. For example, the dominant criteria for being considered a “science teacher” in the U.S. is someone who has received a science content-area certification from a state-agency, spends most weekdays in a classroom with students doing or talking about something related to science, surrounded by materials and classroom décor found in many science classroom across the nation. Once again, the operational definitions of identity are not mutually exclusive; Discourse-grounded identities, by definition, include social recognition and performance within it. However, the added layer of language and communication makes this definition a more complex
– and richer – definition that the relatively simplistic definitions of identity grounded in social recognition or performance.

For example, Wade-Jaimes and Schwartz (2018) did a study exploring Discourses – or in the context of this research, identities – available to African American girls in an all-girls middle school science class. The researchers collected a comprehensive set of data over a two-year span: school observations of school-wide events; school-wide artifacts (e.g., photos of bulletin boards and signs); daily observations from a single classroom over a one-year span; informal conversations with the teacher and students in the classroom; and two formal interviews with the teacher. Note that the artifacts and observations included fieldnotes of what was being communicated – either by print in the artifacts (e.g., postings of school rules) or by verbal communication from the teacher to her students. The most relevant finding from this research were limited number of identities available to the young Black girls within their school and classroom: the Good Girl; the Good Student; the Good Science Student; the Helper; the Ghetto Girl; the Mean Girl; the Authentic Science Lover; and the Imitation Science Lover. The “positive” identities were ways of presenting, performing, and speaking that received praise – such as coming to school in a neat uniform, finishing schoolwork quickly, and speaking in demure tones, if at all, during class. The “negative” identities were ways of presenting, performing, and speaking that received reprimands – such as coming to school with a hoodie over their uniforms, interacting with peers during class time, and standing up for oneself to either teachers or other students.

The main affordance of operationally defining identities as discursive – or rather Discursive – creations is that comprehensively socially and culturally contextualizes being a “kind of person” within language, performances, and recognition. This contextualization allows
for a deeper investigation into what constitutes membership into identity groups and the particularities of the languages, performances, and recognition of a group. For example, Wade-Jaimes and Schwartz (2018) explain their major finding:

This research demonstrated how limited Discourses were available to African American middle school girls. Considering the Discourse available to students provides insight into the ways in which African American women are subject to controlling images throughout society. (p. 24).

Their analysis of how identities of young Black girls are Discursively created within their middle school context revealed the limited numbers of opportunities the girls had to be seen. Additionally, their research discovered how few identities that Black girls could embody that were positively recognized – and even those identities are praised for how much they diminished the freedom of Black girlhood (Collins, 2000; King & Pringle, 2018).

However, Wade-Jaimes & Schwartz’s (2018) research reveals the main constraint of grounding identities as Discursive constructions: hegemonic factions still rule over the criteria of who and what is a particular identity. Because the identities as Discursive constructions definition includes social recognition and performances, it has similar challenges, namely that the criteria for what is recognized versus what is not and the performances that count versus those that do not is decided by hegemony – or the dominant parts of the group membership. Accordingly, power and agency are diminished in these definitions of identities, because they are based on social and cultural decisions – many of which fail to consider or fully value the agency of minoritized members of an identity group. As a result, the amount of agency one has in being included (or excluded) in a certain identity is diminished and is even more diminished for minoritized members who have little to no power in the hegemony deciding who they are.
Identities as Narrative Constructions

The last operational definition of identities as narrative constructions – or stories of self that are reifying, endorsable, and significant (Sfard & Prusak, 2005). Narrativizations of self are not exclusive of recognitions, performances, and language. Rather, the knowledge of these aspects of identity are bundled within the stories one tells about themselves or about others. The salient feature of this operational definition is that the units of data collected are narratives – be they photo-narratives, written narratives, oral narratives, or media-based narratives, among other types. Within these narratives are knowledge, values, and beliefs grounded in lived experiences told in storied form that may be inaccessible from mere recall (Clandinin, 2016; Clandinin & Connelly, 2000).

For example, Avraamidou (2016) explored three preservice elementary science teachers’ science identity formation using life history methodology. The three preservice teachers were purposefully chosen from a larger cohort of 25 teachers because of their orientation towards science – one enjoyed science, one was neutral towards science, and the last one disliked science. The data collected included two interviews, reflective journals, a science biography and a drawing created by each participant, a philosophy statement, an observation, a self-portrait, and a written narrative. She analyzed the narratives she collected using the tenets of Clandinin & Connelly’s (2000) three-dimensional space narrative structure which includes dimensions of interaction, community, and structure. The findings revealed the ways in which different science contexts and key figures in their lives influenced their initial orientation to science and their subsequent journeys in becoming science teachers. For example, one teacher described an experience related to her negative orientation to science:
‘So, we were trying different things like bread and lemon ... and then he gave us soap to try! We thought he was joking. But he was not. He insisted. I refused...I was really frightened. I really hated science since that day, I remember crying when I went home ... he was really weird, a very strict old man. My science teachers at high school were kind of like him, all weird.’ (p. 873)

From this story, Avraamidou (2016) connected the teacher’s initial dislike of science to a “really weird”, “strict old man” and other “weird” high school science teachers. While this knowledge could have been relayed outside of a story, the storied form allowed the connection to made between poor science orientation and a lived experience where a male “science person” forced a young woman to do something in class that was particularly unpleasant. This is one of the affordances of operationally defining identities are narrative constructions – the revelations and connections hidden in storied forms of knowledge.

The main affordance of identities as narrative construction, especially in the context of this study, is that storytellers have all of the agency – be they telling stories about themselves or others. In the previous case, the storytellers chose the stories significant to them and how to share them. In doing so, they revealed their identities as told from their perspectives. As Avraamidou (2016) noted of the benefits of grounding identity in narratives for her research:

The findings of this study show that it is imperative to examine the life histories of pre-service elementary teachers to find out who they are as they come to university in order to support them in forming science identities. If a life-history perspective had not been adopted in this study, there would be no information about events and experiences that would help explain the nature of the participants’ identities as they entered the teacher preparation program. (p. 879).
These personal-created stories of self not only reveal identities as constructed by self, but intricacies behind the how and the why behind the positions of the constructions.

The major constraints of defining identities as narrative constructions are twofold. First, if the narratives collected are about someone else other than the storyteller, the same agency issues that the other three operational definitions have exist here as well – the subject of the story has no agency and power in how they are identified in this case. However, this constraint does not apply when the storyteller is telling the stories about themselves – which is the case in this study. However, the second constraint initially applied to this study – that is, that narratives constructions of identity need additional frameworks to ground the focus of research, lest they become lofty explorations with little empirical mileage beyond the very limited research spaces it exists in. This is not necessarily negative; however, given the utility of this operational definition in how it considers and allows agency in identities, it would be a shame to employ it so esoterically.

**Summary**

Identity as research framework in science education potentially opens up an expanded view of science and science education that has yet to accessed or even imagined. Historically, science and science education skewed White and male (Banilower et al., 2018; Carlone, Johnson, & Eisenhart, 2014; Parsons, 2014). Even with increased efforts to diversify these spaces, minoritized groups of people still are limited in their access, opportunity, and voice. However, if actually leveraging the diversity toward knowledge development and implementation to the benefit of *all* students is a real goal of science education communities, then a reimagining of this process needs to change. In the next chapter, I discuss the methodology and methods used to
explore the lived experiences of Black secondary science teachers and how they position themselves in their schools.
3. Methodology

The purpose of this qualitative study was to explore the lived experiences that inform Black secondary science teachers’ positional identities and how they position themselves in their classroom and school contexts. The research methodology, and related methods, aligned with the purpose of this study and were informed by the following research questions:

1. What lived experiences inform Black secondary science teachers’ positional identities?
2. How do Black secondary science teachers position themselves in their classroom and school contexts?

This research was a qualitative study, meaning that the overarching goal of this research was to explore the “qualities” of knowledge under the assumption that knowledge creation and how meanings that are assigned to knowledge are a fully human endeavor (Denzin & Lincoln, 2011). Given that this was a qualitative study, the focus is on how Black secondary science teachers use narratives of their lived experiences to construct their positional identities. Due to the focus on narrative knowledge, the most suitable methodological framework for this qualitative study was social constructionism, an epistemological stance that views knowledge as socially and culturally created, defined, and situated (Crotty, 1998; Weinberg, 2014). In this section, I first discuss the affordances of social constructionism as the epistemological foundation of the methodological framework of this study. Then, I describe what critical race methodology is and why it is the most appropriate methodology for this study. Lastly, I connect counterstories, the linchpin of critical race methodology, with the narrative methods that I relied on for data collection and analysis.
The Affordances of Social Constructionism

The premise of social constructionism is that there are multiple truths with no inherent value over one another until value is socially imposed upon them (Weinberg, 2014). However, before delving into this, the root of social constructionism needs to be briefly mentioned. Basic constructionism views knowledge as a fully human creation; in other words, the world, when disconnected from human engagement and interpretation, has no inherent meaning (Crotty, 1998). Therefore, objectivity is non-existent. All meaning is subject to a particular human’s engagement and interpretation, which implies that knowledge is fully subjective under constructionism. However, constructionism as an epistemology implies that human engagement with the world and other humans is mutually exclusive. Realistically, humans engage with one another individually, socially, and culturally – which is why social constructionism is more useful.

Social constructionism accounts for the crucial element of human interaction; meaning is constructed through human-to-human interactions, which includes local social interactions and larger cultural interactions (Weinberg, 2014). Under this epistemological stance, not only is knowledge subjective to a particular human, it is also subjective to social interactions and the larger cultural structures that influence these interactions. Given that social interactions can vary across different social and cultural contexts, what qualifies as knowledge and the valuation of knowledge often differs across these contexts. For example, a good deal of knowledge about Black students and Black teachers can be found in narratives, both oral and written. However, much of this knowledge is undervalued, and as a result, it remains marginalized in academic spaces. However, social constructionism allows for interrogating how and why this knowledge got pushed into the margins, in addition to centering and valuing it in academic spaces.
Not only does qualitative research provide space for in-depth understanding of knowledge stored in experience and narratives, it provides the space for interrogating knowledge (Bhattacharya, 2017). Social constructionism as a foundation to qualitative research is what allows this questioning and challenging of knowledge, because social constructionism as an epistemology leaves room for the consideration of human-built power structures into knowledge creation and valuation (Crotty, 1998; Weinberg, 2014). Using social constructionism as a methodological framework for this particular study afforded the ability to consider power structures in understanding experiences, identities, and social contexts. Inherent in the concept of positional identities is the premise that our identities (or collective stories of self) are significantly influenced by how we are situated by socially constructed identification markers, which includes but is not limited to race (Mensah, 2016; Sfard & Prusak, 2005). This study specifically explored the lived experiences that inform Black secondary science teachers’ positional identities and how they position themselves in their classrooms and schools. For this research that simultaneously honored each teacher’s identities and knowledge and also delved further into larger phenomena (i.e., how lived experiences inform positional identities) at work across the teachers, critical race methodology was the most appropriate research “roadmap” towards accomplishing this goal.

**Critical Race Methodology**

In this study, the narratives of each Black science teacher informing this work was central towards understanding their lived experiences that informed their positional identities and how they positioned themselves in their schools. Inherent in exploring the narratives of Black teachers is the intercentricity of understanding the role of race and racism in their lives (Tate, 1997). Race and other identities are social constructions with historical and cultural implications. Therefore,
this research was fully grounded in a social constructionist methodological framework. Given this framework, the methodology chosen for this type of research must be equipped to actively consider, account for, and interrogate lived experiences and positioning.

Solórzano and Yosso (2002) coined critical race methodology (CRM) to describe a research methodology that “foregrounds race and racism in all aspects of the research process” (p. 24) with the expressed purpose of challenging dominant research paradigms of students and teachers of color. CRM is grounded in critical race theory (CRT), and therefore, considers and accounts for all of the tenets of CRT. In alignment with CRT, there were general themes of CRM research that were embedded to some degree throughout research using CRM. I grounded this research in two of these themes: the centrality of experiential knowledge and the challenge to dominant discourse. In the next section, I discuss both themes in relation to this study.

The Centrality of Experiential Knowledge

CRT explicitly acknowledges, legitimizes, and honors knowledge from the experiences and stories of people of color (D. A. Bell, 1980; Brown & Jackson, 2013; Crenshaw et al., 1995; Ladson-Billings & Tate, 1995; Tate, 1997). Therefore, CRM centers research design around counterstories, or “the stories of people whose experiences are not often told”, because of the richness of knowledge that they possess about the lives of people of color (Solórzano & Yosso, 2002, p. 32). This research study directly sought to explore more about how the lived experiences of specific people of color – Black secondary science teachers – and inform their positional identities and how they position themselves in their schools. Positional identities are rooted in experiences as expressed through narratives. Therefore, the collection and creation of biographical counterstories was a central feature of the research design for this study (Yosso, 2006).
The Challenge to Dominant Ideology

As discussed in Chapter 2, science education research, and by extension, education research literature as a whole has significantly discounted the perspectives and knowledge of Black teachers, especially in regards to their knowledge of Black students and the communities they live in (Foster, 1997, 2001; J. J. Irvine, 1989; Mutegi, 2011; Villegas & Irvine, 2010; Walls, 2016). This discounting happens either through ignoring race through “colorblind” approaches to research or through problematizing and pathologizing Black teachers, particularly those who work primarily with Black students and other students of color. The design of this study specifically counters both approaches for a more nuanced understanding Black science teachers through the use of counterstories.

In addition to centering and emphasizing the importance of narrative knowledge, counterstories also serve the purpose explicit in the term counterstories – to counter dominant narratives and discourses around people of color by passing the microphone to those at the center of these discussions, the people of color themselves. Counterstories share narratives of people of color from their own perspectives, not dominant perspectives. People of color have different narratives and perspectives informed by their racial and ethnic positioning in society (Crenshaw et al., 1995; Ladson-Billings, 2009; Ladson-Billings & Tate, 1995). Relevant to this study, Black science teachers face unique challenges in becoming and remaining science teachers (Mensah, 2009, 2012, 2016; Moore, 2007, 2008). In this study, I acknowledged this unique positioning by focusing specifically on Black secondary science teachers’ counterstories. The teachers’ counterstories shared their narratives of their positional identities and how they constructed them through a partnership between them – the teachers, and me – the researcher. These partnerships ensured the counterstories were rooted in their perspectives as the people of focus in this study,
rather than mine as the researcher. Using CRM as a methodology for this study was a commitment to fully honor the identities, the perspectives, and the work that each Black science teacher shared with me.

**Connecting Critical Race Methodology to Narrative Inquiry Methods**

The purpose of this study implies that *narrative knowledge* is the type of knowledge being explored, so the term will be briefly explained. Kramp (2004) simply described narrative knowledge as knowledge expressed through stories about our experiences, perceptions, and selves. Of the importance of stories in transmitting knowledge, Polkinghorne (1988) explained, “Narrative is the fundamental scheme for linking individual human actions and events into interrelated aspects of an understandable composite…Narrative displays the significance that events have for one another.” (p. 13). Narrative helps us to make sense of the happenings in human life, so seeking narrative knowledge as a means to understand identities as manifested through perception and experience is more than appropriate. In this study, I sought narratives about lived experiences and self specifically to harvest in-depth knowledge about Black science teachers that can only be harvested through stories, for as Riesmann (2002) noted, “Personal narratives – the stories we tell to ourselves, to each other, and to researchers – offer a unique window into these formation and reformations [of the meanings of life events].” (p. 705).

For this study, I used narrative inquiry methods for data collection and data analysis as is implied when using CRM. Narrative inquiry seeks knowledge through exploring the “storied lives”, or the continuous experiential nature, of human living (Clandinin, 2016; Clandinin & Connelly, 2000), which is indeed what I sought out in this study. Identities and the subsequent perspectives and actions rooted within them are deeply personal and complex concepts that are often bundled within the stories we share (Polkinghorne, 1988, 1995). Social positionings are
added layers of complexity to understanding lived experiences, identities, and perspectives of teaching. However, narrative methods are highly useful in work where power differentials are contextually important to answering research questions. Of the utility of narratives in dealing with these differentials, Johnson-Bailey (2004) reasoned, “The process of data collection for narrative methodologies (and in qualitative work in general) are responsive to the implied communication differences that might exist between the researcher and the researched.” (p. 126). The malleability of narrative makes narrative methods ideal when engaging in research that purposefully pushes back against rigid, dominant ideology as is what is done when collecting and creating counterstories.

**Research Design**

In this section, I provide a summary of the overall design of this study using counterstories, including how I constructed individual counterstories and theorized across this collection of counterstories. Then, I describe in detail each of the following elements of the research design: the teachers and their work contexts – including the selection criteria and selection process; data collection methods; data coding methods; and data analysis methods.

**Overall Design of the Counterstories**

As described earlier in this chapter, counterstories are useful in both sharing the stories of people of color from their perspectives and exploring larger phenomena at work in the lives of people of color (Solórzano & Yosso, 2002). Similar in nature to multiple case studies – the traditional analogue to counterstories – it is harder to explore and interrogate phenomena with too few cases (Stake, 2006). On the other end of the spectrum, Stake recommended no more than 10 informants in a multiple case study, as efforts become diluted past this point. Six Black
secondary science teachers were willing to participate in the study – a number well within Stake’s (2006) recommendation of finding between three to ten informants.

Part one of the study was the collection of individual counterstories. I detail each step of part one in a later section of this chapter, but for now, I provide a synopsis of the design of part one. From each teacher, I collected narratives through a series of three interviews focused on three overarching topics: their life history with science and education, their current lives as science teachers, and their science teaching work (Seidman, 2013). I analyzed data using a blend of analysis of narrative, interactional narrative analysis, and thematic narrative analysis methods (Polkinghorne, 1988, 1995; Riesmann, 2002) to create individual counterstories of the narrative constructions of the teachers’ positional identities.

The second part of this study was theorizing across the individual counterstories. Similarly to how I treated part one, I use this section to provide a synopsis of the design for part two and save detailed description and explanation of each step in a later section of this chapter. In part two of this study, I used the findings from the six individual counterstories as the source of data for part two to consider them cohesively to explore larger phenomena at work (Mensah, 2016; Solórzano & Yosso, 2002; Stake, 2006). The larger phenomena at work under interrogation in this study was the construction of Black science teachers’ positional identities based on their lived experiences. The findings from each counterstory underwent coding that shed light onto how these phenomena play out across different Black science teachers (Kramp, 2004; Polkinghorne, 1988, 1995; Riesmann, 2004).

**Teacher Selection Criteria and Process**

Of the importance of the decisions behind finding and choosing participants for a study, Patton (2015) noted, “As with all sampling, what you end up having something to say about
depends on whom you sample.” (p. 285). Explicit in the purpose of this research and the questions asked, I intended to say something more about Black science teachers, so that’s who I sampled. Prior to recruitment, I developed three criteria for participation in the study. First, because this study’s primary focus was on Black science teachers, the first criterion for participation was for teachers to identify as Black, as a part of the African diaspora, and/or of African descent. The second and third criteria were that teachers were to be currently employed as a secondary (i.e., grades 6-12) science teacher within the state where this study was completed and to have taught secondary science for a minimum of three years. I put the last criterion in place in the hopes that more years of experiences would mean that the teachers had more narratives from these years to draw from, and in turn, would result in a richer stories.

Once the criteria were finalized, recruitment began. Given that I am a Black science teacher and also a researcher, I began recruiting by leveraging my connections with both my teacher and researcher colleagues, respectively—a form of snowball sampling (Patton, 2015). First, I created a recruitment email that included a description of the study, its purpose, participation criteria, and participation tasks. At the end of the email was a link to a secured electronic interest form for interested teachers to input their contact information (see Appendix A and Appendix B, respectively). I sent this recruitment email to personally known teacher and researcher colleagues for them to forward to potential teachers they knew who met the criteria and would possibly be interested. Once I received their information through the electronic interest form, I contacted them via email to schedule the first interview and to allow them electronically access to complete the informed consent information and pre-interview questionnaire (see Appendix C and Appendix D, respectively). Half of the teachers in this study were recruited via the recruitment email. The other half of the teachers were given my contact
information by researcher colleagues and contacted me directly via phone. Once they got in touch with me, I scheduled their first interviews and allowed them electronic access to the informed consent information and pre-interview questionnaire.

**The Teachers & Their Research Contexts**

In total, I recruited six teachers – three people identifying as women and three people identifying as men. Collectively, these six teachers have 74 years of teaching experience across elementary, middle, and high school contexts, and accordingly, they all had much to say about their perspectives of who they were, who they are today, and how they got there. The teachers represent six different schools across five districts in a metropolitan area located in the southeastern part of the United States. Statewide, the public school student population in grades 6 through 12 are predominantly children of color – 60.4% are children of color while 39.6% are White (Georgia Department of Education, 2019). While most students in grades 6 through 12 are children of color, this is not true of the teachers across the state. Across all grade levels and content areas, the population of teachers in the state are predominantly White – 59.6% White versus 34.5% teachers of color (The Governor's Office of Student Achievement, 2019).

The teacher population in this state has more teachers of color than the nationwide population but is still disproportionate in comparison with the grades 6-12 student population in the state. Even though they are located in the same metro area, the six schools the teachers work in are located across five districts that are different enough compared to the statewide characteristics and each other to warrant further discussion, so in the next sections, I introduce each teacher and describe their teaching – and research – context (see Appendix E for the teacher-informant information summary table).
Viola

Viola is a teacher with 25 years of experience currently teaching standard-level and honors-level chemistry. Over her teaching career, she has taught across two states and six schools – all but one of them are high schools and the outlier is a middle school. After a few years of working as a licensed chemist, she moved back home to New Orleans and applied for job in the parish school district. They hired her without a teaching certificate, because “they were like 'You a chemistry major. If you don’t know nothing, you know chemistry.'” (Viola, Interview 1). She spent the first two years teaching high school general science and biology. Since her third year of teaching, she has taught chemistry in some form, either through a traditional high school chemistry class or a middle school physical science class that integrated chemistry and physics content. After leaving New Orleans for this study’s state context, Viola has taught for Washington County School District (WCSD) for almost 15 years – three years in her first high school in WCSD, five years at her neighborhood middle school, six years at her neighborhood high school (which was Truth High, another school in this study), and now is in year one of her tenure at Bates High School.

Viola teaches in Washington County School District, a suburban district located about 20 miles away from the city at the center of the metropolitan area. The U.S. Census Bureau (2018) estimated that as of 2017, Washington County had a total population of about 928,000 people, making Washington County the second largest county by population in the state. As of 2019, WCSD serves almost 180,000 students, which makes it the largest school district in the state (Georgia Department of Education, 2019). WCSD has the most diverse 6-12 student population of the districts in this state – the district touts the highest percentage of Latinx students and Asian students of all of the other districts and has a percentage of Black students similar to the
statewide percentage (see Appendices F and G for the full tables of the 2019 reported race/ethnicity populations percentage for state, districts, and schools for students and teachers, respectively). Despite the heterogeneous makeup of the student population, WCSD also touts the highest percentage of White teachers of all of the districts in the study and has a slightly higher percentage of White teachers compared to the state. Conversely, WCSD has the lowest percentage of Black teachers of the study districts and has a lower percentage of Black teachers compared to the state. Across racial and ethnicity designations, the student and teacher populations are disproportionate, meaning the teacher population in WCSD does not reflect a similar degree of heterogeneity as the student population.

Bates High, in comparison, is closer to having its staff reflect its student population, though it still has a long way to go. Its student population is predominantly Latinx (about 62%). Black students make up the second highest percentage at about 24%, and only about 2% of the student population is White. The staff of Bates High is still predominantly White at 44%. However, over half of the staff classifies themselves as teachers of color. Additionally, Black teachers make up the second highest percentage of the staff at 25%, meaning that while overall, the staff is disproportionately White relative to the student population, the percentage of Black teachers and Black students are actually proportionate. As Viola noted, “I haven’t worked with this many people of color since I’ve been in [the state].” (Viola, Interview 3).

Laurence

Laurence is a teacher with 22 years of experience currently teaching sixth grade earth science. He has taught at both the elementary and middle school levels. His first five years of teaching were spent in two different elementary schools that are both located in Franklin County Public School (FCPS), another district in the study. As an elementary teacher, he was
responsible for teaching all subjects to classes of 30-35 kids every year. After deciding to focus on only teaching science, he moved to a middle school in FCPS to begin teaching sixth grade physical science at a middle school. Towards the end of his time here, he learned how to teach a new subject. The state mandated a curricular change in the middle school science course sequence – sixth grade science would now be earth science, and students would take physical science during eighth grade. After five years in his first middle school, he left to an adjacent district – Wilson County School System (WCSS) – to be closer to home and to his children. He taught sixth grade earth science at a new middle school located in WCSS for six years. He then moved to his current school in WCSS, Hamer Middle, and he continues to teach sixth grade earth science there.

The district Laurence currently teaches for – Wilson County School System – is a suburban district located about 25 miles away from the city at the center of metropolitan area. The U.S. Census Bureau (2018) estimated that as of 2017, Wilson County had a total population of almost 90,000 people, and accordingly, Laurence described where he works and lives as “just a really nice, little family environment” (Laurence, Interview 1). As of 2019, WCSS serves a little under 17,000 students (Georgia Department of Education, 2019). The 6-12 student population of WCSS is about 70% Black, well above the percentage of Black students across state. However, the percent of Black students in WCSS does not reflect the county’s demographics – only about 51% of the county’s population is Black (U.S. Census Bureau, 2016). The second most populous demographic group of students in WCSS are Latinx students at about 14% of the district’s 6-12 student population. Again, this is incongruous with the county’s second largest population demographic – White people at about 42% of the county’s population.
In WCSS, White students only account for about 11% of the grade 6-12 population, which suggests that White students living in Wilson County are not going to the district schools.

The percentage of teachers at Hamer Middle who are Black is larger than both the statewide and district percentages – about 60% of Hamer Middle’s teachers are Black compared to about 21% statewide and about 45% across WCSS. This means that the percentage of Black teachers at Hamer Middle is actually proportional to the percentage of Black students that attend the school, which is a difference from the disproportionality of the state’s and district’s ratio of Black teachers to Black students. Overall, Hamer Middle serves predominantly children of color – about 93% of the students are children of color, with Black students and Latinx students accounting for 88% of the population of students.

**Angela**

Angela is a teacher with 13 years of experience currently teaching standard-level and honors-level chemistry. She has taught at both middle and high school levels. Her first year of teaching was at a middle school in the Baltimore City Public Schools district where she taught eighth grade earth science. She then taught for a high school in the Baltimore County Public Schools district for seven years before moving to the state context of this study. Within this state context, she has spent the last five years teaching for her current work context, Truth High School in Washington County School District (WCSD). Across her high school science teaching career, she has taught chemistry for 12 years across various levels (e.g., standard, honors, gifted, and Advanced Placement) in addition to teaching physical science and physics across various levels at different points in time.

The school district Angela’s school is located in – WCSD – is the same district where Viola’s school, Bates High School is located. In fact, the two schools are only separated by 10
miles driving on a major county thoroughfare. As a reminder, Washington County is the second largest county by population in the state, and WCSD is the largest district in the state. WCSD touts the most diverse grade 6-12 student population of all the districts in the state, yet over half the teacher population of WCSD is White. Compared to Bates High, Truth High School serves significantly more White students than Bates High (approximately 14% versus 2%), yet it also remains a school that serves predominantly students of color – with the population being about 47% Latinx students and about 29% Black students. However, the teacher population of Truth High is still disproportionately White – about two-thirds of the teachers are White. Comparatively, only 13% of the teachers at Truth are Black, meaning the number of Black teachers is disproportionate to the number of Black students at Truth High.

Regina

Regina is a teacher with six years of experience – seven years when counting her adjunct teaching experience – currently teaching standard-level and honors-level chemistry courses and AP chemistry at Parks High School in Clinton City School District (CCSD). Her journey as a science teacher began when she first taught introductory chemistry courses at a local community college. The next year, Regina decided to teach high school chemistry in addition to continuing her adjunct teaching after school. In addition to her current chemistry courses, she has also taught high school physical science and biology at various levels. For the first four years of her career, Regina taught at high school located close to the epicenter of the metropolitan area. Then, she moved to charter school within the same district as her last school. She stayed for a year before moving to her current school – Parks High School.

Regina’s current school is located in Clinton City School District (CCSD), an urban district that serves most students within the city limits of the place at the very center of the
metropolitan area context of this study. About 465,000 people live within the city limits, but parts of the city are located in Franklin County and are served by that county’s district, and some parts of the city are districted its main county’s district and not CCSD. The district currently serves a little under 52,000 students with about 85% of their students in grades 6-12 being students of color; comparatively, the city of Clinton’s population is 58% people of color. Of the total percentage of students in grade 6-12 served by CCSD, about 76% of the students are identified as Black. At Parks High, the percentage of students identified as Black is even higher than the district’s percentage – 94% of the students are identified as Black. (GDOE, 2019).

Over half of CCSD’s teachers are people of color – most of whom are identified as Black; about 60% of CCSD’s teachers are identified as Black. This percentage is highest of all of the districts in the study and significantly higher than the state’s percentage of Black teachers (about 21%). At Parks High, the teacher population’s racial makeup is much Blacker than the overall district – similarly to the student population racial makeup. About 74% of the teachers at Parks High are identified as Black. Notably, the second highest percentages in the racial makeup of Parks High are Latinx teachers at about 10%. Also notable is that there are so few White teachers at Parks High that the percentage was unreported; instead, they reported “TFI”, or too few to include. However, district-wide, White teachers account for about 17% of the teacher population. The percentages of Black students to Black teachers is disproportionate at Parks High. However, this particular label fails to account for the student population being virtually homogeneous. Additionally, this label fails to account for at least 85% of the staff being people of color – with most of these teachers of color being identified as Black.
Michael

Michael is a teacher with five years of experience, who just finished teaching seventh grade life science during the last school year and is preparing to teach eighth grade physical science in the upcoming year. He has only taught at the middle school level. All five of his years of teaching experience have been in the same school as where he completed his student teaching experience for his graduate teaching program – Tubman Middle School. However, in those five years, Michael gained experience teaching two grade levels and two subjects. He taught sixth grade earth science during his first year as a teacher and taught seventh grade life science for the other four. During this past school year, his colleagues at his school selected him as their teacher of the year.

Michael currently teaches for the Franklin County Public Schools (FCPS) school district, a primarily suburban district – a small fraction of the city at the epicenter of the metropolitan area resides in Franklin County but is not districted for FCPS. Tubman Middle itself is located about 15 miles outside the city center, though other parts of FCPS neighbor the city. The U.S. Census Bureau (2018) estimated that as of 2017, Franklin County had a total population of a little over 730,000 people. As of 2019, FCPS serves about 98,000 students, most of them classifying as students of color. Only about 11% of FCPS students are White, which is the lowest percentage of White students of the districts in this study. The 6-12 student population of FCPS is about 64% Black – well above the percentage of Black students across the state. The percentage of Black grades 6-12 students served by FCPS is higher than percentage of Black people living in the district – about 56% of people residing in Franklin County are Black.

Over half of FCPS’s teachers are people of color – most of whom are identified predominantly as Black; about 54% of FCPS’s teachers are Black. This percentage is much
higher than the statewide percentage of Black teachers (about 21%) and is the second-highest percentage of the districts in this study. At Tubman Middle, the teacher population racial makeup is similar to the district’s – about 54% of the teachers there are Black and about 21% of the teachers are White (relative to the district percentage of 22%). In addition to being comparable to the district’s racial makeup, the racial makeup of the teacher population at Tubman Middle is quite proportionate to the student population at the school – Black students make up about 59% of the population and White students make up about 10% of the population.

Daniel

Daniel is a teacher with four years of experience who is preparing to move to a new school. However, when he participated in this study, he taught environmental science at Chisholm High School for two years. Two years prior to that, Daniel taught biology for two years at a rural high school close to his hometown.

Daniel’s now-former school, Chisholm High, is located in Kennedy County Public Schools (KCPS), a primarily suburban district with rural areas on the margins of the county. KCPS is located approximately 23 miles outside the epicenter of the metropolitan area. The U.S. Census Bureau (2018) estimated that as of 2017, Kennedy County had a total population of about 140,000 people. The racial makeup of Kennedy County is close to being evenly split – about 50% of the county population is identified as White while about 46% is identified as Black. As of 2019, KCPS serves about 27,000 students, most of them identified as students of color. The grade 6-12 student population of KCPS is identified as about 78% students of color, and with about 56% of the same population being Black students. Similarly, the students of Chisholm High are predominantly identified as students of color (76%) with the percentage of the total population being identified as Black being about 58%.
Comparatively, the racial and ethnic makeup of the teacher population working for KCSD is predominantly White – about 57% of the teachers are identified as White. The teacher population of Chisholm High is even Whiter – about 64% of the teachers there are identified as White. The percentage of teachers identified as Black across the district is about 27%, and the percentage of Chisholm High’s teacher identified as Black is even lower at about 20%. The student/teacher race and ethnic makeup is disproportionately White across the district and especially so at Chisholm High.

Creating the Individual Counterstories: Data Collection, Coding, and Analysis

Part one of this study was the process of creating the individual counterstories for each of the six teachers. Figure 3 visually summarizes the process of creating each individual counterstory in a logic model. In the sections below, I describe the collection, coding, analysis methods that took place to create each individual counterstory.
Figure 3. Logic model of the counterstory creation process

The Narrative Constructions: Counterstories of Black Secondary Science Teachers’ Positional Identities
Data Collection Methods

Data collection took place from February 2019 until June 2019. Prior to beginning the interviews, I gave the teachers access to a web-based scheduler to choose dates, times, and locations for their interviews from a predetermined list created by me, in addition to a pre-interview questionnaire to collect preliminary data about each teacher’s teaching history. I decided to interview each teacher three times following a three-series semi-structured interview protocol (Seidman, 2013). The three-series semi-structured interview protocol allowed in-depth, rich data collection from each interview by focusing each interview on a particular aspect of the research topic while allowing flexibility in the interview process to amend protocol to account for knowledge construction occurring throughout data collection (Seidman, 2013).

The topic of the first interview was on each teacher’s life history with science and education, because the purpose of the first interview “is to put the participant’s experience in context by asking him or her to tell as much as possible about him or herself in light of the topic up to the present time.” (Seidman, 2013, p. 21). During the interviews, our conversations of veered from the protocols as questions came up from either me or the teacher or as tangential dialogue happened – this is an example of the interactional narrative analysis that occurred during the interviews. Immediately after the interview, I recorded voice memos, and a day later, added to these voice memos by writing memos to begin analyzing the narratives from the interviews. After transcribing the interviews and in vivo coding, I revisited these memos to help in the process of focused coding. This first round of focused codes were then brought into the second interview with me.

The focus of the second interview was on their current lives as science teachers to “concentrate on the concrete details of the participants’ present lived experience” – specifically
who each teacher is in the school context and how power and agency factor into their identities (Seidman, 2013, p. 21). At the beginning of this interview session, I asked for the teacher’s feedback on the first round of focused codes I developed based on the first interview as a way to ensure that each teacher’s voice and the meanings developed in the previous conversation was preserved through the coding process. After completing this member-checking (Smythe & Murray, 2000) process, the semi-structured interview protocol commenced. Similar to the first interview, I recorded voice memos immediately after the interview ended, and a day later, added to these voice memos by writing memos to begin analyzing the narratives from the interviews, and in turn, these memos were revisited to help focus code the next round of in vivo codes. However, because I had coding from the first interview alongside with clarifications from member-checking, I also pattern coded across the codes from both interviews for either consistent or conflicting themes.

The third, and final, interview focused each teacher’s science teaching work to complete the connection between life history with science and education with each teacher’s current lives as science teachers to their perspectives of what happens in their classroom. Similar to the second interview, I began the interview by asking for the teacher’s feedback on the focused codes from the second interview and the overall pattern codes I developed based on the first and second interviews, and after the member checking process ended, the semi-structured interview protocol commenced the same as the first two interviews.

I originally planned for each interview session to last between 45-90 minutes to allow enough time for a fruitful conversation without impinging too much upon the teachers. However, the actual lengths of the interviews varied across the teachers. Some of the interviews went well beyond the planned 90 minutes – for example, the last interview with Angela lasted over two
hours. In fact, all of the interviews with the Black women teachers lasted at least an hour – my average interview time with them was about 90 minutes. Comparatively, the interviews with the Black men teachers tended to be shorter – the average interview time with them was around 40 minutes. There is not enough to data to attribute the discrepancy in the interview lengths to any particular causes. However, as a Black woman researcher and science teacher, I shared many lived experiences with the Black women teachers, and resultingly, I could more readily understand and empathize with their stories. Despite this particular experience of increased cultural synchronicity with one subset of teachers in comparison to another, all of the counterstories captured particular positional identities that reflected their lived experiences and shed light onto how each teacher positioned themselves in their school context.

**Data Coding Methods**

Given that data collection occurred over a series of three interviews, I similarly structured coding to occur over three rounds for each teacher’s interviews. I used three types of coding across these rounds to code the transcripts of the audio-recordings of the interviews. Figure 4 shows a summary of the structure of the coding rounds.
I used three types of coding through the three rounds – in vivo, focused, and pattern coding. In vivo coding involved coding short phrases and slightly longer narrative excerpts in the teachers’ own words to “prioritize and honor the participant’s voice” (Saldaña, 2016, p. 295). The in vivo coding was guided, in part, by my researcher memos in addition to the a priori conceptual framework – meaning anything related to identities, life experiences, race, and other social markers. After completing in vivo coding, I used focused coding to draw out the most salient themes within the in vivo codes. The last type, pattern coding, involved collecting the salient preliminary themes from Interviews #1 and Interviews #2 and categorizing them based on more global themes (see Appendix H for an example). The end result of Round 3 was a thematically complete and structured counterstory for each teacher.
Data Analysis Methods

Of data analysis within narrative-based methodologies, Riesmann (2002) noted, “Analysis cannot be easily distinguished from transcription.” (p. 60). This particular ethos about data analysis governed this research. Data analysis for this study truly began as soon as the first semi-structured protocol segued into a natural conversation between the teachers and me. In totality, I used three types of data analysis methods, all of which are narrative-based. However, to construct the counterstories, I used two: interactional narrative analysis and analysis of narratives. Note that even though I explain each method discretely, narrative methods, in general, tend not to be so discrete. As Riesmann (2004) pointed out prior to describing several methods of narrative analysis, “In practice, different approaches can be combined; they are not mutually exclusive and, as with all typologies, boundaries are fuzzy.” (p. 2).

Interactional narrative analysis. Interactional narrative analysis, according to Riesmann (2004), emphasizes the co-creation of narratives between the storyteller and the listener. In the context of this study, the storyteller in any given interview was the teacher, while I, the researcher, was the listener. The co-creation aspect of interactional narrative analysis occurred inside the conversations each teacher and I had. Into the conversations, I brought – as the researcher – the interview protocol, my subjectivities, and in the second and third interviews, the focused and pattern codes. The teachers brought their narratives of their history with education and science and their narratives of their current experiences as a science teacher. Within our conversations, the teachers and I engaged in real-time interrogation and sense-making of the narratives being shared. Through the in vivo coding process, I preserved our conversations and our member-checking of previous conversation (see Appendix I for an example of the conversational aspect of the interviews). The end result of the interactional narrative analysis
process was narrative knowledge of positional identities and how they were constructed. To ensure I conveyed this narrative knowledge in a more structured way, I used analysis of narratives to impose structure.

**Analysis of narratives.** Polkinghorne (1995) described *analysis of narratives*, or paradigmatic analysis of narrative, as a process of finding thematic elements (common or otherwise) in the stories collected as data. Often, stories collected as data are not told in temporal order nor are they likely to have any sense of obvious order or structure during the collection process (Mishler, 1995; Polkinghorne, 1988, 1995; Riesmann, 1993, 2002, 2004). Analysis of narratives allows for the researcher to impose structure by: a) bounding the storied elements within data, and b) pulling themes from these stories. This newfound structure then lends towards finding commonalities across stories. In the context of this study, I used analysis of narratives to break down our conversations into more storied and thematic elements – this was particularly done during the second and third round of pattern coding. Within the counterstories, this is reflected in connecting conversational elements across the interviews. Even though this analysis of narratives process was meant to restructure the knowledge from the interactional narrative analysis process into storied and thematic elements, the teachers’ literal voices needed to be shared within their own countersories – which is why I wrote the counterstories as *biographical* counterstories. Similar to biographical narratives, these biographical counterstories are meant to share information about the lives of the teachers and provide information about the contexts in which these lives happened with the added elements of ensuring that these Black teachers are depicted as they are in lieu of stock stories of Black teachers and that their voices remain present and in the center of the story. (L. Bell, 2010; Kim, 2016; Yosso, 2006). Therefore, I maintain each teacher’s voice in the counterstories by directly quoting them.
frequently while my voice is reflecting in the editing for clarity purposes and contextualizing the conversations and their meanings.

**Theorizing Across the Counterstories**

The final part of this study was the theorization across the individual counterstories. Most of the effort in this study was spent on creating the six counterstories for their individual value in understanding how each teachers’ work as science teachers connects to how they construct their positional identities. However, there was also collective value with the individual counterstories in providing larger insights into the influence of race, class, gender, and other social categories that frequently form the basis of oppression and marginalization on how Black science teachers see themselves outside and inside the classroom.

**Coding Across Counterstories**

At the start of the cross-theorization process, I had the six counterstories thematically structured and written based on their respective data sets. From this point, I pattern-coded across the counterstories to compare and contrast the themes created and discussed throughout them. I then went back to the research questions and conceptual framework to do theoretical coding, which entails setting up categories that function as a foundation on which the codes are arranged to build theory. Saldaña (2016) likened theoretical coding as setting up a backbone around which the bones, or codes, can be arranged. From the theoretical codes, I then used the last of the three narrative analysis methods I chose to use in this study: Thematic narrative analysis.

**Analysis Across Counterstories**

While thematic narrative analysis seems synonymous with analysis of narrative, the difference lies in the output of each. As Polkinghorne (1995) explained about what distinguished the two, “analysis of narratives moves from stories to common elements, and narrative analysis
moves from elements to stories.” (p. 12). As I described early, I used analysis of narratives as a starting point to analyzing the stories I collected. I used thematic narrative analysis to connect the bones, or codes, into a rich, cohesive, thematic “story” about how Black science teachers construct their positional identities and their perceptions on how these identities influence their science teaching work.

**Trustworthiness**

The trustworthiness and strength of good qualitative studies lies in its ethical considerations of the humans involved in the creation of the study, its credibility, its transferability, its dependability, and its confirmability (Bhattacharya, 2017). In the sections below, I describe how this study addressed each aspect in ensuring trustworthiness of this research study.

**Ethical Considerations**

As with all research that relies on humans as data sources, this research adhered to the traditional regulatory principles that concern ethics: informed consent, preserving the privacy and anonymity of teachers, and maintaining as much transparency with teachers as is necessary to avoid deception and misconceptions of what is happening during the data collection process (Bogdan & Biklen, 2007; Tisdale, 2004). However, given the personal nature of narrative research, two additional ethical concerns were addressed in the process of this study: potential emotional harm and the powered dynamic between informants and researchers (Smythe & Murray, 2000).

Of potential emotional harm in narrative research, Smythe and Murray (2000) cautioned, “Participants might make themselves vulnerable in their own narrative revelations…narrative researchers, like other qualitative researchers, must confront the potential risks involved in
inadvertently touching on highly charged emotional issues in the course of an interview…” (p. 321). Participants, even with informed consent before the start of data collection, may not fully understand the depth in which they may speak about topics, especially emotionally charged and highly personal ones, such as identities (Gee, 2000; Smythe & Murray, 2000). The three-series interviews, as discussed early in this chapter, were structured to help avoid emotional harm through building rapport between the teachers and me early during data collection and to avoid emotional upheavals from delving into the more personal prompts too quickly. Additionally, I obtained continuous consent throughout the study as a means to ensure teachers knew that they could abstain from answering particular prompts or leave the study should they ever wanted to discontinue.

The second additional ethical consideration I addressed was the powered aspects of the researcher-informant relationship. As the researcher in a study exploring deeply personal concepts, I wanted full awareness at all times of the powered aspect of a researcher-informant relationship even when the researcher was seemingly positioned close to the informants. This means that I could not assume claim to stories as “our stories” nor could I assume that “we” are embedded in one another’s narratives without teachers’ full and continuous consent throughout the research process. This as important, because during this research, I was both a researcher and a colleague. Though I had a degree of “insider” status, there was an inherent power differential in the research process, because the research is presented by me, the researcher, and the words used, including those used to relay the stories of my informants, are mine. Therefore, it was my responsibility as the researcher to not assume that I could insert myself into narratives that the teachers did not consider me a part of even if they were a part of personal narratives that shape my research. Thankfully, narrative methods are highly useful in work where power differentials
are contextually important to answering research questions (Johnson-Bailey, 2004). As a result of this utility of narrative methods, this ethical concern was addressed throughout the research process through the interactional narrative analysis process.

**Credibility**

The credibility of qualitative research is akin to discussing the validity of quantitative research. If validity in quantitative research refers to the accuracy of quantitative data interpretation and representation in a particular context, then the credibility of qualitative research refers to the cogency and believability of qualitative data interpretation and representation. To ensure credible data interpretation in this study, member-checking happened multiple times throughout data collection to ensure that the voices of the teachers were preserved. The participation of teachers in building their counterstories was a crucial element in interactional narrative analysis, which itself is a method of data analysis that inherently ensures credibility through involving informants in data analysis. While cross-theorizing, I actively engaged colleagues in peer-checking, or working with colleagues as a sounding board during the analysis process. This peer-checking process helped make sure that data was represented in sound manner.

**Transferability**

The qualitative construct of transferability is akin to the quantitative construct of generalizability. Though one of the primary reasons to engage in qualitative research is not for generalizing across large samples, addressing transferability in qualitative research allows for consumers of this research to decide if and how the research is applicable to any given number of contexts (Bhattacharya, 2017; Bogdan & Biklen, 2007; Patton, 2015). To give consumers the best opportunity to make an informed decision about the transferability of research, it is the
researcher’s responsibility to ensure that the methodology of the research and the methods used are sound and rooted in literature prior to data collection. In this chapter, I described and explained the epistemological foundation of this study; I described and justified my choice of methodology; I provided descriptions of the statewide, district-level, and school-specific research contexts; and I described participant selection, data collection methods, data coding methods, and data analysis methods. After data collection started, I continued to ensure transferability through presenting thoroughly analyzed and written counterstories that are rich and contextualized enough for consumers to decide if and how this applies to their thinking and their work.

**Dependability**

*Dependability* refers specifically to the cogency of the qualitative research process. Given the importance of context to doing qualitative research, there are an infinite number of ways to operationalize research constructs and to design the research exploring these contexts. Given the number of variations, it is important for qualitative researchers to be able to cogently explain and support their decision-making throughout the research process. As stated in the previous section, this chapter has been largely dedicated to explaining and supporting the decisions behind this research process.

**Confirmability**

*Confirmability* of qualitative researcher is the affirmation that data analysis and the reported conclusions are as free of the researchers’ biases as possible. This notion is highly positivistic in nature, but this research epistemologically aligned with social constructionism, which means this research *was not* conceived free of my biases nor was it executed and written up free of my biases. However, I ensured that my analysis and data reporting reflected as much
of the narrative knowledge as possible from the teachers within my choices of data collection and data analysis methods; they happened concurrently, which ensured teachers’ voices are preserved, which is an important feature when using counterstories. The teachers were active participants in the analysis and creations of their counterstories. While I did not guarantee that their counterstories remained completely free of my biases, the interactive nature of the analysis was a negotiation between each teacher and myself, which means their voices stay prominent throughout the process. Additionally, throughout the data collection and data analysis process, I took researcher memos where I fastidiously recorded my thoughts and feelings to help me and the teachers parse through credibility and confirmability of codes. In the next section, I discuss my subjectivities in relation to this research to further ensure confirmability of the final research presentation.

**Subjectivity Statement: The Researcher’s Positional Identities**

Before presenting the counterstories of the six teachers in Chapter 4, I present my two of own my positional identities. The first positional identity I constructed is being a creator of my own science spaces. When I was in high school, I felt positioned as an outsider to school science. Academically, I did well in my high school science classes; I never made anything less than a B in them. I went to a high school within the same metro area as the teachers’ schools. My school was racially and ethnically diverse yet tracked, and it was clear how the delineation was made between the tracks. Officially, my school was an International Baccalaureate (IB) school, so along with the state-designated diploma tracks – “technical” for students who were supposedly not college-bound and “college prep” for students who were – an IB diploma track and classes existed for the most academically elite students in the school. I was one of students declared good enough for these classes.
However, once I was in those classes, it was clear to me that not many Black kids were considered good enough. Accordingly, I intrinsically felt different, as many of my classmates from elementary and middle school – which were also racially diverse schools – were not in those classes with me. While I did well in the IB science classes, I had to work hard, because I did not have as much social capital in these classes as I did outside of them. Joining lab groups was difficult because I never really connected with my mostly White classmates and they already knew each other already from being in the other feeder elementary and middle school across town, so my study group consisted of me and the other Black girl in class. My all-White science teachers and I never really connected – perhaps because I frequently and adamantly corrected their pronunciation of my name. Despite feeling like an outsider in high school science, I still wanted to pursue a science-based career as a doctor and chose to attend a STEM-focused college, Georgia Tech.

Georgia Tech is well-known for both its rigorous STEM degree programs and its lack of women and representation of Black and Latinx people of color (Thompson, 2018). Going into college, I still considered myself as an outsider to science, yet I also felt confident in my abilities to be a good science student because I was a good overall student. Thankfully, this confidence was warranted; I excelled at Tech and graduated with honors. However, the journey was hard. In my first two years, I abandoned my plans to become a doctor; failed an upper-level calculus class; and experienced my first bouts of anxiety. Things turned around once I found my niche within my new psychology major – biopsychology and neuroscience. Not only did I find something that kept me interested, I found people, specifically women and other people of color, that formed an academic and personal support system outside of my family and non-classmate friends that understood the rigors of life at Tech. Once I found an intra-school support system, I
remembered the importance of my entire support system and reached out to them for help. With their help and love, I was able to not only survive Tech, but I thrived.

As a part of my thriving at Tech, I found a trajectory-altering internship at an all-girls charter school. The second positional identity I constructed is being a “gate-opener” to 6-12 school science. This journey towards this identity began through teaching science to girls of color. Dr. Gilbert, a Black woman, founded the school in the community in which she had taught for many years prior with the explicit goal of providing a high-quality, well-rounded education to predominantly girls of color, in a community filled with families from working to middle class backgrounds. I happened to have grown up in this community. The all-girls school was less than a mile away from my high school, so the opportunity to work for the school and with girls from my community seemed serendipitous when the internship opportunity hit my student email inbox. When I started my internship, I simply observed all of the classes for a period at time over a few weeks before I was allowed to work with any teachers and students. At the end of my observation period, I was asked what subject area I was most interested in and I chose math, because teaching math seemed easier to me. I interned in the eighth grade algebra class where I was slowly integrated into the classroom – from a starting point of occasionally helping students out with problems to planning lessons to finally teaching a few lessons by myself. I loved interning in the math class but frequently found myself in the science classes sharing books and artifacts from my research internships back at Tech. The “scholars” – as the girls at the charter school were lovingly called – mostly were enthralled by looking at brains in the jar, coloring pages from my biopsychology anatomy and physiology coloring book and trying to figure out how to read MRI scans. Even the most resistant scholars couldn’t help but ask me about how I trained goats at a local zoo for semester.
When the end-of-the-year hiring season came around, I knew there was an open math position and applied for it. I was not given any special considerations – I went through the first-round phone interview, the second-round teaching lesson in an actual classroom, and the third-round final interview with Dr. Gilbert herself. She went through the questions quickly and told me she would get back to me with a decision soon. Before I left, we engaged in small talk about Tech, which led to a conversation about my experiences in college. I told her about how hard Tech was but how it led me to this school and how it allowed me to bring some of what I did at Tech back to the scholars and how cool that was for them – and for me. Thirty minutes later, she offered me a job – as the seventh grade science teacher. I was happy to have a teaching job, but I asked why the science spot even though I applied for math. She explained, and I understood her explanation as the following: “You’re a scientist, and you’ll make the scholars scientists.”

Dr. Gilbert was right. I was a young, Black woman scientist helping middle school girls – most of who were girls of color – see themselves as scientists at best, and at the least, see themselves as connected to the world via science. As a new teacher, I taught science the only way I thought possible, which was through constant hands-on activities and investigations. My scholars were rarely in their seats, because they were in groups doing things: coloring, drawing, building, tossing things around, making messes, cleaning them up, and doing it all over again. It took a lot of energy from me to run a classroom like this, but it was almost always worth it because my scholars got to feel what learning and doing science was like, and more often than not, they enjoyed it. After my first three years of teaching, I moved onto to a traditional public high school in the same district where I attended high school. For me, it was an unexpected opportunity to learn how to teach more in-depth science within my community in the hopes I could replicate the successes I found at the all-girls charter school. Instead, I spent my first year
as a high school chemistry teacher fighting. I fought over resources I needed to do labs with my students instead of demos; I fought over time needed to engage in the inquiry necessary to actually do and learn science instead of resorting to lecture to meet time demands; and I fought with my colleagues over how we talked about our students – predominantly Latinx and Black students – and their capabilities to learn and do science when actually given the chance to do so. I did not become a high school science teacher to recite science facts, and my new reality made me disillusioned to what school science was for most students of color.

At the beginning of my second year of teaching high school, I decided to do what I did best, which is teach chemistry through having my students do chemistry. I figured out alternatives to textbook labs that required equipment and materials from science supply catalogs, so that my students could actually do activities for themselves instead of me doing demos; I figured out how to balance instructional calendars with the needs of students to take the time they needed to understand the activities they did; and I pushed back against deficit-based conversations about our students and publicly expressed my joy and excitement for my students as often as possible. While doing this alleviated some of the stress of my first year of high school teaching, I understood that my influence on systemic issues was miniscule. I wanted my influence to be larger, yet I knew that I wanted to know more about the issues around why students of color are positioned outside of science. I also knew that my strengths lie in academics: I am naturally curious; I am tenacious in the face of difficulty; and I am a scientist. My role as a science teacher is help connect science to the lives of students of color. My concurrent role is as an advocate for my students in the classroom, in the wider community, and in the world. Lastly, my role as a researcher is to explore, and then challenge, the ways of thinking about science education and how it relates to people of color.
The purpose of sharing my positional identities was two-fold. First, I wanted to demonstrate how counterstories provide an alternative way of thinking about Black secondary science teachers. Second, my positional identities provided the outline to this study – my narratives lead to the creation and development of this research. By providing a more in-depth version of a subjectivity statement, I enhanced the trustworthiness of this research. I added credibility through making my voice loud and clear here, so that the distinction between voices are easier in the counterstories and discussions of them. Transferability decisions are now better informed knowing my connection to the research and contexts. Lastly, I enhanced confirmability through fully baring my biases and subjectivities in relation to the research here. In the next chapter, I present the narrative constructions of the counterstories of the six Black secondary teachers’ positional identities.
4. Findings: The Counterstories

Narrative research methodologies and methods are grounded in the idea of unearthing and creating knowledge through sharing and telling stories, which are distinctly humane methods of doing research (L. Bell, 2010; Clandinin, 2016; Kim, 2016; Solórzano & Yosso, 2002; Yosso, 2006). Given that this research shares counterstories of Black secondary science teachers – a group of people not frequently heard from in science education research – I ensured that their words made up a significant portion of their stories. Counterstories, like all other types of narrative research, vary in their design and in the decisions behind the design (Yosso, 2006). As I designed the counterstories, I kept the teachers in the forefront of my mind, because I chose critical race methodology and counterstories as means to pass the microphone to Black secondary science teachers and let them have their say in how they are portrayed.

Accordingly, their voices are in the foreground of the stories – within the counterstories of the positional identities they constructed through their narratives are copious amounts of text from our conversations. In the background is my researcher’s voice – I edited some direct quotes for clarity of meaning and contextualized the quotes. Direct quotes were only edited to either: a) remove my voice when it was inessential to understanding the meaning of what the teacher said, or b) rearrange sentences to connect a thought when the teacher’s self-interruptions were inessential to understanding the meaning of what the teacher said. The added contextualization includes historical, social, cultural, and personal data drawn from other parts of the conversation not shared in the direct quotes and the larger meaning behind what the teachers said. Each teacher’s counterstory begins with an introductory vignette written about them from my researcher’s perspective. I then share the positional identities and the sub-
identities – or identities that constitute the primary positional identities – the teachers constructed via their narratives.
Viola: “I am an educator. I am on their side.”

Kids in [my community] who knew me when they were in middle school called me “Ms. Viola”.

Kids in my neighborhood call me “Ms. Viola”. Okay? Other kids call me “Ms. [Davis]”. I really don't care. I had teachers over there that would try to write a kid up for not calling me “doctor”. I'm like, “I don't make them call me doctor, but you! You have to call me doctor.”

(Viola, Interview 1).

The quote above reflects Viola’s understanding of social positioning, in addition to her full control over her own positioning – kids are closest to her and those who are against them get put into their proper place. Through the course of our conversations, this was not a surprise to me. I first heard about her after she interviewed at my school. An assistant principal who sat in the interview told me about Bates’ new chemistry teacher– she’s dynamic, full of ideas, and really smart. I held this prediction in mind during my first encounter with her in the first chemistry team meeting last school year. With her laptop open and notebook at the ready, Viola sat in the meeting as if she had been teaching at Bates High for years. She clearly and confidently spoke with the authority that a 25-year career bestowed her. I watched with wary fascination knowing my team and remembering my first year with them – and immediately understood how some of our colleagues perceived Viola as an abrasive, “know-it-all”. However, I knew better and saw this impending false narrative for what it was. Predictably, Viola challenged our colleagues, but she was always supportive and helpful when she did so. It was an absolute delight to find that she signed up to participate in this study during the first round of recruitment emails – and also, completely unsurprising. Viola, a chemistry teacher of 25 years, had a lot to share and very much wanted to share the knowledge her years of experience imbued her voice. Viola narratively constructed four primary positional identities.
Acutely Aware of Social Positioning

Viola constructed a positional identity of being acutely aware of the concept of social positioning and its influence on her life in the past and in the present. Her stories related to social positioning mostly overlap between her work life and personal life, which makes sense. Her two sub-identities as both being Black and more specifically, being a Black woman are where the overlap happens. For example, Viola’s sub-identity as a Black woman is an identity that cannot ever be left behind in one place or another; Viola is a Black woman at home, at work, and in between, and will always be. The larger positional identity of being acutely aware of social positioning encompasses the general sub-identity of being Black, and the more specific sub-identity of being a Black woman.

**Being Black.** Viola’s sub-identity of being Black is grounded in her early years in New Orleans, where Viola noted:

*Nobody's going to ask you, no matter what you look like, nobody asks you “what are you?” or what color you are, or what race you are, because everybody's jumbled up and mixed up. It's not a big deal. (Viola, Interview 1).*

As a result, being Black wasn’t a big deal for Viola early in her life – it was simply who she was. However, because she moved around a lot and experienced life in the South outside of New Orleans – where race was definitely a big deal – she had early experiences with how being Black for others came with value judgments of her personhood that she did not necessarily understand or subscribe to. Viola recounted a story from when she asked for a recommendation from a local doctor for a science camp while living in Mississippi.

*When I applied for a program at Xavier back in the day, I needed a recommendation from a doctor to go to CHEMStar. And I went to the local doctor in town and as he was*
writing my recommendation for this program, he put in there that I was a credit to my race. And I was confused, because I had never heard that before. I didn't know what that meant. And this is the 80s. This is the Madonna, Cyndi Lauper, Michael Jackson, Prince time, because that’s the music I listened to. There was no malice in my question. I just I didn't know what he meant by that. I said, “What you mean I'm a credit to my race? Like, I don't speak for all Black people, so what does that mean?” And they attribute it to the fact that my brothers and I weren't born there. (Viola, Interview 1).

Here, Viola quickly learned, and then questioned, the premise of being a representative of an entire diaspora.

Being Black in professional spaces meant closely encountering and experiencing the systemic marginalization of Black people in science spaces. For example, Viola described her experience in graduate school:

My graduate school experience, getting my master's and everything, that's what it was. It was White and male, Asian male. There were barely any females - White or whatever. Just there were barely any females, frankly, in anything in pure science. Most of the females were doing something in education. I didn't get the education in until I decided to do my specialist's. My master’s is in science teaching, but I focused on geology, so I took all these geology courses. And we're just not there. (Viola, Interview 2).

Viola went to an HBCU, so as a chemistry major there, she likely wouldn’t have experienced a lack of Black people in science spaces. However, in a graduate program for science teaching at a predominantly White institution (or PWI), Viola experienced how few Black people are in science spaces, in general, and science education specifically.
Her graduate school experience was reified when she taught at Truth High, another school in Washington County that is represented later on in this chapter. Like Bates High, Truth predominantly serves students of color, but unlike Bates High, the disproportionality of White teachers is much higher. Being at Truth reminded her of the Whiteness of her graduate school program. However, she better understood the issue and made moves to improve it while at Truth High.

*I went to Truth and got slapped in the face with grad school experience all over again. I was the only Black science teacher. I was the only Black person in chemistry. The entire administrative staff at the school was White with the exception of two assistant principals, yet the population, the school majority was not. But the ruling body was, so the student leaders were White. The student government people were White, and all the department chairs were White, and all the course leads were White, and everybody in charge was White. But the population that we were serving was not. I ran into a bunch of kids who felt they had nobody to talk to. Nowhere to go, nobody to confide in because they saw nobody that looked like them. So then after I was – it was my third year when I became a chemistry curriculum chair over there and then I became part of the hiring process. Okay, so now when you start bringing in people that look like the student population so by the time I left, we were equitable in the science department, especially in chemistry. (Viola, Interview 1).*

Viola understood that being the only Black person in the science department meant that she would automatically be marginalized to some degree, especially in a school where the administration and teacher leadership was overwhelmingly White. However, over time, she became a leader and then became a part of the hiring process. By doing this, Viola rejected
marginalization through becoming prominent in the school community and then using her influence on hiring decisions to bring in science teachers of color to both serve as representation and to, hopefully, make connections with students who did not see themselves in the school’s faculty and administration.

In doing so, Viola brought in needed diversity into the science department, yet she dealt with the effects of being one of a few Black science teachers and had to encourage and mentor the newer teachers of color to remain resilient against their continued marginalization. For example, Viola shared a story about a science department party held at a White colleague’s home.

*I'll tell you a funny story. We went to a faculty party with my child. The lady had a pool at her house. My daughter asks to swim. The woman of the house was like, “Oh, yeah, sure.” It was... I think, at the end of the school year. “All right, go ahead.” The other parties there, who were in the science department with a straight face, looked at me and said, “Oh, y’all can swim?” They were asking for real, you know and you have to...I have to gauge my facial expressions, and my responses but... But they got my point by the time I got finished talking. They understood that they had messed up in making that statement. And it was odd, because when we used to go to faculty functions, my husband and I were the only Black people there. Like, you’re talking about an entire department of Caucasians and I purposely wanted to go to Christmas parties. I purposely went to the end of the year parties. I purposely went to the summer parties, whatever, to show them that, yes, we can be social, and no, we're not scared of you, and yes, we can do it. I encouraged the other teachers as they were coming in and hired. Don't be a stereotype even if you don't feel like being bothered. I don't always feel like being bothered, but you
really have to make your presence known, and let them understand that you know what you know. (Viola, Interview 1).

For Viola, continuously re-positioning herself as a Black teacher doing prominent jobs within the White science department space was important to ensuring that Black teachers stayed visible at her school and were taken seriously as professionals – and as people with varied and rich interests.

In addition to keeping herself and other Black teachers visible as professionals, Viola made sure that her visibility as a Black person was not muddled in dominant, essentialist notions of what it meant to be Black in the United States. As already mentioned, she spent her early childhood in New Orleans, a city that reflects the ethnic and cultural diversity of the African diaspora, and resultingly, her cultural references are varied. As a Black person in predominantly White science spaces, Viola felt that she had to challenge essentialist assumptions, such as “Black people don’t swim,” or “Black people only listen to hip-hop and rap.” She recounted stories of two encounters – one at Truth and one that happened this year at Bates High, her current school.

*I walked into the guy's room, and he had a song playing-- he had Boz Scaggs playing in the background. And I was humming the song while I was looking for some recyclable folders, and he just was—you know how you feel when somebody's looking at you? And I turn around, I'm like, "What?" "You know that?" "Why wouldn't I?" And I was kinda like, "Why wouldn't I?" I said, "You like Boz Scaggs? I do too. That's good." And he was like, "How old are you?" "I was born in 1972. How old are you?" And I want to say he's about the same age as me, if not, a couple of years older, but that's the music I grew up listening to. I said, "Do you listen to Bootsy Collins because I have that album as well?"*
And the guy had no response. He really didn't. My interests are varied. And our
department chair and our bio lead, and two physics teachers, and another bio teacher
were talking, all male and they were commenting about a series of movies, and I actually
own every single movie. And I was just listening to how they were going back and forth
with whatever, and they made a mistake in something they said. And they were having
this big, hot argument, and I didn't look up or whatever, I just corrected what they were
saying out loud, I just went, "Well no. Actually, dadadada-- Okay." They were talking
about Marvel movies, and then they kinda tried to juxtapose them with Star Wars, and I
also own all of that. And they froze. Froze. Froze. Do you hear me? And they just kind of
stared. I said, "Oh, am I not supposed to like those?" No comments [from them]. I said,
"And I see that you have that Doctor Who lunch box that you like to carry around. Isn't
that great? So which version do you like? You like the original one that came out with
the-- oh, the third installment. Oh, which guy? Because they were kind of different there,
and I read The Hobbit, Lord of the Rings, Tolkien. I'm assuming you're a Tolkien fan as
well, since, if you like Doctor Who, and you like the Marvel Universe, and you're
comparing Marvel to DC, and Superman, and Spiderman, or whatever. So which version
do you like? Do you read the comics?" And I mean, they were just-- they were like, "Oh
my god. She's different. And she's right." (Viola, Interview 2).

Viola encountered shocked responses from her White male colleagues when she revealed she
listened to more than just Black artists and that she consumed mainstream art and pop culture.
Her main objective in challenging these White men was to send the message that Blackness in
the U.S. is not monolithic – Black people have varied interests, talents, and are just as capable
and professional at teaching and science as “insiders”.
However, Viola held tight to her sense of pride in her talents and her sense of liberation and understood that this pride and liberation were grounded in her Blackness. For example, she recalled a question I asked during the second interview about her perspective on Blackness and the subsequent conversation she had with her family about the question. Based on both conversations – with me and then with her family – she concluded:

*So I guess being African American, there are things that we don't necessarily-- that we take for granted, that we don't see as special. It's just how we live. It's just how we do, it's how we interact with each other. And we think nothing of it because that's our culture. So when I started thinking about what is Black privilege? What do we have that others don't have? Or what advantage do I have by being who I am? I started thinking along those lines of just having a culture. And no, I can't sit there and say, I'm Nigerian, or from Ghana, or Liberia, that kind of thing. But just our inner sense of self, and the kind of a cultural sense of pride that we have. So like I said, [my family] had a full conversation about that when I got home. Initially, it was the whole economic impact in the greater world kind of thing. But then, we kind of took a step back and looked at it, it's like, I wouldn't want to switch places for anything. I don't want to be-- because you have so many deficits on that end. And I'll take the few deficits that I have on my side because I can work with it, I can overcome that. And I just have a different perseverance.*

To Viola, being Black comes with the task of resisting positionings that attack and diminish Black people’s sense of self in various ways – their intelligence, their culture, and their capacity. She also recognized that being Black is to *have* a culture that inculcates a sense of pride, resilience, and perseverance that she would not give up.
**Being a Black woman.** Viola’s conception of being a Black woman is rooted in her father’s treatment of her – specifically, the lack of emphasis placed on her womanhood relative to her brothers. This is recounted via her story about her father and building their childhood home.

*My father was like, “You decide it. You build it,” so each of us built our own rooms and there's picture documentation of that, of us with the studs and putting the wall up and sheetrock and all that kind of stuff, so I know how to do a lot. Because of that, science came naturally to me. It was just a natural extension of what I do. I never got hit with that whole “Blacks don’t do science. Women don't do science” thing because for me that was life. That was my life growing up, so it was just a natural extension, so when people say things like that. I don’t even know how to react to it. You know, it's like, “Really? Oh.” That's all I know. And it's literally all I know. (Viola, Interview 1).*

Having science magazines around her home as regular reading material and participating in building her childhood home with her father and brothers inculcated the sense that Black women could engage in science and construction just as well as men could. She camped and hunted alongside her brothers, so for Viola, being a Black woman meant she could do anything men could do.

Viola later discovered that the dominant views of Black womanhood – or of what they are and are not capable of doing – did not align with her version of Black womanhood.

*When I was in grad school – with my professors – the famous line was, "So how do your people feel about that?" And I'd look over my shoulder, "Oh, me?" My people? Would that be females, or you making a reference to my ethnicity?” That would make them feel uncomfortable. (Viola, Interview 2).*
Viola was often labeled as “different”, because she encountered people with dominant views of Black women (Collins, 2000). Being a Black woman with this label of “different”, she knew how she could be perceived by others.

_I know sometimes I can come across as aggressive – or some people deem it as aggressive. Some people deem it as showoff-y or whatever. When I feel resistance or things of that nature, I'm fine. Y'all do you, I’ll do me…and I'm not offended by it at all, but I'm aware of it._ (Viola, Interview 1).

Even with an understanding of how she could be perceived as “uppity” or “aggressive”, Viola never let stock stories of Black womanhood govern how she lived as a Black woman, so she often challenged others who tried to assert their perception of her onto her Black womanhood.

Viola recounted a story of working in her graduate laboratory as the only Black person and only woman in her group and resisting against the perception of her as the “mammy” of the group.

_As a grad assistant when I was getting my master’s, I was the only female and the only Black in the lab with a bunch of Chinese and White men who thought that I was their cleaning girl. They did not see me as an equal. They would complain to the professor about, you know, "She doesn't clean up behind us." We were doing crystallography. "She didn't clean up behind us." The [professor] had to have a meeting with us like, "Ya'll know you are all in the same program. She doesn't work for you. She's here and getting her degree just like the rest of you all." And they were genuinely... [pauses]. "She is not my equal," and the teacher was like, "Yeah, she is, and on paper, she's is. And here's the roster for the class. And you all get paid the same amount of money for this research. And if you leave your station dirty like this again, you're gonna get fired. And then she'll..._
be the only one here.” because my station was the only one that was clean. And with the average person, that runs you off. (Viola, Interview 3).

In resisting against her labmates’ perception of her as the “cleaning lady”, Viola tapped into the parts of her Black womanhood that, not only reject dominant views of her personhood and capabilities, but also actively resist these views and persist against the forces trying to push them onto her – thus her station being cleaned while her labmates’ stations remained dirty (Collins, 2000).

This resistance of dominant views of Black womanhood and persistence against forces trying to assert them onto her is reflected in a story Viola shared about her personal struggle to balance motherhood, teaching, and doctoral-level graduate work while applying for a department chair position.

When I interviewed for the department chair position at Truth, an old White woman – bless her, ‘cause if she wasn't old, she would've got cussed out – told me that she didn't feel that I was -- in the bathroom -- she didn't feel that I was qualified for the position. "Don't you do enough? Aren't you a professor at a university? Well, you have two kids. Innit your mama here? You think you have time to be a curriculum chair or department chair? Won't you just leave that to [another science teacher]?”, who was a single White female who was also interviewing for the position. But that woman with all sincerity, no venom, no malice, was just like, “You should be tired. How about you just sit down over there and let somebody else who has more energy to do it or has more time?” To which my reply was, “You don't live my life. You don't know my tired level at all. I'm quite functional in everything I do, and I excel in everything, which is why I'm currently your boss. Please don't assume anything in my life. Don't ever approach me like that again.”
"I'm so sorry!" She cryin' and whatever. But you should never let anybody see your cracks. We are Black females in this White-male dominated county trying to get something, to hang onto something, to hold onto something. Know what to keep close to the chest. Know what to hang on to. Know what information needs to be disseminated. Nobody should know your business. If they don't have your back, sharing information over here is giving ammunition. (Viola, Interview 3).

While Viola is a Black woman capable of being resistant and persistent, she is also capable – as are all Black women – of being vulnerable and feeling fatigued and was at the time. However, she understood that Black women are often not allowed to be multifaceted and nuanced human beings, especially in work settings where their professional and financial standings are at a higher risk than White women and men (Carlone & Johnson, 2007; Collins, 2000; Parsons & Mensah, 2010). At work, her defense against this was to be wary of her colleagues, especially White colleagues, and to remain emotionally neutral to avoid unwarranted questions of her ability to work.

While Viola remained wary of attacks against her version of Black womanhood at work, she also remained steadfastly resistant and persistent in her Black womanhood by proudly wearing her natural, coily hair. She recalled the backlash from administrators when she first decided to wear her natural hair and the contrasting response from her Black girl students.

I went natural somewhere in the middle of my doctoral process and that was a big to-do. [A Black woman administrator], I'll say, was bothered because it was something that she tried and was shot down by the principal. And then she went back the other way. And then here I come the very next year doing the same thing, so she approached me the same way that she got approached. But my reaction and my response was not what hers
was because mine was more in a fighting manner. I was like, "Who are you and how dare you? And oh, you think this is something? I could be Diana Ross tomorrow." Then I did a day where I picked it out and put a headband on and went to work and did my day and the kids were enamored and the adults were like, “Oh my god,” and my administration... it was like “How dare she?” And then, I had girls who wrote me letters at the end of the year saying, “Thank you so much for showing me that I can be myself. And still be intelligent... and I can get a doctorate at one day and wear my hair natural.” (Viola, Interview 1 & 2).

For Viola, wearing her natural with styles associated with Black natural hair was a subtle form of resistance – it was another insistence of pushing back against stock stories of Black women and their personhood. Natural Black women’s hair is often thought of as unkempt, unwieldy, and unprofessional, and certainly, Black women in predominantly White spaces are supposed to assimilate and make themselves inconspicuously Black (Collins, 2000). Viola wearing her hair naturally in front of her Black girl students provided them an important bit of representation of Black women wearing natural hair as professionals, as scientists, as intelligent, and as capable of becoming doctoral-level scholars.

**Multi-Hyphenate**

Viola’s positional identity as being a multi-hyphenate encompasses the various roles she takes on in a school building. All of these roles are grounded in her main role as a teacher, which was an unexpected yet natural role for her. Of her decision to become a teacher and what led her there, she explained:

> [Teaching] was not my initial career choice. The education part came in when I went to go check my cousin out of school and she was in chemistry class, and I was waiting for
her at the back of a classroom. The teacher was trying to explain to them how to balance equations, and it was the most convoluted process I had ever seen. So the teacher left to go to the bathroom. My cousin asks me to quickly explain to the class my way of doing it. They were going to watch the door. So I went up there, erased what the teacher had, showed the class my way of doing it. [My cousin’s teacher] asked me if I ever thought about going into teaching. I told her no, because the curriculum for education in school doesn't have enough science for me. It's mostly psychology, lesson planning and stuff like that. (Viola, Interview 1).

While being a teacher wasn’t her initial career choice and didn’t take any education classes as an undergraduate, Viola was naturally a teacher.

Once a teacher, Viola took on other roles beyond the classroom that were focused on making the science curriculum and instruction better in her schools, because in her words, “I don’t know how to just be a teacher.” (Viola, Interview 1). For example, her specific interest in being a teacher and a curriculum leader stemmed from her perception of teachers being closer positioned to classroom curriculum and instruction than administrators.

_I’ll always be interested in writing curriculum and making sure things are aligned the right way. I fuss about how the calendar’s laid out, so my interests in that part lie in having an influence with how curriculum is presented to schools with a trickle-down effect to the classroom as opposed to just being a curriculum [assistant principal] who can only do so much and most of what they do is paperwork. I don’t feel like those positions necessarily have an influence on what happens here in a classroom._ (Viola, Interview 2).
As a teacher and district-level curriculum leader, Viola could influence curricular and instructional decisions across more than her own school and could also put these same decisions in effect in her own classroom.

Viola stepped back from some of her curricular roles once she went to Bates High. However, she continued to still be involved in district-level curriculum and instructional leadership activities. As she reasoned:

*I’ve been going for the last five years. Why would I stop now? That's how you get insight; that’s how you get information. That's how you know what's coming. That’s how you get a leg up on other people, on other things, because you know what's gonna happen before it happens, because you get told there before it gets trickled down to other people. And if you don't have representation there, you will never know.*  
(Viola, Interview 1).

Representation to her meant making sure that someone from every school in the district was able to directly hear and see what was happening at the district level and voiced the concerns of their school at these meetings. Even in a new school with fewer roles, Viola still inhabited the role of teacher and representative for the chemistry team at Bates High.

Another hyphenate Viola inhabited was being a de facto mentor teacher. Officially, Viola noted she led and taught other teachers, “I’ve been a lead. I’ve taught other people to be teacher leaders. I’ve been that kind of teacher who was put in charge to train other folks…” (Viola, Interview 1). Viola’s ethos towards mentoring other teachers is reflected in her last years at Truth:

*I was in charge for four years before I stepped down. And then at my last year there, I watched, but I watched people who had come in under me. Now, I could take a step back*
and if [they] needed help on how to tweak stuff or how to organize, things like that, I helped, but other than that it's [their] show. I was simply there as a learner. It's good to change. And that's what I told them at Truth. When they had me there, I felt that I was there maybe one year too long in that position. And if the leaders never step aside, nobody else will have a chance to lead if somebody leaves the building, which is not a good thing, because everybody has leadership potential in some form or fashion and you'll never know what you can do unless you're put in a position where you have to make the decisions. (Viola, Interview 3).

Viola treated teachers mentored by her as if they were future leaders and was confident in her mentorship abilities.

I'm confident enough that the people who were underneath me learned from me and know what the expectation is and how to maintain this. That I feel comfortable taking a step back and letting somebody else from this group step up. (Viola, Interview 1).

She understood that she would not be able to lead all the time, and so her department needed a roster of teachers ready to lead at any point in time. Once she felt her teachers were ready to lead, she let them and was confident in their abilities as new teacher-leaders – and hers as a teacher and mentor.

**Culturally Relevant Pedagogy**

Through the telling of her stories, Viola revealed herself as a culturally relevant pedagoge. She never explicitly referred to herself as such nor did she ever refer to Ladson-Billings’ (1995) theoretical and pedagogical framework, culturally relevant pedagogy (CRP). CRP has evolved and been reimagined in various permutations in the subsequent times since Ladson-Billings’ coining of this term. However, in the broadest sense, culturally relevant
pedagogues – no matter which permutation closest aligns with their pedagogical framework – do their teaching from a framework grounded in high expectations of kids of color and their success; deference for the cultures expressed in their classroom; and an urgency to challenge, and to help students challenge narratives and pre-ordained life pathways for kids of color. Because CRP and its remixes appear to the untrained eye as some intangible notion of simple “good teaching”, instances of it being enacted require explanations to point out the nuances of what is happening (Ladson-Billings, 1995b, 2014).

In fact, Viola’s enactment of her identity as a culturally relevant pedagogue has already been demonstrated in this story once before – in her story about wearing her hair natural during her doctoral program. While this particular story was primarily one about the professional effects of a deeply personal decision to embrace Afrocentric beauty aesthetics, Viola understood that the most important professional effect was what her students saw – a Black woman chemistry teacher proudly rocking an afro. Viola modeled what Ladson-Billings’ called cultural competence and critical consciousness for her students. Cultural competence is pride in one’s own cultural assets and respect for others’ cultural assets, and critical consciousness is the ability to challenge dominant social mores in favor of equity and inclusivity (Ladson-Billings, 1995b). Viola modeled pride in her natural, coily hair texture that has historically been portrayed as unruly and messy, and she also modeled peaceful defiance of well-disguised discrimination from a Black woman administrator, who for whatever reason felt that natural hair textures and styles were unprofessional.

During an exchange we had talking about the question of whether being Black was a privilege or not, Viola talked about the conversations she sometimes has with her students with the purpose of pushing their collective thinking forward.
We’ve had those conversations in class [about skin color], and most of the kids let you know that in their families or where they come from that being darker was a bad thing and it was discouraged. And so people didn’t want to be Black because you were treated poorly and you were talked about even by family members. You know, you were put down. They treated the lighter skin one better—and you would think that, that’s like an American slave thing here. We talk about house [enslaved people] versus field and all that kind of stuff but listening to my Latino students talk about it in depth was enlightening for me, so I can’t say that Black is necessarily a privilege because of all the negative connotations that come along with it worldwide. I had students who were doing some kind of fashion thing for a class. They had covers from Vogue magazine, and I didn’t realize that Vogue was all over the world like this, but the cover models for Vogue—pick a country, any country in this world, they were all extremely fair, with European features. Even if it was the African Vogue, or the Cuban Vogue, or the Venezuelan Vogue. Wherever Vogue was out in all these different countries, the cover models were all fair. They were of that ethnicity but fair, and so we had a little conversation about that in class and some of the kids are very aware of it, some of them know how their parents and their grandparents feel about it so they try not to talk about it, some of them are open to say how because they’re darker than their brothers and sisters they get treated differently by other members of the family (Viola, Interview 2).

While she never espoused being an expert of colorism in Latinx communities, Viola did not shy away from the dialogue nor did she shy away from learning from her students. By engaging in the difficult conversations about racism and colorism, Viola is doing the work of a culturally relevant pedagogue.
Viola also encouraged Black students to challenge stock stories of their lives and abilities through their work at school. For example, I explained the reason why I asked the question about whether being Black was a privilege and noted her “hidden” response to this inquiry from earlier conversation about her daughters. Her response encapsulated her approach to teaching Black students.

**Researcher:** I actually tossed back that question back and forth because you could see it either way. The one first way is “No, of course, Black people don’t have privilege in America! Are you silly? Are you crazy? Where have you been?” And the other side of that, and I’ve actually heard this from you, even though it's not how you originally frame your answer, “It's built a personal sense of pride and resiliency within me and I've instilled that within my children and now my children are prideful, resilient, open, and truthful human beings out there in the world, and they're whole. Even though from the surface of it, being Black doesn't look like it's a privilege, but on the back end of it though, when you look underneath it, the shadow of the surface, it actually has benefitted my child a lot.”

**Viola:** I try to also put this across to my Black students, especially my Black female students. For my Black male students, my mantra is do not be a stereotype. Don’t let somebody tell you what you can't do, and what you won't do, and what you're not going to do, and what they think you're going to end up in 10 years from now. Please be a success. Stay on course. Stay on track. Come back. Show them. Show them what you've accomplished despite them. I push that hard, hard, hard with my kids. (Viola, Interview 2).
Viola tries to inculcate the same sense of pride and resiliency that she sees coming from being Black within her Black students as she does within her own two daughters. She has seen first-hand how raising her daughters to be pride-filled, whole Black young girls has protected and benefitted them in predominantly White spaces, such as college towns and science programs.

Last but not least, Viola had high expectations of her students and supported her students through them towards success. While getting kids graduated from high school was never the impetus of her science teaching work, she often espoused the importance of helping students to figure out what they want out of school and then pushing them to get it.

*I try not to steer kids in a particular direction. I kinda just feel them out, see where they might want to go. I love telling people that my baby brother did not go to college, that he went straight to the military out of high school, and he makes more money than I do, and I have four more degrees than he does. And I'm in debt and he is not, and he lives large. I've lost six kids since coming back from Christmas. And I say "lost" because they're no longer in my class, but they're at [the alternative school] now. And those were sit-down conversations of "Well, let's look at how many credits you have. How old are you? What's your goals for life? When you trying to get out of here? When you trying to finish? Let's look at your attendance record. What would be the best path for you?" rather than telling the kid. Because some of them were just told, very not nicely, that they should go to [the alternative school] because they won't graduate from here any time soon, they'll age out, and stuff. And though that may be true, it's all in the approach. For me, it's all in the way that you broach that subject with a kid. You don't make them feel like a failure. You just say there are many options. Let's find the best path that's best for you.* (Viola, Interview 2).
Viola understood that students of color are often held to “high expectations” that are often arbitrary ways of being in schools that punishes them. However, she viewed high expectations for success as best left as defined by the students themselves, and then helped them achieve their own goals for success – all without pushing the dominant pathways for success for students of color (Milner, 2006, 2012).

As a culturally relevant pedagogue, Viola recognized the full expanse of her role as a teacher of students of color, and best described as role as such:

_We are extremely powerful when it comes to kids’ lives. I really feel passionate about that which means when I see teachers who I deem are stepping out of line or purposely going out of their way to hurt somebody – be it a teacher, a counselor, and administrator – I keep going toe to toe with these people. And it's like, "Hey, you supposed to be on our side." I am an educator, I am on their side, I am a child advocate. The current station in my life is as child advocate. And adults can be wrong and if you're wrong then you're wrong and I will fight you to the nail and show [the kids] that it's not some buddy system._ (Viola, Interview 2).

**Othermother**

While talking about why she never pursued full-time administrative positions, such as being an assistant principal or principal, Viola explicitly positioned her motherhood of her two daughters above her non-teaching roles at work:

_I chose the path of motherhood, so it’s all the paths that we choose that make you happy. And for me, my path is family first, so I never wanted to have a job that was going to take my time or take my energy or my focus away from my kids._ (Viola, Interview 1).
Implicitly, Viola often positioned herself as an *othermother* to her students in terms of discipline, her advocacy for them, and her emotional attachment to their well-being.

For example, Viola shared a story about her approach to building relationships with students while managing her classroom.

*I really don't like the “I'm the boss of you” kind of thing. I come more from the aspect of “I'm a mother”, so like today's lecture. There’s one of the boys in class - he kept talking while I was talking - “I'm really trying to be teacher only. I would love for you to be a student only, but if he would like me to go into mommy mode, you might not like the way I respond to you in mommy mode because I'm going to treat you as if I gave birth to you. Okay?” And some of them have seen my child come here and they've seen me handle my kid, you know. “So if you would like me to treat you as if you were truly, truly, truly mine, I could do that. Okay? Or we keep it professional. You be a student. I’ll be a teacher. And we move on with life.” And they always go, “Eh...”, because they think about their moms. “You know what? Let's not.”*

While Viola ostensibly gave her student the choice between being dealt with as a student or as one of her own, the tone of the entire exchange is that of a mother warning her child of larger consequences if they fail to change their behavior. The implication underneath this exchange is that Viola already felt motherly toward her students but would prefer to not have to discipline the student as if he were her own child.

Her approach to advocacy for her students brought to mind the stance that a mother bear takes toward protecting her cubs from others that threaten them. For example, Viola told a story about a confrontation with another teacher after she sent out an email inquiry. A student of hers
needed tutoring for her math class, so Viola asked a group of math teachers for their tutoring schedules.

Let's say three people replied back to me via email with a tutoring schedule, and one person took it upon themselves to physically walk to my room--walk in my room, look around the classroom, and say, "So who asked her to send that email? Because I'ma tell you what I don't do. Because I don't watch kids and I don't tutor kids, because I have a life." and blah, blah, blah. I mean, he just went on and on and on and on. And I was standing right here. And so, I put my hand at said person's chest to stop them from going past [the door]. And I was like, "I am so sorry. You must be confused. Let's start. Who are you?" Person gave me their name. I introduce myself, which of course, the "doctor" was in front of it. "You will step out of my room. You will re-enter my room with a level of respect for the students who are in here, and for myself. And you will start this conversation over." And that person was in shock as if I had just slapped them in the face. They walked back out my door, knocked, came back in the room, stopped and addressed me, and I said, "So what is your concern? Because you have no conversation with any student in this room because I asked the question, so you're talking to me. And what is your concern. Nobody needs to know your life story." And the person started talking a mile a minute and then glanced around the room, saw a couple of familiar faces. "It better not be you!" I said, "I'm so sorry. You are thoroughly confused." And at this point, the kids are just frozen. I said, "Do not address my children because they're mine. From whatever to whatever time, they're mine. Thus, I treat them as if I gave birth to them, so I will protect them as if I gave birth to them. So now, you are attacking my children. You don't have a tutoring schedule? Thank you. Goodbye. And since you chose
to do your thing out loud, I'm going to do my rebuttal out loud, so the kids can hear how I feel about this. If you ever walk in my classroom again and address any child that's under my care and watch like that again, you and I will have an issue. Please leave."

(Viola, Interview 2).

In this story, Viola publicly declared to another teacher attempting to verbally attack one of her students that the kids are “mine” – or her own children – and she would protect them as if they were her biological children. As a teacher, Viola’s advocacy for her students parallels her advocacy for her own children as their mother.

Lastly, Viola’s “other motherhood” is reflected in her emotional attachment to her students and their general well-being. For example, I asked her when she felt powerless as a teacher, she responded:

*I feel powerless when it comes to things like discipline with the students when you know that you have a greater influence than somebody else, but they broke a rule – statue number whatever – and they've got to go. I had to cut a kid who got [expelled] in middle school when I taught [there]. Oh god, it was for something so foolish and what he did really wasn't that big a deal but the principal had a vendetta and she didn't like him and he just did one thing too many and she put him out of school. And when I say I cried like a baby in a hallway – I'm like, "I am sorry." I felt like I had let him down, like I just allowed him to do this transgression. To have lost that battle for me – that's why I'm really mindful of what rules are, and we can't control the book, the rulebook, and we also can't control their home circumstances, so that's where I feel powerless is that I can't take everybody home. I can't feed them all, I can't dress them all, I can't hug them all, I can't fix what's going on with them."*
Her power – and powerlessness – as a teacher is grounded within her relationship to her students as an “other mother” to them. She felt powerful in understanding the influence of “other motherly” care and enacting it – and seeing it make a positive difference in the lives of her students. On the other hand, she felt powerlessness when the limits of her other motherhood were exposed against systemic power structures – such as school rulebooks and vengeful administrators.

Final Words

Viola’s positional identities were primarily constructed of narratives that are thematically connected through her fervor for being a disruptor of stock stories and being a creator of transformational stories of what it means to be Black and a woman in science-related contexts and her fervor for teaching kids of color to be disruptors in their own right. Her advocacy in adult spaces and other-mothering in student spaces are both identities and manifestations of being acutely aware of social positioning and how it was been wielded in her life and being a multi-faceted science teacher.
Laurence: “I have a kid-first, kid-friendly approach.”

“When it's all said and done, that's what I'd like the kids to know - that no matter where you had me in class that you had a positive experience. That's what it boils down to.”

(Laurence, Interview 3)

The quote above reflects how important it is that Laurence positioned himself in ways that were affirming to kids – and indeed, Laurence’s warm, friendly demeanor shone through in our conversations. Laurence received my recruitment email as a twice-forwarded email from his district’s science curriculum coordinator. The coordinator herself received it from a mutual connection at the university, who I asked to send it out to whoever she thought might spare a second to read it. This was the second time sending recruitment emails and asking colleagues to forward it, and our mutual connection received it and forwarded it the same day she received it. However, I had done this within a week of school ending. The researcher in me cautiously hoped that someone would receive it, read it, and then sign up for the study while the teacher in me – feeling end-of-the-year exhaustion amplified by research stress –just knew I shot off an email into the electronic void. I checked my email within a day of sending the second round recruitment emails and was bowled over to had received a notification that someone was interested in participating. Within the day, Laurence and I had scheduled our first interview. When we first spoke, what immediately struck me was his voice – a gentle boom that commands attention and respect but is generally welcoming – and how appropriate it was for teaching elementary kids and young middle schoolers. Indeed, his counterstory overall matches how I perceived his voice and his summary of himself:

*I'm a big, tall guy, but I hit them with the opposite where everybody wants to hug me at the end of the day, and they can talk to me and they don't feel like they have to run away*
from me. But I do bark from time to time to let them know I still have the ability to bark and get a little grumpy. (Laurence, Interview 2).

Laurence, a teacher with 22 years of experience currently teaching sixth grade earth science, narratively constructed four positional identities.

**Innate Student**

Laurence constructed a positional identity of being an innate student. These narratives encompass his natural curiosity of the world and his enjoyment of continuous learning. From his childhood years spent on Staten Island to being decades into his career, Laurence’s stories revealed him as naturally curious. For example, he described himself from when he was a kid:

> I was always interested in, even as a small kid, how things worked and you know, why things happen, and I'd have a million questions. I used to love to sit down in front of an encyclopedia and just go, you know, go to the pages and just learn stuff. (Laurence, Interview 1)

Laurence described himself as a kid who wanted to know the intricacies of the world around him, and part of what helped to provide him answers was becoming a voracious reader. In his early years, Laurence was a student of his surroundings.

Further feeding Laurence’s curiosity was his time in school. School for him was an outlet for him to be intellectually and socially stimulated away from what he perceived to be an unstimulating neighborhood:

> For me, school was more of a safe place, because we grew up in poverty, so we didn't have a whole lot. So when I was in school, you know, it gave me a chance to pick up books and have fun, and eat lunch, and you know, do all these different things. When I
got home, it was just like, “Blah,” you know? So school was a big outlet for me to basically get out of my neighborhood. (Laurence, Interview 1)

For Laurence, school allowed him a chance to see and do more outside of his neighborhood. Additionally, school introduced him to a teacher, whose passion for sea otters and making learning personal, deeply affected him:

_I hardly ever remember doing a whole lot of science when I was in school, but I did have an elementary school teacher who had diabetes, and she talked to us all about her diet and what she did to cope. She had this thing about sea otters. And for some reason, everything we did in class seemed to revolve around those sea otters and her diabetes, because it was just a part of her. And it really made class interesting._ (Laurence, Interview 1)

Laurence recognized his teacher’s focus on sea otters in his class as an emotional attachment to the content. Even though he did not understand the reasoning behind his teacher’s passion for sea otters, Laurence saw the conviction and fervor behind her teaching that would later inspire and inform his own teaching, but more immediately, nourished his own intellectual curiosity and desire to learn more about health science.

Laurence elected to leave his Staten Island neighborhood to travel to a health-science themed vocational high school in Manhattan. Laurence shared the story of telling his parents of his decision:

_My parents were pretty much against it, because they didn’t want me traveling that distance, but I was telling them that’s the only school that has what I want. So they finally gave in._ (Laurence, Interview 1)
He was so impassioned about becoming a student of health science that he made the decision to go to the school, and he convinced his reluctant parents to let him make the arduous daily commute to and from the school.

*I would travel an hour and a half each way to get to the specialty program I wanted. So I used to take a bus, to a boat, to a train to get to school and then a train, boat, bus to get back home every day – an hour and a half.* (Laurence, Interview 1).

Laurence’s trip to and from school every day was a long one, but he took advantage of the time to do what felt natural to him – learn.

*That little extra time gave me some study time. It actually turned into study time, because I could sit down and read. And I would read newspapers, read my textbooks, and stuff on the way to school and get a pretty good understanding of what was going on in the world.* (Laurence, Interview 1)

Not only did his desire to be a health science student grant him access to a school themed around the topic, his commute to and from school granted him the time – and space outside of his neighborhood – to further satisfy his need to learn about the world around him.

While his commutes were intellectually fulfilling, Laurence found that his experience being a student at his themed high school to be less than satisfying:

*Well, it wasn't until I got to [high school] that there was actually hands-on type of science. And again, it wasn't anything that was spectacular, but it was more geared towards my nursing program, and the medical assistant program that I had started out in high school so we would take temperatures and blood pressure and chart data and that kind of stuff. But in high school, it wasn't really... you know, it was basically "sit and get" – a lot of textbook stuff, not a whole lot of actual lab stuff.* (Laurence, Interview 1).
Like many science classes in vocational schools or tracks, the emphasis was not on actively engaging in investigations of phenomena. Rather, his science classes emphasized learning skills and procedures (Oakes et al., 1990).

Despite his underwhelming experience at his high school, Laurence initially went into college wanting to learn health science and took introductory science classes at the beginning of his college career to prepare for his major but admitted that he felt unready:

*When I got to college, of course, they hit you with, you know, chemistry lab, history, and biology lab, and anatomy lab and now it opens up a whole 'nother world. But I definitely wasn't ready for those classes by the time I got out of high school.* (Laurence, Interview 1)

Laurence’s experience reflected that of many post-secondary science students coming from vocational schools or tracks – feeling out of depth in laboratory-based college science classes.

Though he was unready for his college science classes, Laurence persisted onto a health science internship at a children’s hospital that changed his trajectory. His experiences as an intern changed his focus from wanting to help children as a medical professional to wanting to teach and coach children. As a result of this mindset shift, he changed his major during his second year of school to elementary education, and as a nod to his personal enjoyment of science, he made the subject his concentration.

Laurence’s transition into education began with coaching basketball. He then became a teacher, and as a teacher, Laurence became a student of pedagogy – or of learning about the learning process at the K-12 level. As a teacher, Laurence faced challenges with aplomb and a can-do attitude grounded in his curiosity and desire to learn how to become better at teaching.
For example, Laurence described some challenges at his current school and how he approached them:

> Challenges you face at [Hamer] ... Not enough funding for science, because there is no real science budget for the consumables in the classroom. It's not really an ideal setup for hands-on activities because of the tables - the kids have desks, and they're all of different heights. The way the tables are set up – it's not a flat surface, so beakers or scales and stuff would be sliding all over the place. There's no real place to store long term projects, so that's difficult when you don't have any racking or shelving to be able to put stuff up. And now, they're asking us to switch to where it's more problem-based, and team-based, and working in groups and pairs, and now we're trying to bring in the technology to kinda make the whole thing go. It's been challenging, but it's been fun. I'm constantly changing and feeling like I'm never settled, if that makes sense. (Laurence, Interview 1)

The challenges Laurence experienced in changing science curricula and instructional modes are not unique to schools, and especially to schools serving predominantly schools of color. However, Laurence’s approach to those challenges is different – rather then resisting them, he embraced these challenges as intellectual ones that could be tackled with learning and application of his new learning.

Indeed, Laurence explained how the numerous district-level fluxes affected his development as a teacher:

> Over time, I've learned how to assess better. I really use my data in a better way than I did in the past, and technology has kinda helped me with being able to see stuff faster,
see deficiencies faster, make changes quicker, identify issues quicker. That has really been helpful for me. (Laurence, Interview 3).

Overall, Laurence’s positional identity as an innate student positioned him to be able to view challenges at the school-level as intellectual challenges, or puzzles, to be solved.

Otherfather

Laurence’s second positional identity of being an “otherfather” to his students – the paternal analogue to the “othermother” of Black Feminist Thought – encompasses how his thinking and action as a teacher are heavily governed by his concern and care for his students. Laurence positioned himself as a father-like figure to his students in that he shares similar wisdom between his own children and his students:

First and foremost, I’m a father to my own four children. I find myself saying the same things to my own children that I do say to the kids in the classroom. It’s just things that I definitely want them to know and want them to hear from me before they hear it out there in the world. (Laurence, Interview 2).

In a similar fashion to Black teachers in other research, Laurence aligns his work as a teacher with that of a parent or family-figure (Foster, 2001). Laurence acknowledged that he sees his position as a teacher as more than just a content knowledge instructor in a story about how his students greet him most of the time:

I probably get the most hugs in the building in the morning and kids open up and talk to me about their issues. I try to be part-counselor part, part-police officer, part-whatever, and then I do get some teaching in where I can, [because] if they love me and they respect me, then I have the opportunity to teach them and they let me in. (Laurence, Interview 1).
To Laurence, being a teacher means being stepping into whatever role a kid needs in the moment – be it someone to comfort and reassure them or someone looking after their general safety – much like a parent does. In turn, he’s allowed to teach content during the in-between times when his students’ emotional needs are met. He positioned himself as a teacher/adult who students would respect and like so that he would be able to do his core task of teaching science – in addition to his other roles of caring for students (Foster, 2001; Noddings, 2005).

Laurence’s warm, caring demeanor with kids – and his physical stature – gained him a reputation for being able to work with students other teachers struggled with. He shared a narrative about how his physical stature is perceived and how he upends these perceptions:

Well, I'm 6' 4", probably 280 pounds, so I constantly get the kids that are anticipated to be a headache. I constantly get the kids - the roughest kids in the school, [who] are not that rough to me. I get the biggest and the baddest. It doesn't matter, boy or girl. And also on my team, you might get a lot of ESOL kids, special education kids - IEP, 504s – on my team. And that's just how they've done it, [but] for me, it's not really all about the numbers. 3 But, you know, they come to school and they want to be happy. I take pride in the little stuff and lots of times, it doesn't even have a whole lot much more to do with teaching, it's more about life, and helping the kids come to school and be happy and feel loved. And once they let me, I can definitely get them with a lot of the science stuff that I'm supposed to be teaching. So for me, that's the first step - it's all about the kids with me. And sometimes, you know, the standards are not as important as the child itself. It may not be what everybody wants to hear at times, but I have a kid-first, kid-friendly approach. (Laurence, Interview 1).
Laurence understood that administrators and colleagues expected him to work well with “difficult” students because of his large, physical frame – possibly because they assumed he would intimidate students and act as a disciplinarian to them (J. J. Irvine, 1989; Villegas & Irvine, 2010). However, Laurence positioned himself as a caretaker rather than a disciplinarian and thought that was the true secret behind his success in relating with and teaching the so-called “biggest and baddest” students in his grade level.

Indeed, Laurence shared that he felt the most powerful, and conversely powerless, as a teacher because of his positioning around caring for students:

[I feel powerful] when my classroom isn’t chaotic. It’s not always perfect, but I pride myself on having a very, very calm and accepting, loving type of classroom. And kids come in smiling and for the most part, I guess, they leave smiling and even when they don’t come in smiling. So that’s when I feel like I’m powerful. In the hallway, kids always want to come up and say ‘hi’ and give hugs and high-fives and that kind of stuff. And that’s when I feel like I’m the most powerful. [I feel] powerless as a teacher when the kids are having the absolute worst day of their lives, and there’s issues that are happening outside of my control and then there’s this thing that just can’t be solved in a 55-minute class. You know, kids that are homeless and fighting parents and all types of drug addiction and murder, and just all types of psychotic things that have happened to these kids that are following them in the classroom. And I have no control over that whatsoever except to try to give them a positive day in a hectic life, you know. So that’s when I feel powerless – when I can’t solve a problem that I didn’t create. (Laurence, Interview 2).
Laurence’s position as a caretaker to his students meant that his power was grounded in being able to fulfill this role and when he was unable to do so – most often during instances of life and systemic circumstances – he felt powerless. After 22 years as a teacher, Laurence reflected:

I look back, and it's like, “Oh, man!” I just don’t carry that type of stress anymore [over administrative evaluations]. Now, it's really all about the kids, and if kids wanna be in my classroom, and that's what I care about. I don’t really care if they want to give me a 1, 2, 3, 4 or 5 or whatever they will do. It's just not that serious. I don't take that part so serious. I kinda really want to keep my focus on my kids, you know. I want people to know that I did the best that I could do for the child. I mean that would kill me for a kid to not want to come to my classroom because they felt that they had some apprehension or something about me in the building. I want my room to be a loving, caring, nurturing place. And when the kids trust you, they’ll let you teach them. And so that's what I've always felt, and I think that so far it's been good for me. (Laurence, Interview 3).

By grounding his personal evaluation of his performance as teacher in the reception he got from students, Laurence eschewed traditional power structures within the school.

**Humanizing Science Teacher**

The third positional identity Laurence constructed – humanizing science teacher – encompasses his focus on teaching a science that centers connecting science learning with human experiences and their local and global community connections. How Laurence fashions himself as a teacher is based on engaging his students in a manner similar to his own elementary school teacher who was passionate about otters. He exposes his own passions and tries to emotionally connect them to content.
My teaching style is one where I want them to get emotionally attached to the subject that I'm trying to teach, so something like global warming, I'm very passionate about it. So really every opportunity - just like my teacher with the sea otters - this is my sea otter, which is global warming. So every time I find an article or find a link or a video or something, I constantly sharing those things with the kids. And by the end of the school year, they know everything they need to know about global warming plus some.

(Laurence, Interview 1).

Additionally, Laurence tries to entertain his students by making direct connections between the science content and daily occurrences in the lives of his students. For example, he shared a story about a time how he connected the concept of heat transfer to something that occurs often for the young girls of color in his class.

*I'm more of a presenter-type, entertainer-type of teacher. I was taught that the kids are not gonna grasp onto what you're teaching unless you give them some common experience, unless [the content] is somehow directly connected to their lives in some way. So over the years, I've learned how to take a difficult concept and link it to things that they [know]. For example, we were talking about heat transfer, so I can joke about how when your mom is curling your hair with a curling iron, she might tap that neck or tap that ear and so that heat jumps straight into your skin, and so kids kinda get entertained by that just by [being] able to link it to different things in their lives. (Laurence, Interview 1).

Here, Laurence connected heat transfer to a common hair routine for Black little girls – getting their hair done with a hot curling iron. It is likely that some of these girls in his class immediately remembered the uncomfortable sensation and shrugged their shoulders to their
necks as they were reminded of it. Laurence understood that part of his role in teaching content was to connect the content directly to the students’ daily lives. He also understood that once he made this personal connection, he needed to help students learn the larger implications of what they learned on the world around them. For example, I asked Laurence about his favorite lessons. Laurence instantly shared a story about his own “sea-otter” – climate change:

My best lessons are the ones that I love to teach the most, so ones about global warming, and it is a part of our sixth grade content, but even if it wasn't, I'd probably still try to teach it and plug it in some way. I expose them to the movie "An Inconvenient Truth." We watch pieces of it, and then throughout the year, we track the current news events of things happening around the world that have something to do with global warming. And we pick up and we start tracking the different things and then by the end of the year, we start looking at glaciers that are melting and we just kind of just infuse ourselves with what's going on. So of course, when Trump gets on TV and talks about global warming and says it’s not real, we also have that clip. We're trying to connect all those lessons and everything back to the planet, trying to connect everything and show that the world is a connected, fluid entity that we have an impact on. That's how I feel like I'm making a positive impact on the kids and the kids will have a greater appreciation for their planet. So anything I do with global warming, conserving resources, going green - it's a personal passion of mine, and I feel like the kids benefit from it. Those type of lessons where the kids could see that they are seven and a half billion people on planet Earth. And I want them to realize that they have to really work hard to stand out from those 7.6 billion people, and that, you know, one day, you want to be Google-able for something positive. And so those type of lightbulb moments that the kids can see ‘Well, my life is bigger than
this classroom. It's bigger than these four walls. Bigger than [our town]. You know, there's a lot of people in this world, and guess what? It's okay. We're different. I don't want to be the same as everybody else. I don't do that same thing that everybody else is doing. I want to be different.” And that's what I try to get them to realize. That it's okay to be different but for something positive, and work hard at trying to be different. You know, it's okay to be different. So those are my best lessons. (Laurence, Interview 2).

Beyond simply teaching his students the science content, Laurence attempted to connect the content to the students and then the students’ content knowledge to the world around them.

Laurence understood that for his students to be able to fully engage in science learning and to see themselves as a part of the science community, he needed to teach a fully human and culturally responsive science.

**Community-Oriented**

The last positional identity constructed as community-oriented encompasses his connections to his community and its importance to him and his teaching. He lives only minutes from his school, and he expressed great joy in seeing the kids he teaches doing difference things around the community – such as shopping with their families or playing in community-league sports.

Laurence conceptualized his teaching as a means towards “community-building” – both locally and globally. Locally, Laurence wanted to teach his students to be good neighbors to the people living around them.

*I want to have good, solid, positive citizens. [The kids] have a role too and to think they're going to be taking care of our old selves later on, so we'd better have a good neighborhood of people over here. And I lived two or three minutes from school, so the*
kids that are in that school are my neighbors and they live on my street and I will probably be seeing them at the supermarket and the gas station. (Laurence, Interview 3).

Globally, Laurence wanted his students to care about the world outside of their local communities too and to do their part in maintaining a healthy planet.

Final Words

Over time, Laurence’s positional identities – being an innate student and being a kid-centered teacher – shifted and evolved his teaching. As he noted about himself:

My approach to science has definitely changed since the beginning. In beginning, I guess, I didn't have the teaching pedagogy. I didn't have the classroom management skills. I didn't have the experience to make the connections between the content and the kids' everyday lives, which was hard in the beginning, because I was kinda learning the content as I was teaching. (Laurence, Interview 1).

Laurence’s narratives revealed him to be a natural student – his curiosity carried him through his childhood and college experiences, and eventually, led him to the classroom. Once he was in the classroom, he was further revealed as kid-centric teacher – his main concern as a teacher was always the emotional and social well-being of his students, and his secondary concern was their academic growth.
Angela: “I want to teach kids in a different way.”

I always say to them, "You got me because I'm awesome, so if you're not awesome, this ain't the class for you. You've got to figure out who you want to be and where you want to be in life." And they're looking like, "I want to be awesome." I say, "Aight, then you in the right place.” (Angela, Interview 3).

The quote above well reflects her brimming confidence in herself as a teacher and in her students as potential-filled young people. Additionally, it well represents the “real talk” manner in which Angela shared her stories with me – including the one about why she joined this study. Angela joined the study two days after I sent out the first round of recruitment emails. She received the email as a forward from a mutual colleague – Viola, another informant in this study who used to teach at Angela’s current school, Truth High. Early in our first conversation, Angela chuckled apropos of nothing, “When [Viola] sends me stuff-- let me tell you. When [Viola] sends me stuff, I follow through. I love [Viola], so if it would've came from anybody else, I probably would've pressed delete.” (Angela, Interview 1). This struck me for two reasons. First, I did not expect this level of candor early in our conversations – it jolted me out of my new researcher jitters and reminded me that I’m talking to a fellow teacher, not just a research subject. The second reason was that her participation in this study is the direct result of a positive collegial relationship with another Black woman science teacher. To describe my feelings in non-academic language, I thought it was dope that I recruited a Black woman science teacher who then recruited another Black woman science teacher – who herself makes it a point to show her former colleague love.

Throughout our conversations, I quickly realized stories – told with a mixture of straight-talk, vulnerability, and love – were Angela’s trademark. Most of the questions I asked were
answered in stories, which were then explained by more stories. Our shortest conversation lasted 90 minutes, and we had a hard time ending the last conversation at almost three hours – we only stopped because we both work in schools with early start times. Angela, a veteran chemistry teacher of 13 years, had stories to spare and was generous with her time, stories, and knowledge, and she narratively constructed three primary positional identities.

At Odds with the Public Education System

Angela constructed a positional identity of being at odds with the public education system. She told numerous stories that displayed her frustrations and grievances with public schooling. Her stories are rooted in the public school districts that she has worked in and her specific experiences within. However, her stories reflect well-documented systemic issues affecting numerous students and teachers across the United States – thus, she is at odds with the entire public education system. Three sub-identities combined together to construct this positional identity of being at odds with the public education system: 1) being tired of how the system treats students, 2) being tired of how teachers and administrators within the system treat students, and 3) being tired of how the system treats Black teachers.

Being tired of how the system treats students. Early on in Angela’s stories, she well-established both how much she likes teaching and how tired she was of the public education system and its priority:

*I like my job. I do. I really do. I’m just tired. We had a lot of tests going on in [Washington] County. I feel like these kids are tested every five seconds. Right now, we’ve got the [district graduation test], so we’re doing [test] prep every Thursday.* (Angela, Interview 1).
From Angela’s perspective, the main priority of her school district was standardized testing and their scores, and it was to the detriment of the students. This perspective is not uncommon—other teachers and education researchers also see the current priority of U.S. education as improving standardized testing scores for its own sake, rather than providing a lasting, holistic education (Popham, 1998, 2004).

Relatedly, Angela shared a story about her principal’s message to the faculty regarding their conversations with students.

"My principal said, "Don't do the failure talk with the kids. Half these kids are used to failing so they don't care." They do care. Nobody wants to continue to carry on through life failing and they feel like, "What's the point of me trying if I'm only going to fail?"”

Yep. And I'm like why not have the failure conversation with the kids? Because what they have to understand is just because you're failing at something, it doesn't make you a failure. At the end of the day, chemistry is not for everybody. I don't know where y'all gon' be 20 years from now, because when I was in school I didn't do no homework. I didn't have to. I said, "When I got to college it was a whole different world." And I try to tell them, “Either you gonna to fail for free or you gonna to go to college and you gonna to pay to fail. Which one do you want to do?” (Angela, Interview 2).

This story shared two related perspectives Angela holds about the public education system. First, the public education system and its powerful actors assume that Black and Latinx students do not care about their education or their own successes and failures. Underlying this story is the detail that Truth High, Angela’s current school, serves predominantly Latinx and Black students, but the faculty and administration is predominantly White. In this story, the White principal spoke to a crowd of mostly White teachers about Latinx and Black students with the overarching message
of “Don’t talk to Latinx and Black kids about their success or failure, because they don’t care either way.” The particular message and story is one that has been shared numerous times over time, despite its inaccuracy – which is why Angela took umbrage with it (Love, 2019; Milner, 2010). The second of Angela’s perspectives revealed in this story is that academic failures are not indicative of one’s personhood, rather they are a sign of “safe” risk-taking – which she sees as a purpose for public education.

In addition to being frustrated with what she perceived as reductionist assessments of her students’ motivations in school and abilities to take on academic risks, Angela expressed frustration with oppressive school policies and procedures put in place to regulate students’ behaviors as much as possible. To her, the existence and enforcement of these policies were further evidence that the public school system was not designed to truly serve Black and Latinx students. For example, Angela shared a story about the reaction to what was meant to be a fun, senior theme day at the end of the year:

_We had a gender swap with the seniors. Of course, everybody wanted to get involved. The girls are walking around with their pants sagging, durags on. Now, nobody told these young ladies, "Pull up your pants, take off your durags, pull your hoods off," okay? The boys had on dresses, wigs, stretch pants, and they got sent home. Football coaches is like, "If you participating in this, we going to run you at practice, or you cannot participate at practice or the spring game, or we calling college coaches." I mean, it was deep. So one of the gentlemen that I spoke with, he's homosexual. And he said something to one of the assistant principals like, "Why are y'all doing this? I mean, we just having fun." Or, "The kids are just having fun," because he didn't participate. And she was like, "People are offended." And he was like, "Well, who's offended?" And so she replied, "I'm offended."_
And he said, "Why are you offended?" And she said something about-- I guess he was like, "Why are you offended by homosexuality or transgender [people], or somebody's ability to dress in any way that they choose to dress, as long as it's school-appropriate?"

And so I think she was about to respond, but then she kept her mouth closed. I told the kids once they came back-- I said, "Look, all they can say is that you were interrupting the learning environment." Right as I said that, they sent an email. I opened the email for all my students to see, and it said, "If a student is interrupting the learning or teaching environment, please send the student to the community office", right? And I laughed.

Then one of the teachers were talking, she's like, "Angela, there's nothing wrong. It is what it is. They're just having fun. They got 17 more days until the end of the year. If it's not really out of control, if it's appropriate then fine. If it's not appropriate, yeah, send them home." She was like, "But these girls walk around here like this all the time." I said, "Right, and nobody says anything." And then the other thing is this. Why do we have to address the learning environment? They can come in, everybody's gonna laugh, you got five minutes to get all your laughs out, and when that bell rings, shut up and let's get going. She was like, "It's certain teachers who already don't have control and so now it's really out of control, because you already lack the ability to control your classroom." I said, "I don't even think about all that." But that's the truth. They sent all these teenage kids home. The one boy, he had on leggings but he had his shirt long enough to cover his parts and they were like, "No, this is not school appropriate. You're out of dress code."

He said, "How am I out of dress code when I'm covering everything?" Okay. So they was like, "You can't wear those leggings, he was like, "Who are you to tell me I can't wear them?"" (Angela, Interview 3).
The gender swap narrative revealed that Angela perceived her school’s approach handling a student-organized event to be hypocritical, regressive, and oppressive. Angela thought it was hypocritical in that few problems were brought up with the cisgender female students dressing up in stereotypically cisgender male clothing, yet coaches and administrators were vocally offended by cisgender male students dressing up in stereotypically cisgender female clothing. To her, this uncovered both the school’s double-standard in their treatment of the students and regressive views of femininity and masculinity amongst a faction of the staff (Sadker, Sadker, & Zittleman, 2009). Several of her colleagues were openly uncomfortable with students expressing a fluid understanding of gender and were the most uncomfortable with cisgender male students expressing femininity to the point where some athletes had their future prospects threatened. Furthermore, this blatant disregard for gender fluidity was so apparent that a student felt compelled to challenge an administrator over the event. The oppressive nature of the school’s response is clear in the overreaction to it – emails blasted out to the staff asking for reports of students “disrupting” learning environments; threats of retaliation at athletic practices; and calls to college coaches hoping to scare the students back in line by threatening their future plans.

Given her understanding of what many Black and Latinx students endure within the public education system, Angela was wryly thankful that they – along with her own two teenage sons – experienced it earlier in life:

*My kids have been going through discrimination and all that stuff their whole lives, and I’m okay with them going through it now versus later when they get to college and then they want to commit suicide because they don’t know what it means to understand who they are. I said everything is so— how can I say this? Everything is so detrimental to these kids — everything is big, nothing’s just a small, minute thing. We worked a lot of...*
stuff out because we lived life, but to them everything is big. So I was just like, [teachers
are] not going to keep making these comments when you feel like I've told them when you
feel a certain type of way about a comment that the teacher says – you need to voice your
opinion, you need to speak up. You don't sit here and hold your tongue especially when
it's only a few of y'all in the class. You need to make a statement and ask her to restate
her statement in a different manner. She needs to restate that in a different way. You don't
want to feel offended in a class by anything that a teacher says and not voice your
opinion, make her acknowledge her fault because this is stuff she probably would say
every year and nobody ever said anything. (Angela, Interview 3).

Angela accepted that her students of color will face discrimination but preferred them to face it
earlier in life to build a tolerance – and sense of resilience – to it earlier in life as to avoid severe
psychological damage later on in life. As a part of the resilience-building process, Angela
advocated students voicing their concerns and grievances whenever they felt discriminated
against at school. Her larger purpose behind encouraging students to use their voices was to get
them to force acknowledgement of discrimination and begin the process of getting themselves
restorative justice (Love, 2019).

In the end, Angela acknowledged and honored the fact that she is tired of the public
education system and its treatment of people of color:

*Well, I am good. It is what it is. I have a meeting tomorrow with my AP, and she's
like, "Name one thing you're proud about for the semester." But I think I'm just going to
let her know, "I don't know if this is where I need to be." I just started reading-- Oprah
Winfrey has a new book out, The Past Made Clear, and it's about understanding your
journey and your place in life. And she explains how she was the news anchor on The*
Baltimore, and in Baltimore, for the first time, she was like, "That was the first day of my-
-" What does she say? "That was the first day of my-- that was my first day at work and my last day of having a job," because she understood that being a news anchor or a journalist wasn't her calling, but being the talk show host or just having that small segment of just being able to interview a person and just talk to a person, that was her first day, and she said, "Her last day of having a job," understanding that this was no longer a job for her. This was her life. So I'm like, "Yeah. I need to shift." So I'm about to-
- whatever they say, "Whatever you put the most energy into, that's what the universe will bless you with." So it's time to take my energy out of the system that was not designed for me to be successful and put it into a system that I'm going to design for me to be successful. And therefore, I can touch kids in a different way where I have no accountability. (Angela, Interview 3).

Angela’s narrative here underscored how misaligned her goals for kids of color are with the goals of public schooling to point where she actively wanted to remove herself from the system to create her own thing. While she herself is tired and wants to leave the system, Angela acknowledged that teachers willing and able to work with kids of color for who they are and as they are still needed within system but she remained skeptical about finding these teachers:

*I just think we need people who really want-- who really understand the challenges that we face, that are willing to help some of our students overcome these challenges and help them to be successful, and you can't treat every situation the same. But I don't know if we're going to evolve to that. I don't know.* (Angela, Interview 3).
The next sub-identity constructing the larger positional identity of being at odds with the public school system—being tired of how colleagues within the system treat students—spoke more to her frustration with other adults in the school building.

**Being tired of how colleagues within the system treat students.** Angela’s sub-identity of being tired of how colleagues within the system treat students is grounded primarily in her frustrations with how oversensitive it seems her colleagues are to normal, teenage behavior from students of color and with deficit thinking about the aptitude of students of color. Angela shared a brief, but potent, story summing her thoughts about some of her colleagues and their approach to working with kids of color:

*A lot of these people take things too personal, and when [my son] had this one teacher, he was like, "Oh, my God. I hate chemistry." And she was upset. She came to me, and she said, "He said he hated chemistry," and I just—I said, "Girl, he don't have to like chemistry. Did he say he hate you?" And she said, "No." I said, "Well then, who the hell cares?"* (Angela, Interview 3)

Angela perceived many of her colleagues to be overly sensitive to what are normal behaviors for teenage kids—in this case, expressing dislike for a subject. Another example of this hypersensitivity is displayed in a previous shared story about the student-planned gender swap day the senior class students participated in—many schools have theme days meant to drum up school pride and a sense of community amongst the student body. However, some of Angela’s colleagues see these normal behaviors as potential deterrents to an orderly, controlled student body, which is par for the course in how many Black and Latinx students are controlled and surveilled in several public school system across the U.S.
Further, Angela was also frustrated by the deficit-grounded thinking several of her colleague engaged in as they spoke about the students at Truth High. For example, Angela told a story about teammate’s confrontation with another teacher who disregarded a directive to not publicly write out a passcode to a district survey on a Whiteboard:

[This teacher said], "Well, my kids aren't that smart, so it doesn't matter if I put it on the board or not." So [my teammate] had called me, and he was like, "If this is what you think of your kids--" And one of the kids was right behind him when he made the statement. He was like, "If this is what you think of your kids, what are you really here for? What is your purpose?" (Angela, Interview 3).

Deficit thinking about the aptitude and academic capabilities of students of color is an old, well-documented phenomenon (Acosta, Foster, & Houchen, 2018; Foster, 1997; J. J. Irvine, 2003; R. W. Irvine & Irvine, 1983; Love, 2019; Walker, 2000). Not only did Angela and her teammate witness another colleague espouse disbelief in the abilities of students of color, this pronouncement of the kids as being not that smart happened in front of one of the kids in classroom. Within another story, Angela expressed her understanding of how damaging deficit thinking about kids of color can be to their academic success and their well-being:

I try to tell these people at work. I'm like-- this one teacher-- oh my gosh. She drives me crazy. "My kids can't do that." Stop saying what they can't do unless you force them to do something. Let's stop here. The district assessment are all [depth of knowledge] level 2. They are presuming in their minds that you are at least teaching your kids at the proficient level for them to be proficient. You all need to get there. If you're not teaching them to be proficient, how do you expect them to be proficient? You can't keep saying,
"My kids can't." No. You can't. So let's reverse it. Get out of your little scared zone, and let's get yourself comfortable with the chemistry. (Angela, Interview 3)

From this story, Angela revealed two thoughts about deficit thinking. First, Angela understood deficit thinking to be detrimental to students’ academic success – if they are never taught up to the level standards want covered, it seems inevitable that students will not be on or beyond level (Ladson-Billings, 2006). Indeed, Angela and her teammate openly wonder why their colleague who publicly expressed that his students “aren’t that smart” continued to teach if it seemed it was unwilling to teach his students up to the level the standard required. Related to this line of thinking is the second revelation from the story – Angela’s hypothesis that deficit thinking is, in part, a reflection of a personal lack of confidence in one’s pedagogical content knowledge (Davis, Petish, & Smithey, 2006).

In contrast, Angela told stories revealed her confidence in her capabilities as a chemistry teacher. However, her stories also revealed frustrations about how public schooling values her and other Black teachers.

**Being tired of how the system treats Black teachers.** The last sub-identity that constructs the larger positional identity of being at odds with the public education system – being tired of how the system treats Black teachers – reflects Angela’s perception of the de-professionalization and undervaluation of Black teachers, including herself. During our second conversation, no soon as I asked Angela the question from the protocol about whether she sees being Black as privilege, she immediately answered:

*No. I feel like being Black I always get the kids -- I'm going to be honest. I don't see being Black as a privilege, especially not in education. My other thing is I always get the kids*
that other people or White teachers feel as though as they are unable to deal with.

(Angela, Interview 2)

Angela did not see any privilege in being Black in education as she felt as that she was seen as a sort of disciplinarian whose main purpose is to impose order onto unruly kids. Additionally, the subtext in her response is that she – a Black teacher – is seen at Truth High as someone who can deal with Black and Latinx kids that White teachers could not easily work with (Villegas & Irvine, 2010).

Expanding on the idea of being viewed as a disciplinarian, Angela pushed back on the responsibility put upon her to help kids other teachers could not – or did not – help and rejected the additional accountability measures placed upon her:

I love teaching. I'm not going to lie. I'm very passionate about it, but I'm tired. I'm tired of the accountability always being on the teacher and no responsibility or accountability being on the student, so I'm really physically drained and tired of teaching in a public school setting. I want to still teach kids, but I want to teach kids in a different way. And so I'm in the process of getting my own non-profit organization together, so I can get out of the school. Get out of this classroom and get into afterschool programs and teaching kids in another way, another aspect, teaching them life skills versus teaching them chemistry because it's very, very difficult with so much testing and so much-- when are we really just going to learn just for the sake of learning? And we just don't have that anymore. (Angela, Interview 1).

Like many other Black teachers in the United States, Angela has gotten worn down over time bearing a heavier load than White teachers in helping Black and Latinx succeed in school (Ware, 2002). Again, Angela mentions her desire to leave the classroom and leave the public school
system to pursue alternatives to teaching Black and Latinx kids different knowledges using different methods from that in traditional school settings to ameliorate her misalignment with the public school system as it is today.

In addition to being frustrated with the inequitable share of responsibility for adequately teaching Black and Latinx kids, Angela’s narratives revealed frustrations of being a Black science teacher in a mostly White science department, and school as a whole. First, Angela shared a story about her experience teaching AP Chemistry at Truth High while another White teacher also taught sections of AP Chemistry:

*I'm the only Black teacher who taught AP Chemistry at my school. They took AP Chemistry away from me, because I was not compliant to exactly what the "teacher of the year" – who is a Caucasian woman – was doing. My scores were higher as far as my students would score 4s and 5s. My relationships with my students were different. My relationship with my parents were different. I didn't get parent calls, because it just wasn't what-- I provided my students with test corrections. I provided them with extra credit. I provided them with tutoring. It was so many different things I provided them with because I told them, and this is what I said to them, "At the end of the day, you're 15 years old. I don't care how much we want from you. I don't care how much we want to say, ‘Teach them like college students’, you're 15 years old. You can only react and respond like a 15-year-old." And the great thing about all of this when I'm talking to these kids is my son is 15 at the time, you know what I mean? So I know what it means to be a 15-year-old and have all of this heavy load on you and it's not about all that. It's about the experience. And that's what I brought into my classroom with my AP kids. And
so I learned different strategies like group testing and this and that. And when I tell you
my administration was livid, they were livid. (Angela, Interview 1).

According to her story, Angela did everything she could to teach her AP students up to the level
needed to do well on the AP exam while also accounting for their maturity level and their
workload from other academic classes and extracurricular activities. However, because she did
things differently from her White counterpart, her work with her AP students was scrutinized and
criticized. From Angela’s perspective, the racial difference between her and the white AP
chemistry teacher is what really made the difference in their treatment.

Her perspective on her personal treatment while teaching the AP chemistry course is
reflected in how she worked with other Black science teachers. For example, Angela told a story
about her work with a fellow Black chemistry teacher after he succeeded her as the chemistry
team leader:

\[
\text{So now we have a Black teacher. He was the only Black male teacher we had as far as chemistry, and so when he took it on, we have a very close relationship. I told him,}
\]

"[Smith], I do everything I can because I never want them to look at you in any kind of
way and find any type of lack or shortage. They'll never be able to say that your
department didn't hold up." I said, "But next year when you're gone, I ain't doing all this
stuff. And I don't know who's doing it. I'm not going to do it." I don't like the
responsibility because they require too much for a little bit of money. (Angela, Interview
1).

Angela is protective of a fellow Black chemistry teacher, because as she implied, he could not
afford to fail or even be perceived as anything less than a stellar leader. Like many other Black
teachers across the U.S., the expectations of Angela and Mr. Smith and their work are much
higher than for White teachers – while being less valued than their White peers and enduring higher stakes for mistakes or less than stellar academic results (Foster, 1997; Payne, 2008). Additionally, Angela acknowledges that the stipend offered for the numerous extra tasks and responsibilities did not make up for the psychological toll put upon them for doing the extra work.

Along with the lack of proper compensation for the work and care that she and other Black teachers pour into their students, Angela resented the lack of diversity among the administration at Truth High School. For example, she told a story about why she ignored pressure to pursue administrative roles:

*I'm good at what I do, but I just don't want to have that pressure on me about-- they're like, "It's just the extra meeting." I don't want to be at the meeting. I'm going to be real honest. I don't like the administrative meetings because when I look around, it's not that many Black people in the meetings. And then my principal says stuff that's not funny at all, like completely not funny. I'm sitting here like, "Really? Y'all wasting my time." And everybody's laughing. And I'm like, "Y'all kiki-ing here". I'm just sitting here like-- maybe it's over my head. I'm not that person that's going to pretend to laugh when you make a joke that's not funny.. Sometimes I be sitting here and go like, "What kids are y'all teaching?" The stuff they be coming up with, I'm like, "This is not our kids."* (Angela, Interview 1).

In addition to avoiding even more pressure and responsibility upon the unofficial ones in working with kids White teachers avoid, Angela took umbrage with the lack of diversity in the leadership – and how out of touch it was with the student population at Truth High. As a reminder, Truth High serves predominantly Latinx and Black students, but the staff is
predominantly White teachers with a predominantly White leadership team. To Angela, she would be the outsider on the team where they already had inside jokes and talked about the students at Truth High in ways that rang false to her as a teacher who taught a swath of different kids at Truth High.

As an insider with the student body yet an outsider in the White leadership team, Angela knew her value to Truth High, and simply wanted the teachers who were doing the work of helping Black and Latinx students succeed in a system not designed for their success acknowledged for their work. As she noted about the turnover at the school:

*We have a lot of turnover. We just lost 44 teachers last year. We're probably about to lose another 44. Yeah, it's the stuff that they do where people don't feel appreciated.*

*When I tell you-- when we were at signing day the other day, I was talking to one of the teachers. She was like, "Man, people don't want to say how much we put into these kids." And I said, "They don't." I said, "They hear [Truth High]. They think about the money. They come in, and they see this flat screen TV up here. They see the trophies, they see that." I said, "They see the external factors." But they don't know how much work we put in to build these kids and make them who they are. And we still push them out into the world and they still ain't ready, yet, to be honest with you. But it's very difficult sometimes. Especially when you have certain teachers telling our Hispanic population, go back to where you came from.* (Angela, Interview 1).

At its core, Angela’s positional identity as being at odds with the public school system is grounded in her frustrations with how it attempted to – and often succeeded in – positioning kids of color and Black teachers in ways that demean, undervalue, and marginalize them. Her battles
with colleagues and with the larger system are contrast to her battles alongside her students as a warm-downer.

**A Warm-Demander**

The second positional identity Angela constructed was that of being a warm-demander. This is not a term that Angela ascribed to herself directly. Rather, her stories of specific sub-identities – being an authority figure and being a caregiver – revealed and encompassed the larger positional identity here. *Warm-demanders* are teachers who successfully teach students of color by maintaining structured, no nonsense classroom environments; holding high expectations of students and their success; building positive, yet authoritative relationships with students; and being culturally responsive to students’ needs (Bondy & Ross, 2008; Ware, 2006). Of the three contexts under which Ware (2006) identified two teachers in her case study as warm-demanders, Angela’s stories primarily aligned with two – being an authority figure and being a caregiver.

**Being an authority figure.** As an authority figure, Angela maintained a “real-talk” vibe in her classroom – she rarely held back her emotions and opinions from her students, yet she did it in such a way that the love and sincerity behind her words resonated even when the messages she sent weren’t the sunniest. For example, Angela told a story about how what early school year real-talk conversation sounded like in her classroom:

> When I tell you that’s how I talk to them, they’re like, "No other teacher just keeps it real like that." I tell them, "Y'all want to be a part of the ‘250 Club’?" They like, "What's that?" I say, "Summer school." And I say -- I look at myself in my phone, right? And I say, "I know I'm gorgeous." I say, "I teach you first semester, second semester, if you in my class, you'll be here summer school. If you can't pass then, you'll be back with me." I said, "Then I'll have you for two years. You can look at me all day long." And that's what
I tell them and they're like, "I don't want to be here like that." I say, "I think you would rather be saying ‘hi’ to me in the hallway versus coming in here for my class again."

(Angela, Interview 1).

While she kept a sense of humor in her discussion about passing her class, she also succinctly informed her students of the consequences of not passing her class – repeating it or paying $250 to retake the class during summer school.

Angela shared another story of the real-talk conversations she has with her students. In this story, however, the purpose of it was more apparent:

Everything is still moving whether [they’re] here or not, so [they] have to do what [they’re] responsible for. And I think that for them, that's what it is. I think that they know she not playing no games, you know what I mean? Today, the one kid was like, "You talking to me like I'm stupid." I said, "No. I'm really not," because I said, "You know what? One thing's for sure, two things are certain. I know you know how to do this." I said, "But my thing is, I want to know why your paper blank when I just went over the first two problems." And he's like, "Well, I don't understand." I said, "This is my thing. I know you don't understand, I get that, but if you came up here with a paper full of answers that we just solved collectively as a class and told me you didn't understand, I would have a different approach. But you're coming up here with a blank paper telling me you don't understand. So, how could you understand when your paper is completely blank?" And he's just like, "Well, I was kind of nodding off." I said, "Thank you. That's all I need you to do, is be real. Tell the truth." You know what I mean? Tell the truth. “Now you've owned up on your side. Now, I'm going to help you, but you got to have faith in you.” (Angela, Interview 1).
Angela’s real-talk was designed to lay out her expectations, reaffirm her belief in her students’ abilities, and then finally, offer support. In this story, Angela laid out her expectations – paying attention and following along with the problems done as a class. She then affirms her belief in the student’s ability to get the work once they pay attention. Her students also recognized her real-talk for what it is – a stern, clear-eyed reminder to always strive for more and for better.

In another example of the function of her real-talk, Angela told a story about an interaction she had with a student who, at the time, was new to her school and struggled to pass a district writing test required for graduation:

_I had one kid - he came here from Florida. Of course, the credits didn't transfer over. He was having a hard time with the [district writing test]. It was a lot, so he really didn't want to come to school. He was like, "I'm only coming to school because my mom's forcing me." Now, this was the thing. He's sitting there, and I watched him for a couple days, and I'm like, "What's going on with this kid?" So I go over there, and I talked to him. And he's like, "My credits weren't transferable so I'm sitting here, 18 and in the 11th grade." So he's going on, and so I said to him-- and I'm very raw with these kids. Excuse my French, but sometimes I do curse. So I said, "Look. Let me explain something to you." I said, "You're not here for chemistry." I said, "Yes, you might be in the chemistry class, but you're not here for chemistry. You are here to learn how to be somewhere on time. You're here to learn great work ethic. You're here to understand that when I struggle, or I'm under pressure, I can still pull through." I started breaking down all the things, all the reasons why you really go to school, and how to actually view it. And not to do it in a sense of content, but in a sense of the context of why we're here. And I said, "At the end of the day, I'm going to be real with you. I don't need you sitting around with an_
average nine to five, working paycheck to paycheck. Hell, I do that." I said, "And I'm
tired of it." I said, "What I need for you to do, as my student, I need for you not to be the
construction guy. I need you to be the foreman. I need you to be the supervisor. Hell, I
need you to own the god-dang construction company. I need you at home in the bed
making calls from your house. And you don't even have to show up on the site." I said,
"You making money whether you're there or not. That's what I need from you." I said, "So
who do you want to be? Do you want to be the construction worker? Or do you want to
be the goddamn owner?" And he was like, "Well, I want to be the owner." I said, "Well,
the only way you can own anything is with a high school diploma, so I suggest you do
what it takes to get there." I said, "You rock out with me, I'll rock out with you." And he
was like, "Okay." I said, "Well, let's get it.", and ever since then, when I tell you he
graduated last year. I said, "But I told you if you rock out with me, we good because I
know you're going to give me all you got. And that's all I need from you. I need you to
give me all you got. I know y'all not going to be no daggone chemistry major. I know
y'all not going to be working at a pharmaceutical company. It's okay [laughter]." But
that's one of the best things my students always say is that, "We don't just learn
chemistry. We learn life lessons in here." I relate everything to life. Everything we do in
chemistry, I relate it to their life in some fashion or form just to make them
understand. (Angela, Interview 1).

In this story, Angela understood that the student felt discouraged by being behind in his
graduation credits, so she explained to him what the purpose of her class was – which was not
just learning chemistry. Angela viewed her classroom as a place for students to learn about how
to navigate through life, and chemistry was the conduit through which this learning happened.
Resilience and work ethic were developed through laboratory investigations where Angela provided guidance instead of direct instruction, and the ability to strive for ownership – instead of not being owned – developed through how students are pushed towards owning their innate excellence.

**Being a caregiver.** Angela’s sub-identity as a caregiver consists of stories about building relationships with kids, so that they recognized her real-talk for the love and care that she meant for it to be. For example, at the end of a dialogue about working with students experiencing severe troubles outside of school and continuing to have high expectation of them, she noted:

*I do have some kids that will not work. They don't work for anybody. But guess what? I know today he lost his job yesterday. I know that he lookin’ for a new job. I know what's going on in his house. I know this. I know that he's 18 and in the 10th grade. His brother's 16. His mom wanted them both to graduate. He wanted to do online school. I know everything about him. But when I tell you, I'm like, “Boy, you passed the [district writing test]. You just need to pass this class. You're on track to graduate.”* (Angela, Interview 1).

Angela understood that even her most difficult-to-reach students have stories behind their “refusal” to work, and she cared enough about the students to listen to their stories, learn from them, and help them figure out their situations. As a caregiver, Angela understood that her role was to meet her students where they are, instead of the other way around. For example, she shared how she did this:

*I try to look at the whole kid. I make my students do a survey on how they learn. And then I question them on how many teachers actually teach you based upon how you learn versus their teaching style. And it was crazy, because most of them believed that none of*
their teachers besides me -- out of the six that they had -- really take the time to teach them in a way in which they learn versus the way that they're so accustomed to teaching. And then I made them take a survey on how many other teachers actually motivate them to do better on a daily basis. And one of my students, "The only person that really says anything to me to motivate me is you." And I was like, "Wow." Nobody's having these conversations with these kids. Nobody is actually taking the time out. And I know it's a lot. Don't get me wrong. It's a lot. But this is what we have to do. (Angela, Interview 2).

Angela admitted that being a caregiver specifically – but also being a warm-demand, more generally - was taxing; it took a lot of time and energy from her to do this, but as she saw it, it was a part of the job.

**Driven Toward Personal Success**

The last positional identity Angela constructed was that of being strongly driven and determined to succeed. Her ambition was apparent from early in her stories – through her college years, through her career as a science teacher, and now, through her and into her students. Angela readily admitted that her high school experience wasn’t challenging and as a result, she didn’t put much effort into studies. Even though she didn’t try very hard, she was still a stellar student – her teachers liked that she was respectful and that she made good grades. At the end of high school, she earned the valedictorian title and a full scholarship to an HBCU. It wasn’t until college, and in particular, a chemistry course with a notoriously ornery professor that the depths of her ambition was fully unearthed:

*It was a spring course, and he was the only teacher, and it was only provided once throughout the year. And a lot of people did not pass this course. It was an independent course as far as the labs were concerned, so you had eight labs to complete unless you*
could answer his three questions, and if you couldn't answer his three questions, you had to leave out of his office, come back, and he'd ask you three different questions about the lab. So if you couldn't comprehend to the depth that he wanted you to comprehend about the lab, you couldn't get started. So we used to be in the lab until like 3 o'clock in the morning. We were taking shifts. I would leave and go get my son. Take him to my mother. Or a friend would watch my stuff. She would go get her son, take him home or somewhere else. When I say that was the hardest class – the class that I've worked the hardest in – just by the way that he was no nonsense, straight to the point, did not play games. And we knew if we didn't do what we were supposed to do, we were going to fail. But I was like, “I'm going to finish school, that's all you need to know.” (Angela, Interview 1)

Even while caring for a young son and dealing with an ornery professor who put several academic hurdles in her way towards success in his chemistry class, Angela knew that she would succeed, because she was willing to accept the challenges in front of her and try to solve them using the resources around her, such as family and friends.

In her career as a science teacher, Angela has called upon her ambition to persevere through witnessing and personally experiencing inequities within her school and within the public school system as a whole. Additionally, her drive to succeed pushed her beyond complaining about what she endured and toward doing what she needed to do to make situations work in her favor. For example, Angela shared a story about how she dealt with a situation where she was handed lesson plans and was expected to use them:

What is the point of complaining when I still got to get everything done? When there's somebody to complain to that will pick up the slack, then I can complain. But I ain't got
nobody to complain to because ain't nobody picking up slack! But I got to make sure it gets done. Complaining is just a waste of my energy. That's the energy I could have used to make sure something got done. It was like, I can't think about-- it's just amazing to me. But I don't really complain about too much. I let them say whatever they need to say. And I need to go. I leave. And then I have to process it and think about it and how can I tweak it to make it my own. So everything they do, I just make it my own. If I can make it my own, I know I can bring it to life. You know they say, "Oh, here's the lesson plan." I can't teach from somebody else's lesson plan. I don't collaborate like that. I have to make it my own. So lately we've done review for [the district writing test]. We did it for the seniors, and this lady handed me all my copies and this packet. I said I can't do this. I literally couldn't do it. I was up until 2 o'clock in the morning, because if I can't see it, I can't teach it. So if it's not my vision, it's not something that I can do. So I had to make it my own. (Angela, Interview 2).

To succeed in spite of being handed – both literally and figuratively – things, processes, systems that don’t belong to her, Angela found ways to take some ownership of them and worked hard to see them into come to life. Angela fully understood that barriers exists and acknowledged them but never let them stop her forward movement towards being a successful science teacher.

This personal ambition Angela has to personally succeed as a teacher pours into students through their relationships and collaborative work toward making them successful as students. For example, she told a story of how she coaches students on how to work around the roadblocks in their lives – like she had once done herself when she was in school – and succeed anyway:

One kid was like, "I failed the test because of family issues." And I replied, "Well, okay, family issues are always gonna exist, so what are we going to do to work around these
family issues in order to be successful?" And then his grades start coming up. He started showing more effort. One kid missed the first two weeks of school, and he was like, "I got to get my grade up." I said, "Well, I'm so proud of you for just coming to school for the last two weeks." And then he started taking more interest. He got an ‘A’ on the test he was studying for, and so this semester we talked about fixed mindset versus growth mindset. So they had to explain to me what type of mindset they thought they had, and a lot of them were like, "Well, I think I have both." I said, "Okay. So let's explain why you think you have both, and when do you think you have both?" And so throughout the course of the unit, we stayed on fixed mindset versus growth mindset where they had to actually explain, "What situation occurred this week where you could have had a fixed mindset about it? Now, what could you have done if wanted to move forward with having a growth mindset about it?" And so now we're working on - what are we working on now? - Building a relationship with the teacher. I mean, "How many of you actually have a relationship with a teacher in the building?" Which most of them said that I was the only teacher that showed some form of compassion or some form of relationship building with them. (Angela, Interview 1).

Angela taught the students what she learned during her college experience – what it takes to persevere past life difficulties to view what's already right in their lives and what they can do to keep moving towards their goals.

Final Words

Angela’s three positional identities – being at odds with the public education system, being a warm demander, and being driven towards personal success – are all reflected in her stories about her lived experiences as a chemistry teachers. Angela understood what the students
at Truth High deal within their personal lives outside of school and their lives during the school day. However, her perspective was focus on growth – owning, controlling, and developing what’s in one’s purview. The reality of injustices towards kids of color and Black teachers never stopped her mission of building capacity and hope of liberation for her kids of color – and for herself.
Regina: “I want them to be the best.”

“I’ll be like, ‘You’re gonna be awesome sauce. You’re gonna be awesome sauce, and your day’s gonna be awesome sauce. And why is that?...It’s gonna be awesome, because I touched you.’”

(Regina, Interview 2).

For being as busy as she is, Regina is amazingly upbeat – and the quote above reflects this. She just finished her fifth year teaching high school while concurrently finishing her sixth year as an adjunct college chemistry professor, and as the cherry on top of her teaching sundae, she also runs her own business – a tutorial center located in the community she lives in. Both of our districts were out on spring break when a mutual colleague shared Regina’s interest in joining the study. We made initial contact on the Thursday of our spring break and had our first conversation the very next afternoon while she was setting up her tables at the tutorial center in preparation for her afternoon appointments. Regina spoke with a lilting, hometown drawl of many Black people born and raised around the city at the epicenter of the metro area we live in and keeping in character with hometown folk, she was warm and open.

What struck me the most about Regina throughout our conversations is how unrelentingly hard working she is, yet she took the time out to converse with me. During every interview, she was either actively preparing to work or on the way home from work – it was nothing for her to smoothly pause our conversations to ask for a side of soy sauce to go with her dinner. Her hustle and grind was impressive to me and reflected throughout her stories – from how the motivation behind the grind and how she tries to inspire and engage her kids in learning how to grind.

Regina, a chemistry teacher with six years of experience, constructed three primary positional identities.
The first positional identity Regina constructed is that of being what I call a gate-opener. Gate-openers operate in opposition to gatekeepers (Foster, 1993, 1997; Moore, 2007; Stanford, 1998; Thornton, 1989; Walker, 2000). Gatekeepers in education guard passage through “gates” leading to more lucrative learning opportunities to maintain current racial caste structures and block access to these opportunities for particular groups of students. Gate-openers, in contrast, open gates for students once they are ready for more lucrative learning opportunities. Their role is to set students up for success rather than letting them fail or denying them access without explanation or support to encourage them to keep working towards being ready.

For Regina, being a gate-opener meant showing kids that they don’t have to be the best at a subject, or even like it, to find their own success within learning. For example, she told a story of some her own teachers and how they instilled this idea in her about subjects she didn’t like:

*I think all my teachers were good in their own way. They all taught me something different and I kinda hone into some of their teaching styles. It's funny that I only have one favorite science teacher. All of my other favorite teachers were literature teachers, and that's the one subject that I hate most. And I think it's because they kinda showed me that at the end of the day, just because this is something that you don't like, you can still be successful at it. And I always try to show my students that I'm teaching now just, because you don't think you're going to use science, and you don't think that, you know, you can be successful at it, you really can. It's not, you know, as hard as you think it is. My one science teacher that I did have in high school - he was real demanding, 'cause he was from the army. I think he's the one who taught me the most science out of all the years that I was in high school. And then, my favorite professor - he was also my advisor*
and he was my chemistry teacher. Well, he was my organic chemistry teacher and he was the first one that failed me and he was like, "Well, technically I'll give you a ‘B’, because I don't want you to have an ‘F’ on your transcript, but you don't know anything." So he kinda showed me – why pass on students when they don't know anything, and I think that's a struggle that I have sometimes with education. We're just passing students along, and you know, they're not learning anything. So all my teachers really taught me a lot, and I find myself emulating them, you know, when I'm teaching all of my students.

(Regina, Interview 1)

As a young student herself, Regina didn’t care for literature. Her school even placed her in remedial literature classes in middle school to help her improve her writing. However, she had literature teachers who didn’t make her feel like she was in a remedial class, because they treated her and the other students in the class as if they weren’t remedial. Rather, they encouraged her to put forth her best efforts, supported her when she struggled, and held her to the expectation that she could be a good writer. Just as her own teachers opened the gates towards being a better writer and better science student, Regina did the same for her students.

For example, Regina spoke about her approach to gate-opening for her students through the chemistry courses she taught this past school year:

I think I really teach students about some of the skills that I wish I would have had...studying skills and being organized and being prepared because I got to the end of high school and-- Honestly, I know [they] probably don't need to know what a proton or a neutron or an electron is, but however, you do need to know how to remember information. And if I tell you something, then do it or if I say I want it in your notebook, that's where I want it. I don't want it in my hand. I don't want it somewhere else. That's
where I want it. So I try to instill life skills that I know that they're going to need to help them. And I think that kinda comes off in my teaching. People aren't going to repeat stuff. So, when they ask you, "Do you have a question?" you need to think about it-- listen to what they're saying before you try to say what you have to say, because they're not going to repeat stuff. So I think a lot of the life skills that I kinda had to learn the hard way, I kinda try to teach it to my students while I'm teaching chemistry. So, I think it's kinda why they're like, "Why are you so hard?" I'm hard because life is not going to be easy on you. And if you can deal with me, then you'll be able to deal with a lot. Like I told them, "High school is here to prepare you," and they be like, "Well, I'm not going to college." And I'm like, "You know, that's fine. You don't have to go to college, but a job is worse than college. It's harder. So if you think you're going to straight to the workforce, that's much more difficult to be in than you going to college." So, I think that's what-- I think all of those kinda things come out when I'm teaching. (Regina, Interview 2)

Regina gate-opened through teaching chemistry. To her chemistry – and science, more generally – is a conduit through which she taught her students more general life skills that would help them well beyond her class. Through the process of learning and doing science, Regina taught her students to become self-starters and how to think comprehensively through problems.

Regina readily admitted that she was hard on her kids – she expected a lot from them, and resultingy, many kids initially struggled in her class. However, Regina focused just as much on the journey as she did the end goals. For example, Regina told a brief anecdote from a parent conference with a concerned mom:

I was in parent conference, and the baby was like, "But mommy, I grew!" and mom was like, "But you still failing!" I said, "No, but my baby grew. My baby was at 30. Then, my
baby's at a 50. We gon' make sure he get to an 80." So I think I like to see and I like the student to feel like, you know, at the end of the day even if I’m still failing, I'm growing and I like them to see that growth. (Regina, Interview 1)

This interaction reflects the core of her role as a gate-opener. She can’t yet open the gate for this student onto more advanced chemistry opportunities, because he hasn’t grown enough as a chemistry student for her to responsibly allow him to move forward. However, as a gate-opener, she doesn’t blithely deny him to the opportunity to move forward nor does she ignore the progress he has made towards the gate. Rather, she celebrated the progress her student demonstrated so far and affirmed her support and confidence in him reaching the goal of making an 80%.

An important element of being a gate-opener for Regina was affirming her students’ ability to reach their learning goals. To her, “I can’t” isn’t the reality for her students, so she doesn’t entertain these statements when her students say them. As she explained:

That's my whole thing with anything that I teach, because even in my tutorial center, the kids will be like, "I can't do it but my classmates can." "What's the difference between you and your classmates? Nothing. So I don't want to hear that." So even with them, I want them to be the best. Whatever I touch, I need it to be the best. So you're going to be amazing, because you're a product of me. And they'll be like, "What?" And I'll be like, "Yeah, you're a product of me. You're already amazing. But when I have something to do with you, you're going to be awesome sauce." And my kids will tell you all the time, I'll be like, "You're going to be awesome sauce. You're going to be awesome sauce. Your day is going to be awesome sauce. And why is that?" And they'll be like, "Well, my day is not
Regina’s expectations were high, and she was unrelenting in seeing her students meet them. However, in the process of getting her students to being their best, she didn’t allow their lack of confidence in themselves to slow them – or her – down. What they lacked in confidence, Regina made up for it in spades. Her approach was to express this confidence in their ability to learn and engage in science, all while holding the students accountable for doing their parts as they learn.

Being a gate-opener was difficult in that in the process of walking students through the journey towards the gate, Regina took on a role that can look like that of a villain – she had to have high expectations of her students; she had to help them meet those expectations; and when they didn’t meet them, she had to keep steady enough to not open the gate onto the next journey all while encouraging students to persevere through the hardships of being denied the instantaneous gratification of a good grade. Additionally, she didn’t get to immediately see the results of her efforts as gate-opener, if she ever saw them at all. However, when Regina did get to see her efforts pay off, they were sweeter than candy:

*Oh, I think my greatest successes is – usually I don’t see them till they go off to college. I’m known as the crazy, mean teacher, so I don’t get that many accolades or praise while they're there. But I’ve had several students contact me once they got into college and was like, "You know what Ms. [King]? I ended up getting a ‘B’ out of chemistry. I failed you but I got a ‘B’," and I'm just, like -- that's what I wanted. I tell the students everyday like the goal is-- the goal is for me to teach chemistry, but if you don't plan on majoring in chemistry or anything science related, then you're right. You're not going to see this again. But the ultimate goal is can you persevere in something that you're not good at or
something that you don't like because that's what life is about. And just having students come back and say "Hey, I did research over the summer. It was great. Here's a picture the award I received," or "Can you come and pin me from graduate from college?" and I'm like, "No I can't come and pin you because you're graduating from college and it makes me old." [Laughs] And knowing that that was like, "I can't stand you. And I can't wait to get out of your class. You have ruined high school for me. " And now you are asking me to come and pin you at your ceremony and you know, you're telling me that if it wasn't-- you know, like she said, “I just kept telling myself I can make out of Ms. [King's] class, I can make it out of college" and those are moment that I live for and I know the kids won't see it. And I think that that part -- that's hard for me sometimes. I know what I'm doing is affecting them but when you're gonna see that the part that I'm like, I don't know when I'm going to be able to see it you know. At the end day, this is what you know I'm here to do. (Regina, Interview 1).

Regina admitted that being a gate-opener was taxing on her – she didn’t always get to see her hard work come to fruition and she had to be tough on her kids, which means she wasn’t always well-liked while students were in her class. However, when she received feedback, it was from students who were becoming successful young adults in college who acknowledged what Regina had poured into them and the gates she opened for them.

Passed Along

The second positional identity Regina constructed is that of being passed along. This identity reflects Regina’s feeling that she progressed through high school with good grades and several accolades, because she was a compliant student rather than one who completely learned what she was supposed to in her classes. In relation to her first positional identity, being a gate-
opener, the motivation for becoming a gate-opener stems from this identity of being passed along.

For example, as already noted, Regina graduated high school with honors, but she quickly realized that something was amiss with her education when she took placement exams before her first semester of college:

You know, I graduated with honors. I graduated the top percent of my class. I didn't want to go to a big school, and I didn't want to go far away from home. So that's why I picked [a small HBCU]. When I got there, being that I did graduate the top 10 percent of my class, I'm thinking "Oh this is going to be a breeze." When I got there, I had to take --- Now mind you, I thought I was wonderful in chemistry because I had an 'A'. Well, I took the class and then when I had to actually take the placement exams for chemistry, I failed it. And I was like, "Man, what happened?" (Regina, Interview 1).

Because Regina was purportedly a “good” student by her high school’s estimation – or a student who had no behavior issues and made good grades, she expected to smoothly transition into college-level chemistry courses. However, she was surprised to find out that she wasn’t as well prepared for learning chemistry at the college-level as she thought, which made her question the quality of science education she experienced in high school.

Regina described her experience with high school science before mentioning the two science teachers who stood out the most to her:

My science classes in high school – I don't really they think challenged me except for my physical science teacher. I think he was the only challenging teacher that I had and that I think he challenged me moreso because he didn't teach the standards that we have to teach. He taught way beyond them. I remember balancing equations – chemical
equations. I got to college, and I was like, “We did this equation when I was in 10th grade.” Like, we was balancing this in 10th grade, so I think he was one of the ones that was the most challenging. He's the one who for the first time I remember having to stay after school to get help from the teacher. So when I got to college, actually failing - or getting D in organic chemistry – he kinda showed me that when you say you gonna have a degree in or major in something, you need to know it. No matter what you know or what it is. I think he kinda instilled that in me. Like, don't say you're majoring in something, and when somebody asks you a question, you don't even know how to answer the question, so he helped me with that part. And in graduate school, all my professors there, they pushed me to wanting to know more. I guess in high school, it kinda showed me what I'm interested in and then college showed me that "Okay, you can do this. This is what you know. You can actually make money off of something that you're interested in" and I think graduate school actually kinda showed me that if this is what you want to do, then what extra are you going to put into it? What else do you want to do with it?

(Regina, Interview 1)

According to Regina, her overall high school science learning experience was lackluster in terms of the rigor it presented her, with the exception of her physical science class. This particular class stood out to her as challenging, because the teacher made it a point to ensure that he went beyond what his mandated standards asked him to teach students and into more difficult concepts that forced Regina to apply effort in her learning. This teacher, alongside her college experiences with chemistry, instilled in Regina the notion that a diploma or degree indicates a certain level of expertise on a subject that the holder possesses, and that it is important that a student’s actual
learning and knowledge reflects this expertise. Regina takes this idea seriously today as a high school teacher.

The impetus for Regina becoming a gate-opener once she became a teacher is rooted in her high school experiences with lackluster science education. In telling the story of her journey in becoming a science teacher, Regina revealed how being passed along influenced her:

*I knew I want to be in the science field. I started off wanting to be a doctor and realized that blood - yeah, I can't do bodily fluid. So I still wanted to be in the medical field – still wanted to help people – so I decided to go into pharmaceuticals, so being a pharmacist or helping develop drugs. So I did internship with a pharmacist, and I was like, "Oh, this is boring. I can't do this at all." So while I was in school, I kinda realized that it was harder for me than I noticed it was harder for other people in our categories - like you know, what's the difference between me and them? And I was like, "You know, I really think that it has something to do with me being in high school and me making good grades, but the grades didn't reflect what I actually knew when I got to college." So I went onto to go to – but I was like I'm still not gon' be no teacher because they don't make any money - so I went on and I went to graduate school. Got out of graduate school, went and got a research and development job and I hated it. So I was just like, you know I'm gonna give teaching a shot, but I'm not gonna teach high school because they still don't make any money. So I started teaching as an adjunct professor first, and when I got there, I noticed that our students were struggling just like I was when I was in school. So then I was like, I want to give high school a try, and I've been in there for the last six - five years, yeah. I've been an adjunct for six years and a high school teacher for five. (Regina, Interview 1)
Regina became a high school science teacher after realizing that several of her college chemistry students struggled in similar ways that she did when she was in college – which connected back to an earlier realization that her high school science education didn’t adequately prepare her for college science classes. By becoming a high school science teacher, Regina could then do her part to help students avoid the same pitfalls that she experienced as a college student by having to catch up in terms of understanding the rigors of college learning along with being able to rise up to the college-level educational work. In her own words:

I was just like, “How is it that a child got an ‘A’ in the class, but then on the flipside, you give them a standardized test and they can’t pass it?” So does that ‘A’ really represent what they know or does that they just represent they was just a good child? And I just feel like now, looking back at it, I think I was just a good student. And I think, you know, I didn’t talk back. I didn’t give the teacher any trouble. Whatever the teacher told me to do, I did it - I did all of the work, but did my ‘A’ - when I look back at it -- did my ‘A’ represent what I knew or did my ‘A’ represent my effort? And I think as a teacher, I kinda to try to let my grades emulate that if you get ‘A’ out of my class that means that you really deserved it, because I don’t want to give them false hope either. You want to be these amazing things but then are you going to have the willpower to actually accomplish those amazing things when somebody is not there to hold your hand. Like, if you had to go into a remedial course, are you going to let it beat you down or are you just gonna take it in stride and learn what you need to learn and then pick yourself back up and keep going? And that kinda scares me a lot, especially with my honors students and my AP students that you don’t know as much as you think you know and when you figure out you
Being passed along without experiencing quality education acted as a gatekeeper to keep Regina away from college-level chemistry at first and rerouted her into remedial courses at the beginning of her college career. However, Regina took it in stride and eventually worked her way towards a master’s degree, an industry job, and then college-level chemistry instructor positions. Her hopes are that even though she is doing her best to challenge her students and to ensure that they aren’t passed along without having learned chemistry to an appropriate level, that once her students realize that the system has overall failed them to some degree, that they aren’t discouraged from continuing their learning.

**Advocate for Black Kids’ Education**

The third positional identity Regina constructed was that of being an advocate for Black kids’ education. Regina has an affinity towards teaching in Black communities that stems from her understanding that Black kids need more gate-openers in their classrooms. Because of the historical and continued marginalization of Black students in public education spaces in the U.S., Black kids tend to endure low expectations from their teachers, and as a result, they also endure a lack of preparation for life beyond public education and thus are “gatekept” from greater opportunities (Milner, 2010).

Regina is very familiar with Black communities as her K-12 years were spent in schools in predominantly Black communities. As a result, she is comfortable teaching in these spaces and understand the challenges these communities face due to system-caused bindings:

*I’ve never taught -- I guess, a different type a different type of population, So all of my students have been predominantly African-American or Hispanic, and those are the type*
of students I like to teach. I got into teaching, because I just felt like, you know, I could possibly be wrong but a lot of our good teachers are or a lot of the teachers that you know are known to be good – they kinda leave our babies behind – and what I mean "our babies", our Black babies – behind. I've always, and I will probably always, teach in those type of areas, so [this school year is] pretty much the same as all my years. A lot of the students are not exposed to science really until they get to high school which is really sad. They kinda see it – certain concepts – in middle school, but they don't really get a good exposure of science like they do math and literature. And I think it's based upon the state tests. They don't have a test for science until the ninth and tenth grade, so it's not really pushed like that, so most of the kids that we're teaching – they don't see the benefit of it unless there's a test attached to it which is the sad part is. So all the schools I have been at are similar. I had the same demographic of students in all of the schools that I've taught at. (Regina, Interview 1)

Regina has an affinity for and comfortability with teaching Black and Latinx kids, which is not unusual for Black teachers – many schools serving large populations of students who are of color are staffed by teachers of color, including Black teachers (Payne, 2008). Extending her impetus for teaching to ensure students received a thorough, quality science education experience in high school, she also teaches to ensure that she pours this into Black and Latinx students. These particular groups of students experience some of the largest disparities in science learning opportunities in K-12 education, and through personal experiences, Regina intuitively understood this (Atwater, 2000; Oakes et al., 1990). From the lessons that she learned from having to compensate for the failure of the public school system to adequately prepare her for postsecondary science learning opportunities and experiences, her objective is to help her Black
and Latinx students learn in spite of the circumstances put in front of them. For example, because science is an untested subject for most of their K-12 educations, Regina felt that science was backburnered for her students in favor of classes that were tested, and because these are students in a Title I school that predominantly serve Black kids, the microscope from state monitoring was intense. Therefore, test scores were highly important to these schools. Regina wanted to help her students overcome the failures on the part of the system and encourage them along the way toward doing so.

**Challenging Teacher**

The fourth positional identity Regina constructed was that of being a challenging teacher. To Regina, being a challenging teacher meant that she was hard on her kids. She thought they perceived her as strict in how she ran her classroom; tough in the high expectations that she held for the students; and no nonsense when students push back against the structure of the classroom. For example, she described her teaching style as one that shoots for stars but is cool with landing on the moon:

> So my teaching style...I always like to teach students above level – kinda like how my professor taught and my 10th grade teacher taught us – and scaffold that down. I know a lot people like to scaffold up. I'm moreso a scaffold-down person, because I don't want to go like, "Oh, chemistry is hard. The kids don't know it. Let's make it easy." No, we're gonna teach it on this level and then if you don't get it, then let me break it down to you until you get it. I like small groups, because I think that one-on-one connection with science actually helps students grasp the information better. I like repetition, but I also like teaching new concepts while doing repetition because students get bored very fast, even my college students. So I love teaching something new but letting the kids see the
success in something old, because if they like, "I can't get it this. I can't get this. I can't get this." then they shut down. And I know science and math are one of those things people shut down very fast on. So that's kinda my teaching style and my philosophy. You know, I want to be able to reach down by showing them that they can be successful at something and then showing them that, "Okay. See this is where you started in this where you know came from." So I do a lot of pre-test and quizzes and post-test and I kinda let the students track their data. So they can say, "I am growing" (Regina, Interview 1)

From Regina’s point of view, the typical approach to teaching science that she experienced growing up is starting at basic-level knowledge and effort and then slowly working up to a higher-level of engaging in science. However, the potential issue with this approach is that, given particular constraints – either time created or human created – students never get the chance to reach the higher levels of engagement in science leave. Regina’s approach was the opposite – she began teaching concepts at higher-levels of engagement and thinking and worked backward to teach kids up to this level. This kept her from wasting time on basic knowledge when it wasn’t necessary, because she didn’t assume her students inherently wouldn’t be able to understand at higher levels. This also allowed students to see what their learning goals were upfront. She also liked to mix in new content with older concepts – the ethos here being that it helped to keep students engaged in learning new material while reinforcing older material. This particular practice acted as a confidence builder for her students to keep them going through the harder parts of learning.

Being a challenging teacher to Regina also meant keeping a competitive spirit for herself and for her students, so they stayed motivated to do their best. I asked Regina if she would be as tough of a teacher as she was if she taught another subject other than science. She quickly
affirmed that she would be just as tough – her challenging nature as a teacher, came from her desire to open gates for her students but also her competitive nature of wanting to be the best.

Regina shared a story about this drive to compete:

> So I think that it's like a strength and a weakness, because it's kinda like, "I'm going to win. My kids are going to be the best." When we do data talks, I tell them, "When I'm doing [professional learning community meetings], my kids' scores ain't gonna ever to be worse than nobody else's." So my kids have my competitive spirit. I'll be like, "No. This is crap." They'll be like, "What?" I'll be like, "This is crap. You're not going to tell me I didn't teach. I taught. I taught this. So you need to get on board." So I think no matter what I teach, I'm going to be that way. (Regina, Interview 2)

Simply put, Regina wanted to win, and she wanted her students to win alongside her. She wanted to challenge herself and challenge them, which is why she balked whenever higher-level engagement in learning was mistaken for a simple increase in the amount of work. She told the story of her conflict with some of her assistant principals and their use of the word “rigor:

> It's not enough rigor, and I hate when APs use the word 'rigor' because it bothers me because I'm like, if they don't understand the concept, I can't add rigor to it. I mean, I need them to understand the concept, and I think in education, we've gotten away from that so much that the kids are lacking foundations, and I think-- I just love meeting with one of my students from the Tutorial Center. They were thinking about keeping her back, and I was just-- but it's really not her fault. You all don't teach times tables anymore, so since you don't teach times tables, you teach them all of these little triangles and boxes to figure out answers, then you're mad because she can't figure out the answers on [state
standardized test]. So how is that her fault? So I think I'm just sick of APs. I think they
learned this word 'rigor', but they don't really know what 'rigor'. (Regina, Interview 3)

As her administrators use it, “rigor” was giving the kids more work but not necessarily more
challenging work. To Regina, “rigor” meant providing students with foundational knowledge
and skills – no matter how rote it seemingly is for students to learn it and for teachers to do it –
and then applying the foundational knowledge to higher-level activities and thinking. Regina
understood that this foundational knowledge was lost in schools serving Black kids in favor of
flashier lessons and activities that actually provide students “shortcuts” to memorize certain
knowledge without having a conceptual foundation to this knowledge.

Final Words

Regina’s four positional identities – being a gate-opener, being passed along, being an
advocate for Black kids’ education, and being a challenging teacher – are reflected in her
competitive nature to make herself the best teacher she could be and to make her students the
best prepared versions of themselves as possible even if it meant re-doing things a few times.
Her ultimate goal as a teacher to ensure that her kids aren’t simple passed along, because they are
“good”, compliant students. Rather, she wants to make sure – that like she did – they know how
to fight for and earn every bit of knowledge and excellence that they deserve.
Michael: “I use my abilities to help me build relationships with the students.”

“I had an elementary school teacher. He was a language arts teacher, and he sticks out because he looked like me, and I wanted to be him when I was older. This is before I knew I wanted to be a teacher. He was the only one.” (Michael, Interview 1)

The first word I think of to describe Michael is “chill” – which is a state of consistent calm and comfort Michael seems to be in no matter where he finds himself. From his overall demeanor to his “low and slow” cadence, I can’t help but think, “He’s so chill,” every time I think about Michael. Even the way he joined this study can be accurately described as “chill”.

During the last wave of recruitment at the end of the school year, I received word from a mutual research colleague that he heard about the study and was interested in joining. After reaching out to him the same day, two text messages were all it took to get him on board and schedule for his first interview.

Michael’s overall chillness extended into our conversations – they were slower paced and unrevealing at first. However, once the conversation ebbed and flowed at a faster pace, I found that this chillness is a façade hiding of a deeper reflectiveness that Michael possess about himself as science teacher and as Black male science teacher, more specifically. As a slightly more seasoned science teacher, I recognized the vulnerability in asking rhetorical questions about education, his identities, and his work in a conversational yet still research-oriented setting. I admired the introspectiveness of his narratives – and its reflected in his stories of his identities of being a Black male role model/mentor, a structured teacher, and aware of how Black kids experience public education. Michael, a middle school science teacher of five years, narratively constructed three primary positional identities.
Black Male Role Model and Mentor

Being a Black male role model and mentor to Michael are interwoven identities where he views himself as both a role model – or someone for his students to aspire to be similar to as they grow up, and a mentor – or someone to help steer and encourage his students of color, and in particular young Black boys, along pathways that will lead to positive development and success for them as they go through K-12 education, “My primary option was to be an athletic director. And I didn't find out that-- I finally found out that I had to teach and coach in order to become one.” (Michael, Interview 1). Michael’s first career choice wasn’t to teach – rather, he wanted to be an athletic director in schools, an overseer of the athletic programs in schools that helps these programs grow and succeed. However, he discovered that in order to become an athletic director down the line, he had to teach and coach first. This is the seed that later turned into Michael becoming a Black male role model and mentor once he got into the classroom.

The nourishment of the seed idea of becoming a Black male role model and mentor came from Michael’s own experience in public school where he didn’t see many Black men in the classroom for him to look up to. However, when he finally found one, the influence on him was profound. For example, Michael told the story about who his teachers were and what stood out to him:

*Mostly all of our teachers were women, and we did a lot of book work. And they just showed up to work and gave us assignments. They tried to make sure that we learned but didn't really tell us how to apply it to life. That probably not my best answer because I don't really have fond memories of my science teachers at school. I had an elementary school teacher. He was a language arts teacher, and he sticks out because he looked like me and I wanted to be him when I was older. This is before I knew I wanted to be a*
teacher. He was the only one. And I think I had a band teacher. When I changed schools, I had a band teacher that was a Black guy as well. That was it. I had all Black teachers in elementary. I didn't have any White teachers in elementary. I don't think I had any. I had a lot of teachers in middle school and I had a lot of teachers in high school. I ain't never seen the Black middle school and high school teachers, and I had White teachers, and it was cool. (Michael, Interview 1).

Like many students in the K-12 public education system in the U.S., most of Michael’s teachers during his K-12 years were women and/or White (Banilower et al., 2018; National Center for Education Statistics, 2019). However, in elementary school, he was exposed to a Black male teacher who he then wanted to emulate as he grew up. This image of a Black male teacher stuck with Michael through middle and high school while he was classrooms lead with White teachers, even though his schools predominantly served Black kids.

In turn, Michael uses this understanding of the mere presence of Black male role model in a classroom to positively influence the lives of his students – mostly Latinx and Black children with a few White children in the classroom as well:

*I'm pretty familiar with [my] identities. It's just who I identify as, as a teacher which makes it so that I use my abilities to help me build relationships with the students. So first off, any student that looks like me, I find it a lot easier for me to connect with them. And then if they look like me and they are a guy, it's even easier to have tough conversations with them. I mean, I just try to treat everybody the same way, but I do have conversations outside the class. I might pull some kids aside that are brown skin and tell them, "Hey, you need to get your stuff together." I mean it's like the stuff that people did to me when I was growing up, so. However, it has been challenging to have conversations with the
ladies who are the same color as me, because they are ladies. Sometimes it's some stuff I can’t talk about – some things that I let another female teacher talk to them. But I kinda think that helps out with the teaching. Other than that, dealing with other minorities, I don't really have any issues. And then dealing with the majority, I sometimes do get kids trying to talk to me about things that they think that I listen to because of the way I look, and it always surprises them when I don't really respond to them the way they think that I would. Sometimes a White kid will come at me and try to act super cool like, "What's up Mr. [Jordan]?" and try to do whatever they see on TV trying to look cool, a little cool gesture when they, I guess, shrug their shoulders or put their arms a certain way to try and look cool. They only do it to me, because they don't do it to the other teachers. So that's how I know that it's probably because of what color and the way I look, and so they see me associating with the other students and how I interact with them, so... They try to talk to me about rap music or I guess “Gin and Juice”. It's very inappropriate but...[laughs]” (Michael, Interview 2).

Michael understands that to be a Black male science teacher in a middle school is unique, and likely, novel to all of his students – no matter their race or ethnicity. As a Black male role model and mentor, he uses his distinctive position to build immediate positive relationships with his students and develop long-lasting memories of positive relationships with Black men in his students. With his Black male students in particular, he intentionally positions himself as a role model – someone who looks like them to aspire to be – and mentor – someone who can guide them and steer them in directions more conducive to the success of Black men in the United States. He recognizes that for the White students he teaches his role as a Black male role model and mentor doesn’t work the same for them. Rather than seeing him as someone to aspire to be,
he provides them an image of positive Black man teacher to, hopefully, be included in other images. Additionally, his role as a Black male mentor to White children works differently as well. Rather than helping them navigate through racial turmoil with minimal damage, he steers them towards better interracial relationships that aren’t based in monolithic, racial stereotyping.

Being a Black male role model and mentor to Michael also means that he has to provide his students the concealed stories of Black fatherhood and paternal relationships (Milner & Howard, 2004). For example, Michael spoke about how he relates to his students:

*I’m going to talk to them as if they were my – I don’t want to say – I guess if they were my child. So I treat the kids as if they were my own child. So, I mean, there’s just a certain way you talk to kids as if they were your own kids, and how would you treat your own kids. Would you treat them really bad? Or would you treat them really good? When they get in trouble, do you yell at them and curse at them? Or do you tell them how to do things better?* (Michael, Interview 2)

Michael makes sure that he relates to his kids positively – almost like he were talking to children that were his own. Michael understands many of stock stories of Black men, and Black fatherhood, in particular – the narratives of Black fathers being absent, either physically or emotionally, from the lives of their children or of being verbally abusive and harsh (Milner & Howard, 2004). However, by being mindful and reflective above how he speaks to children, Michael aims to subvert these stock stories and reveal them as myths and half-truths in the lives of the students he teaches by maintaining healthy, paternal-like relationships with his students.

Finally, as a Black male role model, Michael wants to inspire more young Black boys to become teachers – and Black male role models and mentors – like him. As part of this particular mission, Michael tries show his students how science relates to the lives’ of people of color, and
Black people specifically. For example, Michael shared a story about how he approached using real-life examples in his teaching:

*I try to get more people that look like me involved in this so they see my face teaching science, hopefully that will-- I try to push them, give them the extra push to be inside, to make it more fun. Just use these real life examples of things that helped me fall in love with science, so I use the same things that helped me fall in love with science and make it realistic and why science is so applicable to your everyday life. The examples I give the kids are more so things that involve my identity because I know that the stuff that's in the textbook is not going to be stuff that they can identify with. So the stuff in the textbook for example, I guess, I kinda use myself as a textbook, I guess. That makes a little bit more sense. So it's just I don't use the textbook, and they don't understand most of the stuff that's in there, I just kind of re-write it myself and use examples that I know works. I use those same things that work for me and things I identify with, I just give them the same examples to try to make things make sense. So where some people might call it watering it down, or dumbing it down, but I just feel like the kids need to know examples of things that they've already experienced, and that they will experience in the future, that they experience at home. So I try to bring in things from things they experience at school, things they experience at home, and things they have seen on TV or have heard from other people that they've experienced. I try to bring, and tie that all in together to create this science identity. So I feel like the kids have an identity as scientist. So that's a big thing that I push in my classrooms. Have the identity as a scientist because I feel like everybody can be a scientist, whether you like it or not, you're all scientists. I just show
them how they are scientists, and how they can become better scientists, and how to debate as a scientist. (Michael, Interview 2).

An important part of Michael’s approach to science teaching is ensuring that the students see him and themselves in the curriculum – he does this by bringing in examples from their lives and examples including cultural references, and in particular, references from the cultures of people of color. His goal in doing this is to help his students see that the world of science is open to those beyond White people and men, and that essentially, everyone can be a scientist to some degree (J. J. Irvine, 2002; Mutegi, 2011).

**Structured Teacher**

This second positional identity Michael constructed is that of being a structured teacher. To Michael, this means that he sets clear parameters in which his students can co-exist and learn science. Anything within these parameters is acceptable and fair-game, while anything that steps beyond them results in negative consequence – either from Michael himself or from larger school or societal forces. For example, Michael explained his teaching style:

*My teaching style is discipline first. I'm going to teach the kids the rituals or routines first, and then after they learn those, then I teach them concept. So I like to discipline first and then fun later. So it's pretty much of just work now and play later. That's my philosophy for teaching. So we do all the work and then afterwards, then we can have fun.* (Michael, Interview 1).

Michael described his style as “discipline first” – by which he means “structured”. He teaches his students the parameters of his classroom environment, so that they know how to function within the space productively and the consequences for stepping beyond the parameters. Once he
establishes these parameters, Michael feel freer to have “fun” – or to allow the students the structure to have more independence in the learning process and to explore scientific phenomena.

Michael’s sense of his strength as a teacher is maintaining the parameters, which for him, is a form of creating a positive learning environment for his students (Ross, Bondy, Gallingane, & Hambacher, 2008). For example, he described when he feels powerful as a teacher:

_I feel that I have power as a teacher, actually, when I stand in front of the room and I'm actually instructing the kids. I feel powerful in the sense that I have information or knowledge that they want to obtain. Whether they actually obtain it or not is a question, but I actually feel powerful as a teacher. So I feel that if they don't listen to me that they're only setting themselves up for failure as they get older. I never really feel powerless because I know that students can't really see the future the way I can see the future for them. And so, with that being said, knowing that information helps me always feel powerful because pretty much, when they don't listen to me, they always get in trouble. It usually always works out to my advantage, and it continues to make me feel like I'm powerful. So even when they're acting up, it's like I'm just able to give them examples of "Hey, you can't go out in society and do this, or the consequences are going to be this."_ (Michael, Interview 2).

The power that Michael feels he derives from being a teacher stems from the structure he imposes on his classroom – those who stay within the parameters will learn and progress, while students who step beyond the parameters he sets will often incur negative consequences. Michael implies that the structure he imposes on his classroom comes from his understanding that particular characteristics and behaviors that his kids exhibit could lead them down particular pathways – some leading to undesirable outcomes. Because he knows certain patterns, he is able
to predict with a degree of accuracy what happens outside of classroom when students step beyond the parameters of structure imposed on them, and to some degree his classroom acts as a microcosm of larger, societal structures at work on the lives of his students.

Even though part of the reason why Michael is a structured teacher is because he wants prepare his students of color for survival within a discriminatory and racist U.S. society, he also uses the structure he builds and maintains to create a safe environment for students to interrogate the knowledge that they bring into the class and then create knowledge from themselves as they do this with a classroom full of other kids. For example, Michael discussed in more detail how he structures learning activities for his students.

*Well, I mean, when I think about who I am, I think about my identity. And so, with age, I think with anything that anyone does, who they are is going to show in what they do. So how I teach my science class or how it relates to my science classroom is that I teach it from a perspective of this is how the world-- this is what the world wants-- how the world wants to see things. This is how you should interpret things. I try to teach it from multiple perspectives, so I just try to give people multiple vantage points in everything that I do in the classroom. So I give every child a voice. I try to empower them with the way that they think about things. And I try to tell them that, "Hey, it's okay. Everyone has their own brain. They have their own body. So they're going to think about things differently. They're going to act differently. They're going to experience things differently." So based off those things, as long as you're able to provide evidence and support your reasonings. So one of the big things that we push in science is “CER [Claim, Evidence, Reasoning]”. I don't know if you guys do that in high school, but that's what we're teaching them in middle school. So I try to teach all the kids that it's okay. There's not always one right
answer, and that your answer can be right as long as you can provide the evidence to support your answer. So I try to teach them that it's not always won by an answer, but it's how you're able to explain the answer is what makes it right. (Michael, Interview 2).

Within the parameters Michael sets for his classroom is the idea that the classroom is structured, so that students can safely navigate through multiple perspectives of science and feel free to think for themselves. However, Michael imposes the structure in how this happens, which is in a very argument-driven manner – students must provide evidence and reasoning for their thinking, or “claims”. This structure helps students develop the ability to create arguments from claims and to defend them with evidence and reasoning. As Michael says, he emphasizes the argument over the “correct answer”, because the argumentation is how the science learning happens.

**Aware of How Black Kids Experience Public Education**

The third positional identity that Michael constructed is that of being aware of how public education marginalizes Black students. In addition to being a middle school science teacher, he is also a first-year science education doctoral students interested in learning more about history of Black male teachers and the asset they brought into their communities. This interest stems from understanding the stock stories of generations of Black students being subjected to lesser quality education.

*I can see certain situations that it can be a privilege, but the majority of situations, it's not a privilege. I say that because of the type of education that we've got and that I've received since I was in school. Everything that I've read about pretty much is of people that don't look like me, so I mean – I don't really have connections to those kind of people. That's one of the things that I actually want to put in the curriculum and at least within my class. I started with putting it in my class and then one day, put it in the*
curriculum so that students are able to read about people that look like them and just able to find literally text that they can identify with and make connections with. So maybe that would help keep students interested in school and as a way of keeping us from not wanting to drop out and stuff like that. Because nobody wants to sit through another British literature class, because that's the only class that's offered for AP so... (Michael, Interview 1)

Michael perceives that the education that Black students receives to somehow lacking. He specifically noted that Black people seem to lack representation in different texts and that the content taught in school seems disconnected from the lives of Black people (Foster, 1997, 2001). He cites this disconnection as a motivating factor for him to make science curriculum – starting within his own class and one day expanding beyond – more inclusive and equitable.

Michael also mused about the state of education for Black children in the U.S. during our conversations. For example, Michael explained his current thinking about how he perceives that Black children don't fight as hard for their education as those who were in school from Jim Crow through the Civil Right Movement in the 1960s:

When we struggled to get education as far as –when I say “struggle”, I'm talking about when we first were trying to fight for our educational rights to go to school, I feel like that was a time where people were really hungry for education and then now, it's not like that anymore. They're just not into it anymore. I think back then you saw a lot more Black authors – not that you don't see any now but it was just such a big push from the youth. They were hungry to learn more and those same youth became adults and they wrote and people read what they wrote but then once they disappeared, cause they got too old and probably passed away and stuff like that, it kinda just got lost. I never really heard about
those people because it's not taught at school so unless somebody's telling you about this stuff or you're reading about it – because nobody around you is reading, they should be. It's just hard to know about this stuff unless you go seek the information on your own or somebody tells you about it. I know I'm talking a lot. There's just a whole lot on my mind. (Michael, Interview 2).

Michael’s awareness of how public education marginalizes Black students extends to his thinking about knowledge of Black people and their contributions to our society – including Black American literature and Black philosophical thought. He understands that there are gaps in his knowledge about Black people and their art and philosophies – but he also realizes that his thoughts are in the beginning stages and that he has more to think through and research about the historical and contemporary issues that Black students faced in getting an education in the United States (Walker, 2000, 2009, 2013, 2015)

Finally, Michael mused specifically about the state of Black men in the education system. He specifically noted how Black male children, in particular, have suffered educationally over the last several decades. As he mused:

The statistics about where Black males are in society, education-wise, the fact that you see that they're really are at the bottom of pretty much everything right now. It didn't use to be that way. When I read some – I came across an article where it didn't use to be that way. They used to be at the top. They used to be the cream of the crop. They used to have reading clubs in all kind of cities. And they used to just come and hang out. That's what I used to do, but they used to do that with text in front of them and they would sit and talk about that and talk about issues that were affecting their lives and the community and
As a new doctoral student, Michael’s sociopolitical awareness and consciousness is expanding to think and read more about the historical and contemporary contexts of Black men in the United States.

**Final Words**

Michael’s three positional identities – being a Black male role model and mentor; being a structured teachers, and being aware of how Black kids experience public education – combine to reflect his own past lived experiences that caused his sense of ennui with education and present enthusiasm to learn and do more about the state of Black education in the U.S. Ultimately, Michael wants to be more than a Black male role model and mentor – he wants to be a leader and a scholar of Black education, so that he can be more to his Black male students.
Daniel: “I teach my head off when it comes to them.”

“We're in school to learn, and that should always be your number one goal. When you leave school every day, you should always be able to ask yourself what did you learn. If your answer is ‘nothing’ – wait a minute, you mean to tell me you just spent eight hours on the job and earned no money. Really? (Daniel, Interview 2)”

The quote above is a good reflection of Daniel’s polite yet straight-to-the-point, slightly Southern cadence. Daniel came into the study during the second wave of recruitment. Once again, a mutual work colleague put him in touch with me – and within hours, we had arranged an interview. This was especially impressive to me, because our mutual colleague told me he coached track and field, a spring semester high school sport. Even more impressive, several of the students he coached won state championships in their events, for which I congratulated him on. Daniel – who is also quite humble – replied with a slightly embarrassed sounding, “thank you,” from which we quickly moved on from and into the main conversation at hand. Though Daniel was the newest of the six teachers interviewed for this study – he was in his fourth year of teaching during the study – he stories carried a surprising amount of nuance for a teacher so early in his career, though his newness was reflected in some of the tentativeness in sharing some of his observations, but was an understandable tentativeness. Daniel, a high school science teacher of four years constructed two main positional identities: being pragmatic and being suspicious of inequities in his school.

Pragmatic

The first positional identity Daniel constructed was that of being a pragmatic teacher. The word *pragmatic* describes situations and people who attend more to the realities of practices rather than the ideas and theories of practices. Accordingly, as a pragmatic teacher, Daniel is
laser-focused on doing what works best for his students, while being open to learning more about other strategies so long as he’s provided evidence and reasoning behind these new strategies. Daniel’s pragmatism is best reflected within a story about the difference between who he is at work versus who he is outside of the school building.

I read this book called The Art of Happiness at Work. And in my in my humble opinion, I think that every educator should read. And the entire book was an interview with the 14th Dalai Lama of India. And the whole thing was started when an individual asked him, what does he do for a living? What does he do for a living? What does he do in—what is his work? What does he do in order to make money? What does he do to survive? And the Dalai Lama answered him and said, “Nothing.” And he said, “What do you mean, nothing, everybody has to make a living, what are you talking about?” He said, “Well, I do nothing.” And he goes throughout the book to explain exactly what he meant by that. And what he meant by that was that his life alone is how he makes his living. Who he is on his job is the same person he is at home, the exact same person. So once you—I mean, if you as a person are a part of how you make a living, then technically, you’re not working, you’re just living. So you don’t have work if somebody says, “What’s your job? Where do you work?” You say, “Well, I work nowhere,” that’s not saying that you don’t work, it’s saying that you live your lifestyle in one place, and then you go to another area, you live that same lifestyle. (Daniel, Interview 3).

His philosophical stance is that he’s not working as a teacher – he’s simply living his life, but in a different environment. He sees no difference between who he is at work and who he is outside of work, because the only difference is the setting. Therefore, who he is as a teacher inside the school building is just who he is.
Despite perceiving himself as not having a teacher identity, his pragmatism is well-reflected in his approach to teaching. In his own words, his students very much see his attention to the “pure” teaching aspect of the job:

*I guess about 90% of my students would say I resemble a college professor. I mean, so that’s what their perspective would be. My perspective would be—I mean, it’s attention to detail. My teaching style is attention to detail, and very loving and very supportive of the kids. And very practical, very practical. Honestly, I teach my head off when it comes to them. I teach my head off all the time. I don’t just give them stuff and stand back. I teach, I teach, I teach, and I teach.* (Daniel, Interview 1)

Daniel described his style as very oriented around teaching in the tradition sense of the word – exposing his students to new concepts, and then providing detailed explanations of them before allowing them to continue on to doing inquiry activities that would reinforce what he has already explained.

Daniel’s practice of inquiry is a bit different from that which current science education research supports (Windschitl & Stroupe, 2017). However, Daniel doesn’t completely eschew students asking their own questions – he encourages them and prepares for them.

*I always try to remember what my mentor said. She’s a professor at [a local research university], and she always told me to come in 10 steps ahead of the students every single day. And with that said, I think I need to always come into the class trying to predict at least one question they will ask in whatever section that we’re in and try to have an answer ready for them, so. For instance, if we talk about genetics and when I step into the classroom that day that we start genetics, I need to know how twins form because they’re going to ask. It’s just inevitable. They’re going to ask “Where do twins come
from, and where do fraternal twins come from? What’s the difference between the two?”

You just know it’s coming. (Daniel, Interview 2)

Because Daniel knows that questions are unavoidable, he works to ensure that he has thought through as many questions as possible that his students might ask. This is a part of him understanding that pragmatically, no lecture or explanation he could provide would ever result in his students’ mastery of whatever science concept they are learning that.

As mentioned already, he encourages his students to ask questions. However, even more than this, Daniel is disappointed when his students don’t have questions at all. As he explained:

I tell them if they don’t ask me “why”, we’re going to have a problem. “If you stop asking me questions, if you stop asking “why”, we’re going to have a serious, serious problem because you’re not in school to just take it, to just sit here, and just ‘Oh, let me just learn it, pass it, and get it over with.’ We’re not in school for that. We’re in school to learn, and that should always be your number one goal. When you leave school every day, you should always be able to ask yourself what did you learn. If your answer is ‘nothing’ – wait a minute, you mean to tell me you just spent eight hours on the job and earned no money. Really? I mean, nobody goes to work for eight hours and comes home—" if you say, “Well, what did you earn today?” “Nothing.” “What? You just spent eight hours at work and you brought nothing home?” So it’s the same thing at school. You spend eight hours at school. You come home. You learn nothing in an eight-hour interval, you learn nothing? And so I tell them, they should always have a question ready.

It’s like wasting eight hours of your time. That’s 40 hours a week. (Daniel, Interview 2)

The message that Daniel’s students receive is that a lack of questions indicates a lack of work and engagement on their part. To him, this is akin to going to work and not receiving any pay –
which he implies is due to a lack of actually doing work. Within this story, Daniel’s pragmatism is reflected within his perspective of school – he sees school as not just for attending and getting grades. He actually wants his students to leave school with an education (Foster, 1997).

Lastly, Daniel’s pragmatism is reflected in his perspective about professional development and learning. According to him, there is little purpose in learning strategies that aren’t documented as “successful”. For example, he expounded on this perspective using a hypothetical scenario:

I ask, “Where did you retrieve that teaching method?” And they may say, “Okay. Well, I got this from, I don’t know, anywhere. I got this from Johnny Appleseed High School and they’re number one in the state. And a teacher from Johnny Appleseed High School has been doing this for 10 years, and her schools have been exceeding the state’s average scores. She said it worked, so I’m suggesting that we adopt this technique.” And I’ll say, “Okay. This thing is research based. Obviously, it works. So, let’s rock and roll.” But if it’s something that comes from wherever, I ask again, “Where did you get this?” – this is my main thing – “where did you get this from?” So let’s go on the other end and I say, “Where did you get this from?” And the teacher said, “Well, I got this from Johnny Appleseed High School and Johnny Appleseed High School is number 40 in the state of Georgia.” And I say, “Okay, well, number 40. So you mean to tell me we are adopting methods from a school that is number 40, which is not bad, they’re still not bad. But we’re adopting methods from a school that’s number 40, instead of adopting from a school that is number 1, or number 2. Why? Why are we doing that?” And so, whatever that person’s answer maybe, I’m trying to make sense of it. I’m trying to make sense of this because I don’t agree with it is, if it’s not being done by the best, by the absolute
best, then what is the purpose of it? Not to get smart, but to really figure out, what is it that you see in this in this method? So that’s how I would go about it when I’m disagreeing with somebody. I’m trying to dig in to find out what is the purpose behind us doing this. (Daniel, Interview 1).

Because he is pragmatic, Daniel isn’t interested in science teaching strategies and methods that have been sufficiently demonstrated to be successful – which is measured in this narrative by school rankings, which themselves are determined in large part by the state standardized tests. Without evidence and reasoning that he determines as adequate, Daniel is disinclined to seriously consider and use teaching methods beyond what he already uses.

**Suspicious of Inequities at His School**

The second positional identity Daniel constructed with his narratives is that of being suspicious of inequities within his school. Through the course of our conversation, Daniel measuredly discussed several observations he made while at Chisholm High – mostly unprompted by me. He attempted to remain objective as he spoke about these observations, but through his narratives, it became apparent that even though he couldn’t precisely name what was happening to Black students in his school, he noted that something was amiss in the scenarios he observed.

For example, at the beginning of our conversation about challenges that he experienced at Chisholm High, Daniel immediately started to discuss a challenge that didn’t necessarily affect him – rather it is something that he observed about groups of students found in “lower-level” courses:

*Challenges. Oh, man. Yeah. So, one challenge I would definitely say is we have lower-level classes, not special-ed classes, but lower-level, kids with lower test scores. And that*
class is full of African-American kids, full of them. That's one challenge. Because I'm just not-- I'm not confident that 90% of African-American kids are deficient in reading. I'm just like I-- do I think it's high? I think it's high. But not 90, 95%, I just don't think that, not that high. (Daniel, Interview 1).

Daniel’s observation that the “lower-level” classes are disproportionately filled with Black students relative to the school population is one that is well-documented. Black students across the U.S. are disproportionately tracked into lower-level classes and labeled as “special education” students (Oakes, 1986, 1995). Daniel doesn’t acknowledge that this is an well-known inequity Black students faces, but he does recognize that it something isn’t right with the numbers of Black students in lower-level classes at his high school.

The second suspicion Daniel had about inequities in his school is the disproportionate numbers of White students in upper-level and Advanced Placement courses:

*The other challenge I would say is the higher courses, the honors-level courses, and AP-level courses, there's definitely a higher percentage of Caucasian Americans in them based on what I have seen when I walk past the classroom. And so, it makes me wonder how are you pushing these kids forward? What type of system do you have in place that's pushing more Caucasian Americans into the honors-level courses versus African-American? Now, are there African-Americans in there? Of course, there are, of course, there are. But the percentages, the percentages are different, definitely different versus lower-level classes. (Daniel, Interview 1).*

Again, Daniel suspected that there was something wrong with the high numbers of White students in the honors-level and AP courses relative to the population of the school. Daniel was beginning to not only observe but develop question about what he’s observed – for example, he
began to ask about the mechanisms pushing White students towards upper-level courses and Black students into lower-tracked classrooms, which is a common question amongst socially just and culturally relevant pedagogues (Atwater, 2000; Oakes et al., 1990).

Finally, Daniel began to infer that what he was observing with students – and with teachers – may have something to do with racism, even though he was reluctantly to even say the word “racism”. For example, Daniel continued with his list of challenges onto what he noticed amongst his faculty – specifically who teaching particular classes, which is where he begins to makes his inferences.

*The other challenge I see is you have some teachers who only teach honors-level, the honors-level kids. It's like they don't even want their hands on any lower-level kids because, well, I don't even know, I don't even know why. And so, I'm not going to give you any rationale. But you have some teachers, they only, only, only teach higher-level students. And that's very questionable. What is it that's making you not teach these lower-level students? Is your class management not strong enough to manage these kids or how is this even possible? How are you only getting these particular students? How is this happening? And what is it so-- what's so great about your teaching style that's allowing you to only teach the best and brightest? Another challenge I would say, there's definitely been some-- there's definitely been some, I know a few signs and symptoms of – I don’t want to say racism. I don't want to say that. But I would definitely say, I would definitely say that there's a few signs and symptoms of difference in treatment. That's what I would say. You have some people whose backends were getting kissed and then you have other people whose backends are getting kicked.* (Daniel, Interview 1).
Daniel clearly noticed that something was amiss amongst both the students and teachers – particular groups of students and teachers are more associated with “upper-level” courses and others with “lower-level” courses”. While he is reluctant to call these instance of racism, this reluctance – alongside his suspicions – is indicative of this positional identity’s future capability to evolve into actual being able to identify these observations as instances of racism once he has more experience as a teacher to say so.

**Final Words**

Daniel constructed two positional identities – being pragmatic and being suspicious of inequities – both of which are a reflection of his relative newness to science teaching. He wants to use strategies that work to raise test scores, and at the same, he recognizes that several things are amiss in the course placements for Black students. The depth of the inequities and injustices are tricky to find with untrained eyes, but with Daniel’s positional identities, he is almost certainly going to get to the bottom of them – and will continue to do the right thing for his students once he does.

**Closing the Counterstories: Researcher’s Reflection**

The conversations with all six teachers took place from February 2019 until June 2019. Fellow teachers will recognize that timespan as a “semester”, which isn’t simply what a marker of time but also of effort. Teachers will know that any semester of a school’s calendar encompasses an immeasurable amount of effort. I know how much effort that we all put in during daytime hours working with kids and then how much time we spent in our afterhours coming together to co-create the narrative knowledge that make up these counterstories, so I am immensely grateful to the teachers for their time and their knowledge.
As for the knowledge shared here, these counterstories reflect wide variety of experiences Black secondary science teachers lived through. No one teachers in this study lived through the exact same experiences as another, and therefore, no one teachers was exactly like another – which is just a small taste of the immense diversity within the African diaspora, and within the small percentage of Black secondary science teachers working across the nation. However, reading through the counterstories reveals commonalities in experiences – particularly in who these teachers teach, how they came to be who they are today, and how they position themselves as teachers today. In the next Chapter 5, I discuss and explain the themes across the counterstories.
5. Discussion & Conclusion

The purpose of this study was to explore the lived experiences that inform Black secondary science teachers’ positional identities and how they position themselves in their school contexts. In Chapter 4, I shared the counterstories of six Black secondary science teachers’ narrative constructions of their positional identities. Counterstories contribute stories about Black science teachers different from the stock stories already in the cannon (L. Bell, 2010; Solórzano & Yosso, 2002; Yosso, 2006). Beyond being a counterpoint to stock stories from the dominant, mainstream spaces of science education that tend to overwhelm and silence those pushed into the margins, these are stories of resistance and transformation that add vital knowledge to the science education research cannon on how to dismantle inequitable, oppressive science education spaces and create equitable and liberated spaces. These counterstories consisted of the narrative knowledge co-constructed by each teacher and me in the interactional narrative analysis process that happen throughout all of our conversations. Conveyed through the stories were both of our voices. My voice shaped the stories by editing for clarity and contextualizing the conversations and meanings, but at the forefront and center of the counterstories were the voices of the teachers in form of direct quotes from our conversations.

Steering this research were the following research questions:

1. What lived experiences inform Black secondary science teachers’ positional identities?
2. How do Black secondary science teachers position themselves in their school contexts?

This chapter provides answers to these questions. I first explain and discuss the lived experiences of Black secondary science teachers that informed their positional identities. Then, I explain and
discuss how Black secondary science teachers position themselves in their school contexts.

Finally, I close by reviewing the research, policy and practical implications of this study.

**The Lived Experiences of Black Secondary Science Teachers**

Throughout the counterstories were descriptions of various lived experiences spanning several states, various science learning contexts, and schools – the Black secondary science teachers represented in this study provided a tiny slice of the variety of experiences and positional identities represented in the African diaspora here in the U.S. alone. However, two thematic elements about the lived experiences informing their positional identities emerged from the six counterstories. First, the teachers journeyed to become scientists in one form or another, and second, the teachers observed forms of racial discrimination in their schools.

**Becoming Scientists**

All of the Black secondary science teachers in this study went into to college become scientists – medical doctors, nurses, chemists, athletic trainers, pharmacist, just to name a few of the original career options of the teachers named. Every teacher in this study majored in something science-related. Figure 5 shows a list of the teachers’ college majors and positional identities.

<table>
<thead>
<tr>
<th>College Major</th>
<th>Viola</th>
<th>Laurence</th>
<th>Angela</th>
<th>Regina</th>
<th>Michael</th>
<th>Daniel</th>
</tr>
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<tbody>
<tr>
<td><strong>Conceived</strong></td>
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<tr>
<td><strong>Positional Identities</strong></td>
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<tr>
<td>Acutely aware of social positioning</td>
<td>Innate student</td>
<td>Ave at odds with the public education system</td>
<td>Gate-opener</td>
<td>Black male role model</td>
<td>Pragmatic</td>
<td></td>
</tr>
<tr>
<td>Multi-hyphenate</td>
<td>Otherfather</td>
<td>Warm-demander</td>
<td>Passed along</td>
<td>Structured teacher</td>
<td>Suspicious of inequities at his school</td>
<td></td>
</tr>
<tr>
<td>Culturally relevant pedagogue</td>
<td>Humanizing science teacher</td>
<td>Warm-demander</td>
<td>Insider advocate for Black kids' education</td>
<td>Increasing awareness of how Black kids experience public education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Othermother</td>
<td>Community-oriented</td>
<td>Driven toward personal success</td>
<td>Challenging teacher</td>
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*Figure 5. List of the teachers’ college majors and positional identities*
With the exception of Laurence, all of the other teachers did not receive undergraduate degrees in education. Rather, they were educated to be scientists, which is what some of them did initially after they graduated from college. Viola, Angela, and Daniel worked as chemists before becoming science teachers. While all of the teachers majored in something science-related – and most of them were educated to be scientists – their journeys towards science differed. However, there were still commonalities within these journeys. The science learning contexts (SLCs) – or formal or informal learning spaces where science learning and engagement is happening or is supposed to be happening – the Black secondary science teachers experienced through the journeys could be divided into two categories: facilitative and antagonistic science learning contexts (Erickson & Schultz, 1997).

Becoming a scientist within facilitative science learning contexts. I defined facilitative SLCs as safe, encouraging learning contexts for the teachers of this study to learn science within and to engage in scientific practices. The facilitative SLCs of their past positively encouraged science learning and engagement for the teachers while they were in their formative years. For example, Viola had science teachers who encouraged her sense of inquiry and exploration. As she described them, “These ladies and gentlemen let us learn. We messed up. We blew stuff up. We crashed things. We broke things. We burned the lab on fire or whatever. Everything was a teachable moment.” (Viola, Interview 1). Much like the “remembered teachers” of Stanford’s (1998) study of teachers who inspired and influenced current Black teachers, Viola’s science teachers showed her that scientific inquiry and knowledge were actively done and created, rather than developed from just reading and studying science textbooks. Relatedly, she described her own science teaching philosophy as grounded in the type of inquiry and engagement she experienced as child. Lortie (1975) described the apprenticeship of observation framework,
which explains a phenomenon influencing many teachers who come into the profession thinking that they understand theory and praxis, because they were once students in K-12 classroom. Typically, this framework comes up in discussion of why classroom-based reform fails and why out-of-fashion pedagogical frameworks and practices persist despite newer research. However, Smagorinsky and Barnes (2014) concluded that the apprenticeship of observation model can be used to explain why some teachers enter into the profession using research-supported pedagogies and practices with minimal to no education about them – they simply experienced good teaching prior to becoming teachers. Indeed, this helps to explain why Viola – who came into teaching as a second career and was hired as a science teacher prior to receiving her teaching certification – reproduced the pedagogical frameworks and practices of her remembered teachers.

Viola also experienced an *everyday science learning setting* in non-school spaces that were also facilitative SLCs. *Everyday science learning settings* – a type of informal SLC – is described as “not really a single setting at all – it is constellation of everyday activities and routines through which people often learning things related to science…Science learning is simply woven into the fabric of everyday activities or problems.” (National Research Council, 2009, p. 93). For Viola, this everyday science learning setting was her home – her and her family manually designed and built their energy-efficient home long before these types of homes became popular and widely available. Her dad was an avid popular science magazine collector, and she was encouraged to read them alongside him. She also camped and hunted with her family. As Viola described how she was brought up, “Science came naturally to me.” (Viola, Interview 1). As an informal SLC, her home did not have official science learning goals and objectives to meet, yet in her own home, Viola engaged in all six of the science learning strands described by the National Research Council (2009): 1) developing an interest in science; 2)
understanding scientific knowledge; 3) engaging in scientific reasoning; 4) reflecting on science; 5) engaging in scientific practices; 6) identifying with the scientific enterprise. Additionally, she not only engaged in all six of the science learning strands, she did so in an environment that supported and nurtured her love of science and affirmed her personhood that included her racial and gender identities.

Because Viola had positive, affirmational contexts in which to learn and engage in science, many of her positional identities can be described as *liberated positional identities*. These liberated positional identities are grounded in freedom from racist, gendered, and classist notions about Black people and science typically found in stock stories and creating newer, transformative stories of freedom (Atwater, Lance, Woodard, & Johnson, 2013; King & Pringle, 2018; Mutegi, 2011, 2013). For example, Viola constructed the positional identity of being acutely aware of social positioning. This positional identity is located closest to the facilitative SLCs of her past, such as her own home as a kid and her experiences as a chemistry student at an HBCU. All of these facilitative SLCs – both formal and informal – reinforced the positive notions of young Black girls as learners and doers of science, and accordingly, she became a Black woman who is a scientist. Even though she did eventually find herself in a few SLCs that were the opposite to the facilitative SLCs of her developmental years, the influence of the facilitative SLCs had done their job – no matter how anti-Black or anti-woman the SLC was, she maintained her freedom in being very much aware of how mainstream views of Black women and science would position her and of how *she* actually positions herself as an accomplished Black woman scientist and science teacher.

**Becoming a scientist within antagonistic science learning contexts.** I defined the second type of SLC experienced by the Black secondary science teachers of this study –


antagonistic SLCs – as discouraging, marginalizing, and in the most severe contexts, oppressive learning contexts for the teachers to supposedly learn and engage in scientific practices. Antagonistic SLCs work in direct contrast with facilitative SLCs. Figure 6 shows a model comparing the two SLCs.

![Figure 6. Comparison of facilitative SLCs versus antagonistic SLCs](image)

The antagonistic SLCs varied across the counterstories – some were blatantly antagonistic (e.g., Laurence’s Staten Island neighborhood and Viola’s graduate school laboratory) – but far more of the SLCs of their past were insidiously antagonistic, meaning that the negative influence on science learning and engagement was not readily apparent until after they left these SLCs and reflected upon them later on.

For example, Regina realized that most of her high school science SLCs were antagonistic once she went to college. After failing a science placement test at her college, she realized her grades were mostly a reflection of her behavior and compliance. Many Black
students, particularly those in high schools serving mostly Black and/or Latinx students, find themselves in similar situations of earning good grades that reflect their compliance with school authorities rather than their scientific knowledge (Wade-Jaimes & Schwartz, 2018). In reality, these Black students are in science classes taught at a lower level of rigor with outdated teaching practices that do not promote higher-level science learning and engagement that increases the chances of accessing and succeeding in postsecondary science learning opportunities (Atwater, 2000; Banilower et al., 2018; Oakes et al., 1990). As Oakes et al. (1990) reported:

To the extent that they are enrolled in secondary schools where they are the majority, low-income students, African-Americans, and Hispanics have less extensive and less-demanding science and mathematics programs available to them, and they have considerably fewer opportunities to take the critical gatekeeping courses that prepare them to pursue science and mathematics study after high school. This disadvantage is compounded by difference in students’ opportunities within schools. Students who are thought to be of low ability are far less likely to be placed in traditional academic courses than are students judged to be more capable. (pp. 44-45).

If Regina was not considered as one of the “good” students, it is likely that Regina would have had an even more difficult time in her science courses at the beginning of her college career. These types of science courses are antagonistic, because they marginalize Black students by failing to provide them with the adequately rigorous and engaging science learning experiences necessary to allow them future access into postsecondary science learning spaces.

Laurence, Angela, and Michael also told stories of similar antagonistic SLCs that underprepared them for the challenges of postsecondary science learning contexts. For Laurence, it was a specialized vocational, health-science themed high school. Even though historically,
vocational schools are associated with less rigorous courses, a health-science themed school should have at least provided more rigor than the average vocational school, because even nursing and nursing assistant programs have demanding science requirements (Oakes, 1987, 1992, 1995). Magnet science programs tend to be better resourced in terms of staff and physical materials available to them compared to specialized vocational schools. In light of this, it becomes easier to understand why a health-science theme school could only provide antagonistic SLCs for their students to learn health sciences in – the resources (i.e., certified science teachers and science equipment) were not as readily available to them. Research suggests this inequitable resourcing extends to the number of higher-level science and mathematics courses available to Black and Latinx students as well (Banilower et al., 2018; Oakes et al., 1990).

The Black secondary science teachers in this study clearly overcame any antagonistic SLCs they faced – most graduated with bachelor’s degrees in a science-field and some even worked in industry as scientists before becoming secondary science teachers. However, the positional identities some constructed reflect the influence of the antagonistic SLCs that they lived through to become scientists. These positional identities constructed around antagonistic SLCs are what can be described as *oppositional positional identities*. These oppositional positional identities are grounded in countering and resisting the stock stories of Black people and science – namely that they are not interested in science, not capable of doing science at high levels, and not deserving of high-level science learning and future opportunities in science.

For example, Angela constructed the positional identity of being at odds with the public education system, which consists of three sub-identities – two of which reflected her frustrations with systemic inequities affecting kids and with specific perpetrators of these systemic inequities. Similar to Regina, Angela came from a predominantly Black high school that left her
underprepared for the rigors of college, even though she persevered and eventually succeeded in graduating with a chemistry degree. However, the antagonistic SLCs of her past are reflected in frustrations. She wanted her students of her high school – one that serves predominantly Black and Latinx students – to have access to high quality science classes, but many of her colleagues openly espoused their beliefs that their students could not learn science or were not interested in learning science. These beliefs – that students of color are not as capable of learning science at high levels or do not care to learn science at these levels – are unfortunately common and are reflected in how many students of color are tracked into lower-level secondary science courses and in how many more go unrecommended for science magnet programs when they are available (Atwater, Lance, et al., 2013; Banilower et al., 2018; Bryan & Atwater, 2002; Prime & Miranda, 2006; Xie, Fang, & Shauman, 2015). For Angela, her positional identity of being at odds with the public system is a form of resisting against the stock narratives of her students as incapable and uninterested in learning science as she was once a student – like her current ones – in antagonistic SLCs reflecting discriminatory low expectations of Black students and the resulting lack of resourcing and care put into developing and providing high-quality science learning experiences. Angela positioned herself as a fighter and advocate on behalf of her students against stock stories, but like all fighters in bouts that seemingly continue on forever, she gets frustrated and tired, then fights back harder so that she can finally get some rest.

**Becoming a scientist historically Black colleges/universities.** Any discussion of facilitative and antagonistic SLCs in the context of this study would be incomplete without discussing the roles of HBCUs in helping many of the teachers in the study become scientists. Half of the Black secondary science teachers in this study – Viola, Angela, and Regina – attended an HBCU. Even more, all three Black women graduated with baccalaureate degrees in
chemistry from their respective HBCUs – which is actually not surprising, according to literature. HBCUs came into existence during a time when Black people were openly denied access to an education strictly because of their Blackness (Lloyd-Jones, Jean-Marie, Frierson, & Tate, 2011). These campuses became safe, supportive places where Black people could be educated by mostly Black faculty and staff and be around other Black students seeking to further their education. Though HBCUs only account for about 3% of baccalaureate degree awarding institutions, in 2016, 15% of Black students earning baccalaureate degrees in science or engineering, received their degrees from an HBCU (National Science Foundation & National Center for Science and Engineering Statistics, 2019).

Though expanding STEM options for people of color at predominantly White institutions (PWI) have decreased the number of STEM graduates from HBCUs, they remain instrumental to graduating Black students with STEM bachelor degrees in addition to preparing them for graduate-level STEM studies and awarding Black students a significant percentage of STEM doctorate degrees (Owens, Shelton, Bloom, & Cavil, 2012). Part of the reason why HBCUs have remained instrumental in the post-secondary education of Black students over several generations is the community-like nature of HBCU campus. For example, in a study exploring the structural supports that exist at HBCUs, Garrett, Li, and Carter (2017) found that a common strength noted across undergraduates, graduates, and faculty interviewed for the study was the community feel of HBCU environments that supports Black students as they are away from their home communities:

The data indicate the importance to students of a multi-faceted network of supportive connections that includes organizations, field of study cohorts, upperclassmen, faculty members, and staff. The “honest car[ing]” present at HBCUs that was expressed by one
staff member was also supported by other comments indicating the extra time faculty spent with students. Time spent expressing concern and listening to students can be a way that faculty and staff members gain awareness of influences in Black students’ lives and help Black students feel a connection to the campus community. (pp. 101-102).

This suggests that HBCUs may provide culturally-specific types of structural supports that helps Black students persevere through difficult STEM programs. Viola sends her youngest, middle school-aged daughter to some of the same summer STEM programs she attended at an HBCU in Louisiana, because she felt they helped her daughter build capacity as a young Black girl doing science on a campus of other young Black academics. Regina noted that she specifically chose a small HBCU in the southern part of the U.S., because of its smaller, community feel. Angela did not specifically choose to go to an HBCU. However, her HBCU offered a full scholarship to attend as the valedictorian of her inner-city high school, and no other school in her area – a large, metropolitan area with at least two prominent PWI universities – offered her a scholarship.

**Observing Racism Against Students of Color**

Many of the Black secondary science teachers in this study shared stories of observing racial discrimination against students of color throughout their careers. Some were able to call – or at least describe – these instances for what they were: racism. Viola knew that the student council leadership team consisting of all White students even though the student body was predominantly Black and Latinx was a clear case of racial discrimination. (Tatum, 2017). Angela understood that White coaches threatening to endanger college athletic scholarships for kids of color having harmless fun on a senior theme day was clear-as-day racism within the need to control and surveil Black and Latinx children’s bodies (Payne, 2008). While he did not call it racism, Daniel could identify tracking – which is often racist in its application – that put many
Black students in his former school in lower-level classes or general classes while White students took AP courses (Oakes, 1986).

Other cases of racial discrimination that the teachers observed were more subtle yet just as racist to the discerning eye. For example, many of the teachers shared multiple stories of working with colleagues and administrators expecting little of their Black and Latinx students and therefore, demanding little of them academically. On the surface, this may not seem as if this is racism, however, this type of racism often goes unmissed, because it happens under the guise of “being nice” or “being sympathetic” (Love, 2019). Nieto (2008) explained this why these low expectations are racist:

teachers can participate in practices of racism – that is, practices that deny students of color equal opportunities along racial lines – even when they think they are individually being “nice,” … “nice” educators sometimes convey, even unwittingly, a deep disdain and disrespect for families by suggesting that home cultural values have no place in school. I have seen numerous cases in which “nice” teachers expected less of their students of color, believing that by refusing to place the same rigorous demands on their students of color as they do on White students, there were making accommodations for the students’ difficult home life, poverty, or lack of English-language proficiency. Such “accommodation” may unintentionally give students the message that teachers believe these students are incapable of learning. (p. 29).

Low expectations are signals to Black and Latinx students that their teachers – and the system they worked within – have no faith in them and their prospects, and unfortunately, these low expectations often become fulfilled prophecies.
More specific to science, many of the teachers observed their science teaching colleagues rely on textbook-based assignments and strategies that promoted rote memorization of science concepts as opposed to engaging their students in inquiry, and often, when they challenged their colleagues about these decisions, they were met with resistance. Much of this resistance was grounded in the “they can’t do it” arguments – which is something that even Regina fought with amongst a staff that was mostly Black. Ong (2008) postulated that many of these “they can’t do it” arguments are grounded in racist tracking policies that are based in both standardized test scores and teachers’ own personal biases and expectations of kids of color – scores that are even slightly lower than a White student’s along with stock stories of kids of color as incapable and hard-to-teach are enough to drastically lower the chances of kids of color going into a STEM program in college. Ong made the following recommendation – which would fly in the face of “they can’t do it” arguments:

Teachers can take antiracist steps in their classrooms to promote more STEM workers.

The first charge of the teacher is to cultivate passion in science and mathematics.

Students, regardless of their ethnicity or race, must love science and math if they are going to pursue it. Unfortunately, relative to white students, students of color do not receive the same levels of encouragement, inspiration, and exposure to STEM… (p. 115)

Racism within science education largely exist in the lack of exposure to high-level STEM learning opportunities, even when the classes are offered at the secondary level – which is what many of the teachers of this study observed happening to the Black and Latinx students in their own school environments.
How Black Secondary Science Teachers Position Themselves in Their Schools

Throughout the counterstories of their positional identities were descriptions of how they positioned themselves in their school communities – or the roles and identities they embodied in and around their roles. Once again, they described a variety of positionings, yet there were commonalities within these positionings that emerged as themes. Two thematic elements emerged from how the Black secondary science teachers positioned themselves in their schools. First, they positioned themselves as specifically teachers of students of color – especially for the most vulnerable within these groups. Second, they positioned themselves as caregivers to students of color to serve their holistic needs.

Positioned as Teachers of Students of Color

All of the Black secondary science teachers in this study work in either middle or high schools that serve predominantly Black and Latinx kids. Figure 7 shows the percentages of Black and Latinx students by the teachers’ current schools. Many of the teachers expressed their dedication to teaching students of color. Viola, the most experienced teachers of group – explained how her roots in New Orleans made her appreciate working in environments with various students of color and noted that all of the schools that she had worked in over her 25-year career served predominantly kids of color. Regina discussed her affinity for teaching science to students of color. She mentioned that she turned down an offer to transfer to a wealthy, predominantly White high school on the other side of her district, because she realized that many Black teachers within her district tried to do so – leaving students of color behind in

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Regina</td>
<td>99.2 %</td>
</tr>
<tr>
<td>Laurence</td>
<td>87.6 %</td>
</tr>
<tr>
<td>Viola</td>
<td>86.6 %</td>
</tr>
<tr>
<td>Michael</td>
<td>76.8 %</td>
</tr>
<tr>
<td>Angela</td>
<td>76.4 %</td>
</tr>
<tr>
<td>Daniel</td>
<td>69.8 %</td>
</tr>
</tbody>
</table>

*Figure 7. Percentage of Black and Latinx served at the teachers’ current schools*
the process of doing so. Laurence has never worked at school that did not predominantly serve Black and Latinx kids, and his positional identity as a “kid-centered teacher” has never wavered amongst those schools.

This positioning among Black teachers as specifically teachers of students of color is not unusual and is grounded in literature that covers historical roots as far back as before the Brown decision. Recall that Black teachers pre-Brown were described as community-oriented advocates for Black children in segregated schools dedicated to their racial and social uplift (Walker, 2000). This orientation of Black teachers towards teaching students of color – acting as their advocates and caretakers – is grounded in African-American philosophies valuing the uplift of the community over the uplift of the individual. In other words, many Black teachers understand that they cannot be free until everyone – including students – are free, and in many cases, the least free of all students are students of color (Perry, Steele, & Hilliard III, 2003). In a contemporary study of teachers working in communities for color, Milner (2010) interviewed a teacher – a middle-aged Black woman – who expressed a version of this sentiment:

In the classroom and during interviews, [Ms. Shaw] reflected often on her own experiences as a student and teacher pre-desegregation, and she discussed how her mindset had been shaped by the “Black community.” She explained that “Black culture” had fostered a sense of community commitment, and she was taught that she should use her increasing individual influence and success in ways that contributed to society. (pp. 134-135).

Similar to Ms. Shaw, many of the teachers in this study expressed a similar sentiment of feeling committed to working in communities of color to pour back into the community what was once pour into them as they came up as young scientists and eventually, science teachers.
Additionally, many of the teachers positioned themselves as teachers of students of color above and beyond this calling – teaching the most vulnerable of these groups.

In addition to positioning themselves as teachers of students of color, some of the teachers also position themselves as teaching the vulnerable students within these groups – or students with exceptionalities or students who are English language learners. Literature suggests that students with exceptionalities and students who are learning English are typically tracked into the lowest-level classes available in secondary schools, which also means they tend to get the least experienced teachers and the least rigorous instruction (Oakes, 1986, 1987; Oakes et al., 1990). Additionally, students of color are labeled as needing special education services at a higher rate than their White peers, therefore reducing their chances of getting access to high-quality science education. Only decades ago, many students in these groups were denied access to secondary science courses beyond basic requirements all together, which is why it is important that there are qualified and willing science teachers available to them.

For example, Viola purposefully declined to get certified to teach gifted classes, because “Gifted kids don’t need me, in my opinion, so I got ESOL endorsed,” (Viola, Interview 1). Viola understood that someone with her qualifications and expertise would be best applied to teaching students who are largely underserved in science education and allowing them to benefit from receiving high-level science learning experience tailored to their needs. Laurence prided his abilities to reach and teach students with exceptionalities and English language learners in an environment that labeled these children as the “baddest”. Angela also took great pride and care in teaching the “trailer” chemistry class – or science classes literally placed in trailers outside of the main school building for students repeating the course. The Black secondary science
teachers of this study are all highly qualified and educated science teachers, and they choose to pour their knowledge and talents into the groups of children who need it the most.

**Positioned as Caregivers to Students of Color**

The Black secondary science teachers of this study all positioned themselves relative to caregiver roles for students of color. There are several concepts of *care* in education research literature. One of most popular frameworks – and also one of the most basic – is Noddings’ (2005) care theory. Noddings (2005) described a *caring relation* as a connection between a caregiver and a recipient where both parties are active participants in the transaction – recipients have their needs attended to and the caregiver’s engrossment in attending to these needs is acknowledged by the recipients. For example, Laurence positioned himself within this traditional framework of care. Laurence positioned himself as a *kid-centered teacher*. He sees his role as a provider for his students’ emotional and social needs, just as he literally provides for the needs of his biological children.

This conceptualization of care fits the roles that the teachers of this study positioned themselves in. However, their caregiver roles are also more culturally specific than what Noddings’ refers to as care in two main ways. First, the caregiver roles the teachers positioned themselves as are more familial and community-oriented in ways specific to African-American philosophies and epistemologies. Second, the caregiver roles they positioned themselves go above and beyond their science content teacher roles – they take on extracurricular roles inside and outside the school to tend to the needs of students of color holistically.

**Familial caregiver roles.** All of the teachers in this study positioned themselves in caregiver roles. These roles did not look the same for all of the teachers. In fact, the three most senior teachers (Viola, Laurence, and Angela) positioned themselves in more maternal/paternal-
like caregiver roles. For example, Viola positioned herself as an othermother – or a woman who supports birthmothers by sharing motherly responsibilities with them (Collins, 2000). She told a story in which she literally stands between her students and another teacher threatening them and declares them as “mine.” Black Feminist Thought (BFT) helps explain othermotherhood. BFT encompasses the sets of knowledge Black women possess and deploy in opposition to historical and contemporary oppressive and marginalizing forces upon their personhood (Collins, 2000). As Collins (200) explained of this body of knowledge:

As mother, othermothers, teachers and churchwomen in essentially all-Black rural communities and urban neighborhoods, U.S. Black women participated in constructing and reconstructing these oppositional knowledges. Through the lived experience gained within their extended families and communities, individual African-American women fashioned their own ideas about the meaning of Black womanhood. When these ideas found collective expression, Black women’s self-definitions enabled them to refashion African-influenced concepts of self and community. (p. 13).

In accordance with BFT, these refashioned concepts of self and community are reflected in how Black women teachers position themselves as caregivers in a manner different than the mainstream view. Viola’s conception of being a caregiver for her children of color is standing in the gap for their mothers – either birthmothers or their guardian othermothers – during the school day or out in the community when they are not presented during the moment.

Also steeped in epistemologies of BFT is Angela’s positioning as a Black warm-demander. This more culturally-specific warm-demander – steeped in the traditions of African–American pedagogy – also grounds their work and thinking in the concepts of “othermotherhood”, though warm-demander pedagogy also is steeped in the BFT’s ethic of care.
(Collins, 2000; Ware, 2002, 2006). The ethic of caring within BFT is an epistemological foundation for how Black women know the world and develop meaning within the world. There are three crucial components to this ethic – personal expressiveness, emotions, and empathy. As J. J. Irvine (2003) described of “warm demanders” steeped in this ethic of care:

These “warm demanders” are caring, competent educators whose public “take no prisoners” demeanor may lead some to conclude incorrectly that such teachers do not care about their students. It has been my experience that naïve classroom observers and evaluators often misinterpret the caring in what appears on the surface to be rather harsh disciplinary tactics. (p. 43).

As an authority figure and caregiver within the warm-demanding pedagogical framework, Angela certainly expressed and displayed all three components regularly. Angela spoke firmly, clearly, and pragmatically about what the true purpose of schooling for students of color is – to survive it and leave with the ability to thrive outside of the confines of public schools (Love, 2019). Rather than providing the coddling from the dominant perspective of care, Angela provided tough love – like that of an othermother – to demonstrate her dedication to guiding her students of color through the hostilities of school.

BFT also helps in understanding Regina’s positioning as caregiver. Though Regina’s positioning as a caregiver was not as maternal as Viola’s and Angela’s, her positioning as a caregiver was more sisterly – as a closer contemporary, she could relate to what her students experienced, but because she is older, she can provide guidance and context for what they are going through to help them avoid some of what she did. As a gate-opener for her students, Regina showed them “tough love” – tough in helping them truly learn something about chemistry yet love in the intention and action. This ethic of care in the tradition of the community-oriented
roles of Black women explains how her refusal to open a gate until her students are ready is actually an act of care – failing grades to her do not mean that the student is a failure. Rather, they need more time to grow before moving forward in their journeys. Stock stories would portray warm-demanders in similar positionings as Angela and Regina as dispassionate task-masters or as overly harsh and critical teachers. However, concealed stories about these teachers reveal that these “task-masters” are working to ensure their students learn science up to their high standards and the “critical” teachers are holding students accountable for their learning and actions.

As indicated by the phraseology of Black Feminist Thought, its attention and focus are on theorizing the worlds of Black women from the perspectives of Black women, which intrinsically excludes Black men. However, the perspectives of Black women can be extrapolated onto theoretical frameworks grounded in the work of Black teachers that can – and do – include the work of Black men teachers. Culturally relevant pedagogy (CRP) and all its remixes (including warm-demander pedagogy) and other theoretical frameworks centering the thoughts and work of Black teachers – such as Black teachers as cultural translators (J. J. Irvine, 1990) and African American Pedagogical Excellence (Acosta et al., 2018) – owe their genesis to the work of Black women educators. That said, these frameworks can apply to Black men as well. For example, Michael’s positional identity as a Black male role model and mentor looking after and guiding Black boys through school aligns to the general concept of the fair but critical teacher, and it also connects to a more culturally-specific brand of warm-demander. This culturally-specific warm-demander, grounded firmly in the pedagogies of Black teachers, understands the culturally and racially specific needs of their students – which Michael is attending to with his Black boys as a big-brotherly role model for his boys to look up to. Foster
(2001) found that Black culturally relevant pedagogues displayed a cultural solidarity with their students that allowed them to empathize with the experiences of their students and then use this empathy to encourage and advocate for them, and in a sense, Michael displayed cultural solidarity with his young Black boys by being there for them as a role model and mentor.

**Extracurricular Roles.** All of the teachers in this study did more than just their science teacher roles – they worked after hours in, around, or tangentially to their schools to continue pouring into the lives of students of color. For example, Viola is a school-based curriculum leader for the district-level science offices. She does this, in part, to ensure that teachers and students from Title I schools in her district had a voice in the decisions that were made at the district-level, which is still very White relative to the student and teacher population in the district. Angela also serves on many district-level science committees – often, alongside Viola – for similar reasons as Viola. Regina runs a tutorial center in her community, and also, is an adjunct chemistry teacher at a local community college serving mostly students of color. Before his own biological children were born, Laurence used to coach basketball for his community’s youth league, and Daniel coached some of his track and field athletes to state championships last year. Michael also coached youth football before having to give it up to focus on his doctoral studies, which are currently focused on Black male science teachers. As the current body of general education research suggest of other Black teachers, the Black teachers of this study understood that – within the current structure of public school – even with them doing their best to engage their students in high-level science learning, they would not be doing enough to holistically meet the needs of the students of color they teach (Stanford, 1997, 1998). Therefore, they did more than their science teaching roles. They write curriculum to improve it to meet the needs of all the students across the district, but especially for students to color to access it; pour
their scientific knowledge and teaching skills back into the community; and mentor and coach young, talented kids of color on how to be scholar-athletes, who are talented on the field and in the classroom.

**Implications**

In the last sections, I described and explained the findings of the study – specifically the lived experiences of the Black secondary science teachers and how they positioned themselves in their schools. In this section, I discuss the implications of these findings in relation to what should be done in research and what should be done in practice.

**Research Implications**

**Facilitative science learning contexts deserve more of science education researchers’ attention.** Antagonistic science learning contexts are nothing new (Atwater, 2000; Atwater, Butler, et al., 2013; Carlone & Johnson, 2007; Johnson, Brown, Carlone, & Cuevas, 2011; Mutegi, 2011; Parsons, 2008, 2014; Parsons & Mensah, 2010). Many stories of resilience and persistence from Black science and STEM students and professionals – including fellow science education researchers – are grounded in fighting back against antagonistic science learning contexts and the people maintaining these toxic spaces. While these stories are important, the body of science education research would do well to explore facilitative SLCs, because they are far and few between – and they should not be. If those who care about science education research and the rut its stuck in by chasing magic reform standards and addendums within them, they should be interested in the spaces where marginalized voices and perspectives are nurtured and how to create and sustain more of these supportive incubators of new knowledges. Future investigations in facilitative SLCs should include both formal and informal science learning environments. Facilitative, formal science learning environments are important,
because of the amount of time Black students spend in them and in access that can be granted into other formal science learning environments based on their success in K-12 formal science learning spaces. Less intuitive are explorations into facilitative, informal science learning spaces. As Philip and Azevedo (2017) explained about the important of investigating facilitative SLCs that are also informal science learning spaces:

Only recently have researchers begun investigating science learning in spaces such as the home, collective hobby practice, visits to doctors, do-it-yourself venues, neighborhood associations, and community organizing in ways that honor the ideological and epistemological diversity of the participants. This has left the field with a very partial understanding of equity across the full range of out-of-school science practices – settings that might give rise to new discourses of equity and novel insights into how these sites operate as terrains of contestation with potential for societal transformation. (pp. 529-530).

Overall, science education has only a partial understanding of what Black science education looks like as a small portion of what science education looks like for kids of color across the U.S., and because we do not really know what it looks like, we also do not really understand what it could be – which is why exploring facilitative SLCs in which Black kids develop as scientists is critical towards developing the next generation of scientists and science teachers as a much more diverse and inclusive group than the last few generations.

**HBCUs – as science learning contexts – also deserve more attention from science education researchers.** HBCUs have a long, well-established record of excellence when it comes to educating and graduating young Black people, in addition to whoever else wants to enjoy the culturally-specific yet inclusive college communities maintained on HBCU campuses.
Much is said about the “leaky” pipeline into STEM for women and people of color but the success stories of people of color and women making it through the pipeline *emotionally and psychological intact* are few and far between (Carlone & Johnson, 2007; Johnson et al., 2011). For the same reasons facilitative SLCs should be paid more attention, HBCUs also need the same attention.

**Science education research needs to explore the specific classroom practices of Black secondary science teachers who position themselves as “teachers of students of color”**. In a similar vein to general education research that looks at the specific practices of culturally relevant teachers or of “warm-demanders”, science education research needs to explore the specific classroom practices of Black secondary science teachers who position themselves as specifically teachers of students of color. Science education researchers talk a lot about inclusive and equitable education, but this inclusivity and equity starts in science classrooms filled with students of color. We already know the STEM pipeline leading from the classroom into industry is leaky to the point of failing to carry anything at all, but we don’t know about the classrooms of people who ground their work as science teachers of color trying to build pipeline out of new material that will actually carry their students into STEM positions.

**Additionally, science education researchers focused on exploring, developing, and modifying science instructional models need to ensure that students of color and teachers of color are represented in their studies.** Walls (2016) found that nature of science research since the late 1960s tended to either: a) not report the race of the participants of the study, or b) recruit mostly White participants in the unusual case that race was reported in the study. About the implications of his results, he mused:
To date, an existing body of science education research clearly has focused on equity specific to populations of color. However, even with these efforts, much work on establishing science education theory that is inclusive of and specific to Black and other persons of color, remains. As a result of this tenet [of CRT, the centrality of experiential knowledge] one might ask themselves questions such as, Was the race of the participants considered in the development of the research questions?; Are all the participants identified by race in this study?; What are the percentage breakdowns of each racial group member taking part in the study? If not, why not?, and, How will the findings from these research questions further the goal of science literacy for all? The research question development phase provides no better place to begin actionable steps toward infusing equity into the overall research study evolution. (p. 1559).

Similar to Walls’ concerns about leaving out the experiences of students and teachers of color from NOS research, I worry about leaving out the experiences of students and teachers of color in research about science instructional models and practice. The average Black and Latinx student in the U.S. is a student in a Title I school that serves predominantly Black and Latinx students that is staffed by a larger-than-the-average percentage of teachers of color – most of whom are likely Black teachers (National Center for Education Statistics, 2019). As Walls (2016) noted, when equity is not the focus of research, it is easy to forget how much knowledge is lost when colorblindness sets in – as example, the degree of cultural specificity of findings from a study can be ascertained rather quickly when the race and ethnicity demographics of the participants are reported. Further, generalizability in quantitative research and confirmability in qualitative research is grounded in detailing the research as much as possible – including who participated in the study and the criteria for choosing them.
As a researcher at a university in a large urban area surrounded by several urban and suburban districts of various sizes and levels of difficulty to work with, I understand that many decisions researchers make when doing research is done out of convenience in regard to time and money. Additionally, many large urban and suburban districts serving large populations of poor students and students of color have a history of being difficult to partner with because of their large, bureaucratic organizational structures that are often also dysfunctional to some degree (Payne, 2008). However, this does not excuse leaving out the voices, perspectives, and experiences of the students and teachers in these hard-to-reach districts, especially when research on effective science instructional models and strategies are likely to be the most beneficial to these schools.

**Practical Implications**

**Schools desperately need to prioritize antiracist work.** Though the words, “post-racial” were thrown around callously after Barack Obama was elected as the first Black president of the U.S., as if one Black leader fixed or could fix centuries-worth of racial subjugation in the U.S., our society is not there yet. Accordingly, our school systems are not either. Racism is alive and is quite healthy in 2019 (Love, 2019). Though racism in schools looked different immediately before and after *Brown*, the same consequences are occurring – Black and Latinx students continue to leave K-12 schooling in positions that lower their chances of attaining the social, economic, and political capital to even maintain a comfortable middle class living. These students continue to suffer from the insidious consequences of surveillance, bodily control, and low academic expectations, because school officials fail to recognize these as symptoms of systemic racism infecting their school communities. Educators who are truly dedicated to eradicating this racism imbedded within our schools and creating restoratively just systems of
education need to learn about antiracist work and prioritize it as much as they would the actual content they teach. Love (2019) explained the impetus behind creating new, antiracist systems of education instead of reforming existing structures:

Education reformers take up space in urban schools offering nothing more than survival tactics to children of color in the form of test-taking skills, acronyms, and character education. The barriers of racism, discrimination, concentrated poverty, and access to college – persistent, structural barriers – cannot be eradicated by tweaking the system or making adjustment. We must struggle together not only to reimagine schools but to build new schools that we are taught to believe are impossible: schools based on intersectional justice; antiracism; love, healing, and joy. (p. 31).

For science educators specifically, Love’s words imply that we need to look beyond merely teaching science content toward: a) ensuring that our contributions to our school communities are antiracist and promote antiracism outside of our classrooms; b) ensuring that our classrooms are antiracist spaces; c) teaching science with full fidelity – letting students do science, not just read about it; and d) teaching science and antiracism at the same time as they are not mutually exclusive content areas.

**Schools need more than just Black teachers teaching science to students with exceptionalities, English language learners, and students struggling in school.** Many of the Black secondary science teachers in this study expressed their pride and joy teaching groups of students that many other teachers do not want to or cannot teach – students with exceptionalities, English language learners, and other students struggling in school. They love their students and teach them at high levels. However, it is worth noting this aligns with the historical treatment of Black teachers as the disciplinarians of integrated schools or the ones who “dealt” with students
with additional needs to have fair access to the curriculum (J. J. Irvine, 1988; R. W. Irvine & Irvine, 1983). Eventually, this treatment led to a decline in the number of Black teachers.

Schools need diverse teaching staffs with diverse perspectives and expertise that can be organized in the quest to reimagine education as truly inclusive, enriching, and equitable. However, this new, reimagining of education cannot happen without re-examining how we treat particular groups of teachers as workhorses existing to take on roles and tasks that other teachers – often times, White teachers – do not want. For example, Angela specifically pointed out that part of her problem with the public education system is with how White teachers at her school go out of their way to avoid teaching lower-level classes that are populated mostly with students with exceptionalities and English language learners. To her, it was unfair to the teachers of color in her department, who were also highly educated science teachers wanting an opportunity to stretch themselves as teachers and teach something else like an AP science course. Her main point was that as teachers, it was everyone’s responsibility to reach all groups of students – not particular teachers’ jobs to reach particular groups of students. While J. J. Irvine (2003) explained that many Black teachers serve as cultural translators for students of color because of the high chance of cultural alignment with these students and of parallel lived experiences, she made a point to note that Black teachers should not be the only teachers to make connections with students of color – all teachers are expected to do so (Ladson-Billings, 2009; Milner, 2010).

Closing Thoughts

Though there is a good deal of general education research focusing on Black teachers from their own perspective instead of the stock stories about them, there was little science education research focused on Black science teachers – to the detriment of the field and future science students of color. This study was a small step in filling this science education research
gap. Six Black secondary science teachers co-created their counterstories of their positional identities. The findings from the counterstories suggest that Black secondary science teachers have specific lived experienced in common – namely that they are scientists and science people and that they are very aware of racism that is around them and that affects them and their students. The findings also suggest that these Black secondary science teachers positioned themselves mainly as science teachers to students of color and as caregivers to these same kids within their schools. While this study filled in a gap in the science education research cannon, more work is to be done with Black science teachers and other science teachers of color on behalf of students of color. In addition to being teachers and caregivers to kids of color, these Black secondary science teachers are scientists – with the knowledge, skills, and expertise to back it up – and this unique blend of talents deserves to be shared.
References


http://dx.doi.org/10.1007/s10972-009-9125-z


doi:10.1002/tea.21513


doi:10.1080/13613324.2013.832935


doi:10.3102/0013189X035007003


http://hepg.metapress.com/link.asp?target=contribution&id=P2RJ131485484751


Plessy v. Ferguson, 163 U.S. 537 (1896).


http://dx.doi.org/10.1177/0042085906291924


http://dx.doi.org/10.3102/0013189X13490140


http://dx.doi.org/10.1111/j.1949-8594.2011.00099.x

Appendix A
Recruitment Email

Dear Colleague,

My name is Sonia Howard, and I am a doctoral student working with Dr. Natalie King at Georgia State University in the College of Education and Human Development. I am conducting a research study examining how the positional identities of Black secondary science teachers are connected to their perspectives of science teaching and their perceived science teaching practices. You are invited to participate in the study if you meet the criteria listed below:

- You identify as Black, as a part of the African diaspora, and/or of African descent.
- You are currently employed as a secondary (i.e., grades 6-12) science teacher in [ ].
- You have taught for three or more years as a secondary science teacher.

If you meet these criteria, you are invited to participate in completing a pre-interview questionnaire, three interviews, three transcript reviews, and a final review - all of which will occur between February 2019 and April 2019. The questionnaire is anticipated to take no more than 5 minutes of your voluntary time to complete. Each interview is anticipated to take no more than 90 minutes of your voluntary time. Each transcript review, as well as the final review, is anticipated to take no more than 30 minutes of your voluntary time. The anticipated total amount of voluntary time is no more than 7 hours for this research study.

If you are interested in participating, please click on the link below to complete an online form and indicate your interest. The information provided will only be used to contact you for the purpose of this research.

https://gsu.qualtrics.com/jfe/form/SV_1HV7ljW2HPcbDKZ

You may contact me if you experience any technical difficulties in accessing the form or have any further questions.

Cordially,

Sonia Howard
Doctoral Candidate
Georgia State University
Showard18@students.gsu.edu
Appendix B
Electronic Recruitment Form

Please enter your first name and last name in the form below.

First Name

Last Name

What is your email address?

Email Address

What is the best telephone number to reach you at?

Telephone Number

Do you prefer to be contacted via telephone or email?

☐ Telephone (Please note the best time of day for you to receive a phone call in the box)

☐ Email

Please leave any additional information that you would like us to know in the space provided below.


Appendix C
Informed Consent

Georgia State University
Informed Consent

Title: Positional identities as narratives: Counterstories of Black secondary science teachers and
their science teaching practices
Principal Investigator: Natalie King
Student Principal Investigator: Sonia Howard

Purpose
The purpose of the study is to explore how the positional identities of Black secondary science
teachers is connected to their perceptions of effective science teaching and their science teaching
practices. You are invited to take part in this research study because you identify as Black or are
of African descent, and you have taught secondary science for at least the last three years. A total
of seven people will be invited to take part in this study.

Procedures
If you decide to take part, in a series of three interviews. Prior to the first interview, you will first
complete a pre-interview questionnaire, which should take about 5 minutes to complete. Each
interview will take about one hour and will be scheduled in 2-3 week intervals at your
convenience. In between each interview and after the final interview, you will be sent a profile
with notes and memos from the prior interview for you to review and comment on. The
anticipated total time for your participation is 7 hours over the course of two months.

- Pre-Interview Questionnaire
  o You will only need to complete the questionnaire once.
  o This will require about 5 minutes of your voluntary time.
  o Your responses will be stored on a password protected computer.
  o You can withdraw from this questionnaire at any time.

- Individual Interviews
  o Individually audio-recorded, one-hour interviews will be conducted three times in
two months, scheduled at your convenience.
  o Interviews will take place in one of the following: a) public spaces of your choice
(Georgia State University’s library, a public library, a cafè, or a private room in
the school in which you teach) OR b) via video conferencing.
  o All audio recordings will be stored on password protected computer.
  o You can withdraw from this questionnaire at any time.

- Profile Reviews
  o In between interviews and after the final interview, you are requested to review
and comment on profiles that include notes and memos from previous interview
  o Any electronic communication (e.g., comments on Word documents) will be
stored on a password protected computer.
  o Any paper documents will be stored in a locked cabinet.
  o You can withdraw from these reviews at any time.

Version date: 01/09/19

IRB NUMBER: H19331
IRB APPROVAL DATE: 01/25/2019
Future Research
Researchers will remove information that may identify you and may use your data for future research. If we do this, we will not ask for any additional consent for you.

Risks
In this study, you will not have any more risks than you would in a normal day of life.

Benefits
This study is not designed to benefit you personally. Overall, we hope to gain information about how Black science teachers’ identities inform their perceptions of effective science teaching in comparison to their actual science teaching practices.

Alternative
You have an alternative of not taking part in this study.

Voluntary Participation and Withdrawal
You do not have to be in this study. If you decide to be in the study and change your mind, you have the right to drop out at any time. You may skip questions on the questionnaire and during the interviews or stop participating in the interviews at any time. You may refuse to take part in the study or stop at any time, this will not cause you to lose any benefits to which you are otherwise entitled.

Confidentiality
We will keep your records private to the extent allowed by law. The following people and entities will have access to the information you provide:

- Dr. Natalie King
- GSU Institutional Review Board
- Office for Human Research Protection (OHRP)

We will use pseudonyms rather than your name on study records. The information you provide will be stored on a password- and firewall-protected computer. After transcribing the data, the student PI will develop pseudonyms and remove any personal references to protect your anonymity. A code sheet will be created to keep track of pseudonyms. The transcripts and code sheet will be saved separately and will be stored on a password- and firewall-protected computer. When we present or publish the results of this study, we will not use your name or other information that may identify you.

- All paper materials consisting of your information and data obtained during the interviews will be discarded after five years.
- A digital copy of your audio recordings will be stored on a computer, which is password and firewall-protected. Once they are transcribed, the audio recordings will be destroyed.

Contact Information

Printed Name of Participant
Signature of Participant
Date

Principal Investigator or Researcher Obtaining Consent
Date
Appendix D
Pre-Interview Questions & Semi-structured Interview Protocols

Pre-Interview Questions
- Gender
- How many years have you taught science?
- Which science subject areas have you taught and for how long?
- Current content area(s) and how long have you taught each one?
- How long have you taught at your current location?
- How many schools have you taught for prior to your current location?
  - Please list each schools’ name/location and how long you taught at each.
- Please share any other information you would like me know prior to the interviews.

Interview #1 Protocol – Life History with Science & Education
- Tell me about how you came into teaching as your career choice.
- Tell me about some of your teachers when you were a student.
- Tell me about the schools you went to as a student.
- Tell me about how science classes were for you as a student.
- Tell me what your teaching style is like.
- Tell me about what it’s like teaching for [insert school].
- Tell me about some of your success as a teacher here at [insert school]
- Tell me about some of your challenges as a teacher here at [insert school]

Interview #2 Protocol – Current Life as a Science Teacher
- Tell me about why you chose to teach here at [insert school]
- Tell me about your relationships with the people in the school building: colleagues, administrators, and the students.
- Tell me about how some of your identities play into how you approach teaching.
- Do you see being Black as a privilege?
- Tell me about times when you feel you have power as a teacher.
- Tell me about times when you feel powerless as a teacher.
- Tell me about differences between who you are here at school and who you are in non-school contexts.
- Tell me about similarities between who you are here at school and who you are in non-school contexts.
- How does who you are influence how you teach science?

Interview #3 Protocol – Science Teaching Work
- Tell me about your favorite lesson from any year of your teaching career – what standard(s) did you teach and what happened?
- Tell me about your least favorite lesson from any year of your teaching career – what standard(s) did you teach and what happened?
- Given what you have shared about your teaching style, tell me about how your style has changed over time.
## Appendix E
### Teacher-Informant Information Summary

<table>
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<tr>
<th>Name</th>
<th>Gender</th>
<th>Identification</th>
<th>Years of Experience</th>
<th>College Major</th>
<th>Subject(s) Taught in 2018-19 School Year</th>
<th>Current School</th>
<th>Title I Status</th>
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<td>Viola</td>
<td>Female</td>
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<td>Chemistry</td>
<td>Chemistry</td>
<td>Bates High School</td>
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<td>Chemistry</td>
<td>Truth High School</td>
<td>Y</td>
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<td>Chemistry</td>
<td>Chemistry</td>
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<td></td>
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<td>Life Science (seventh Grade)</td>
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<tr>
<td>Daniel</td>
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<td>Chemistry</td>
<td>Biology</td>
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<td>Environmental Science</td>
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## Appendix F
## 2019 Reported Race/Ethnicity Percentages for Students in Grades 6-12

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<th>Black</th>
<th>Hispanic /Latinx</th>
<th>Asian</th>
<th>Two or More Races</th>
<th>American Indian</th>
<th>Pacific Islander</th>
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<td><strong>Statewide</strong></td>
<td>39.6</td>
<td>36.6</td>
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<td>4.3</td>
<td>3.4</td>
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</tr>
<tr>
<td>Parks-High</td>
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<td>4.9</td>
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<tr>
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<td>3.5</td>
<td>0.1</td>
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### Appendix G

2019 Reported Race/Ethnicity of Teachers
## Table

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<th>Two or More Races</th>
<th>American Indian</th>
<th>Pacific Islander</th>
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</tr>
</tbody>
</table>

**NOTE:** TFI - "too few to include", which means there were 10 or less teachers that reported this race/ethnicity

### Appendix H

Sample of Pattern Coding Across Interviews from Viola Interviews
Appendix I

Sample from Transcript of Interview 2 with Viola
Viola: So yes, I push positive like this. Yes, you can do whatever. Yes, people at county office know me, and yes, they must all call me Dr. [Davis], and I keep it that way, because-- and on that case, the kids don't call me. They call me a little bit of everything. But when you get to that level-- because if you show a little bit of weakness or being timid or anything like that-- so I wouldn't go there and let one of those males call me [Viola]. Now you're comfortable. I don't want you to be comfortable with me. I don't want you to be, because then you get comfortable in the name aspect, then you might start saying some other things or treating me a little differently, whatever, because you feel like—

SH: She's cool. She's down.

Viola: And I'm not.

SH: Right.

Viola: And we're not. And let's just keep it professional. I address you by your title. You address me by my title. If I address you by anything other than your title, then you should know that I'm belittling you. If I call a grown man by his first name in a professional setting, whatever, I'm making a point [laughter]. I have gone out of my way to do that to—

SH: Oh man.

Viola: --get a point across. And you still got to come back and address me by my title. All right? So [laughter]—

SH: Yeah, I'm laughing, because I was in a similar situation, actually, just last week, where someone called me by my first name improperly, and I had to come back at them with their first name several times and email for them to understand that [laughter]—

Viola: We don't do that.

SH: No way. Yeah, this was actually-- it's interesting. This came up on Twitter, Friday. It was old clip of Dr. Angelou being asked a question by a black teenager. She was a young kid. I think she was like 14, 15, and she was like, "I've always loved your work, Maya." [laughter]. And so Mother Maya very calmly -- didn't read her but corrected her and then explained to her why she corrected her like, "No, no, no. I'm 62 years old. I have lived a whole life. I am your mother. I am your aunt. I am your teacher. As a show of respect, Ms. Angelou, not Maya.” And then it was interesting to see the debate around this old clip being shared. I think folks that are about-- the middle to older millennials and up, so that would be around my age and up -- were like, "this young girl was crazy." It would never cross my mind to ever address an adult—

Viola: No. It would never have crossed my mind to address any adult as Maya, by her first name and for the few adults that do call her by her first name, it's Miss Maya or Miss Angelou or Miss whatever. Of course, we're thinking, this is insane. Of course, she got corrected. Of
course, Maya Angelou was fully within her rights to go like, "no, no, no, no, no. No, no, No, no, sweetheart. Miss Angelou."

**SH:** And then you have the younger set. So about, these kids age, the early 20s set and then teenagers like, "I would have corrected her. I would have been like, 'okay, Maya.' She ain't going to tell me what to call her. She out of her mind telling me what to do." And it was—

**Viola:** Oh.

**SH:** -- it was an interesting debate. And then just last week I was talking to a language arts teacher and I had to explain to him why I don't let just anybody call me by my first name.

**Viola:** It's different. And it's a level of respect. My daughter played volleyball in high school. She called her coach—[Jessica] is the coach's first name and she's also in other positions in volleyball around the area. She does reffing She's known.

**SH:** She been around.

**Viola:** She's known. And so my daughter always referred to her as Coach [Jessica]. Coach [Jessica]. So she was hot and bothered at one of the practices when one of the little 14-year-olds was like, "well [Jessica], you need to do da, da, da, da." And the coach didn't correct her, and my daughter was like, "wait a minute." She corrected the child and she did it loud enough where the coach could hear and she explained to the child why you do not address an adult by the first name and you most certainly don't address our head coach by her first name like that. You put a handle—

**SH:** Yeah, put a handle on it.

**Viola:** Put a handle on her name. And the funny part is, when that coach left the next year and her assistant who's younger, became the head coach, she remembered that. She did not let any-- and she was . She didn't let any of those girls call her by her first name. And they were taken aback. I mean, they were just like, "what do you mean we can't call you by your first name?" She didn't even let them call her coach and her first name because her first name was [Samantha]. The one girl who was like, "Well [Samantha], you need to--" When she got through running her 10 laps around that gym, the other ones were like, "oh, this is different." And when somebody called her Coach [Samantha], she ran five laps. And my daughter said, "you mean Coach [Johnson]." And they were like, "oh, new regime. New world order." The caucasian females were very taken aback. They call their parents by their first names so it's just a different mindset.