

DISSERTATION

CONSIDERING RISK, RESPONSIBILITY, AND REWARD: EXPERIENCES OF WOMEN
OF COLOR IN SCIENCE SPEAKING TRUTH TO POWER

Submitted by

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ABSTRACT

CONSIDERING RISK, RESPONSIBILITY, AND REWARD: THE EXPERIENCES OF WOMEN OF COLOR IN SCIENCE SPEAKING TRUTH TO POWER

The purpose of this study was to understand the risks, responsibility, and rewards women of color in the sciences navigate and negotiate when choosing to speak truth to power. The theoretical lenses that guided this work included Critical Race Theory, Critical Feminist Theory, Harding's strong objectivity, and Foucault's analysis of *parrhesia* (speaking truth to power). Employing the *counternarrative*, participants were provided an opportunity to reflect on their intentions, motivations, and behaviors when choosing to be outspoken about oppression in their personal and professional settings. The research questions for this study were: (1) What motivating factors guide women of color in the sciences to choose to speak truth to power? (2) How do women of color in the sciences envision the future of science culture? If speaking truth to power is a game, as Foucault suggests, the study identified five rules that served as a social contract for women of color in science. The emerging rules include: (1) stay true to oneself, (2) avoid ruining it for other women of color, (3) live to die another day, (4) if you must leave, go out on your own terms, and (5) share the map with others. Manipulating relationships and creating boundaries served as strategies that women of color in science uniquely operationalize to achieve their goals.

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When I first started this program, I thought I would have this beautiful leatherbound opus of my work. I have been dreaming of this moment for at least several years now. While the world was at the beginning of a COVID pandemic, I was painting with my then two-year-old godson, Levi. I realized in that moment that this conglomeration of pages is the equivalent of my first preschool macaroni art piece. This study represents my effort in becoming a researcher. It is the embodiment of the ways I have come to question and observe the world around me. I am grateful to the following people who have come on this journey with me.

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DEDICATION

To Evelyn and Benjamin—who taught me to use my voice for justice.

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CONSIDERING RISK, RESPONSIBILITY, AND REWARD: EXPERIENCES OF WOMEN OF COLOR IN SCIENCE SPEAKING TRUTH TO POWER

Chapter 1: Introduction

I stood as one among many, looking up at her. A young Black woman with a rainbow fist on a black shirt stood singularly in front of us. Hair slicked back in a loose bun, letting her tight curls fall where they may, she held the mic to her mouth, then pulled it away. Visibly moved with overwhelming emotion, she searched for the right words to say in that moment. With a nervous laugh, she looked out into the crowd and pulled the mic back up to her lips. A hush blanketed the crowd.

“Wow, y’all. We just did that.”

The crowd answered with a few laughs to calm the nerves.

“Look around, y’all. Look to your left, to your right. See who we are. I see friends. Classmates. I see mentors. Faculty. Allies...” She went on to address the importance of the moment and what the crowd could expect next from the group of young Black women college students who planned this march.

Weeks earlier, a white student shared a picture to her Snapchat story that was later screenshot and shared with a wider audience on the predominantly white campus. In the picture, the white woman and three other white men posed with black face masks and the caption “Wakanda foreva”—a phrase that came to represent Black solidarity from Marvel’s Black Panther film. Having rippled through the local and world-wide waves of social media, the institution’s administration responded with a legal rebuttal that the institution could not reprimand the students involved. Sent in an email to all university affiliates, the First Amendment was weaponized to justify inaction.

A group of upper-division Black women students, moved by this and other racialized incidents on campus, gathered in the Black student cultural center. After days of discussing the incident in mixed groups of faculty, staff, and other students, these women decided to transform their silence into action. They started by addressing the ways the institution touted their brand “Proud to Be” and asked students to share their negative experiences on campus under the hashtag “*Not Proud to Be.*” While the president of the institution made plans to hold a listening session at a student government meeting, they made sure to share the opportunity with Black alumni to ensure generations of Black experiences at the institution were heard. As the institution’s first woman president was to formally address the community for the first time, the Black women staged a silent march through the heavily populated area.

After the march, I stood there watching this young Black woman with a rainbow fist on her black t-shirt stand before hundreds of us. As emotion lumped in her throat, tears welled in my eyes. Memories flashed back to when I first met her on her very first day of college. She signed up to participate in a living and learning community centered on supporting students of color in natural science majors. While watching her address the crowd, I could not help but think that the lessons she learned navigating her racial, gender, and queer identities in a competitive, isolating, weed-out, color-evasive, and heteropatriarchal science culture throughout her educational experiences led her to this moment. As a Puerto Rican woman in higher education administration, I am left wondering if there are ways we can protect students of color from having to risk their educational and professional dreams to create an inclusive and equitable space for themselves and others in the sciences. I hope that by no longer having to focus on their pain, science students of color can be empowered to focus on their respective passions and interests in science.

These negative experiences are not isolated to the college environment. Women of color have been described as “too much,” “too intimidating,” “too opinionated,” “too loud,” “too aggressive,” “too angry,” and “too forceful.” They have seen comments like “doesn’t work well with others” or “doesn’t listen to feedback” on all kinds of evaluations. These are coded racial and gendered microaggressions meant to convey to girls and women of color that they should assimilate to the dominant culture (Sue et al., 2007). Girls and women of color learn early and often that their cultural values and communication styles do not jive with most educational and professional spaces, especially in the science disciplines (Carlone et al, 2014; Carlone & Johnson, 2007; Sue et al., 2007). The competitive, isolating, weed-out, color-evasive, and heteropatriarchal culture of science leads many women of color to fear the repercussions of sticking out amongst their peers for anything other than their science prowess (Carlone et al., 2015; McGee, 2020; Seymour & Hewitt, 1997). Filled with passion for their fields and knowing that they can positively impact their communities and their professional science disciplines, women of color work hard to build relationships with colleagues, create *counterspaces* within classrooms and organizations, and go so far as to change the way they speak and their appearances in order to fit into a science environment (Castro, 2014; Lane, 2016; McGee, 2016, 2018; McGee & Martin, 2011; Ong, 2005; Ong et al., 2018). Those who choose to actively resist the oppressive science culture while still aiming to exist within it have to manage the risks of doing so. Outspoken women of color, but especially Black women, “are looked upon as entities to be contained” and a danger to others if not tamed (Cooper, 2018, p. 3). Women of color want to be recognized for their contributions to the science discipline, and science’s isolation strategies are impacting their ability to do so (Carlone & Johnson, 2007; Carlone et al, 2015). In the midst

of this environment, we should not be surprised that some women of color may be choosing to speak up for themselves and others.

Therefore, advocacy likely comes with inherent risk to themselves and career. Women of color have become adept at situational awareness and adapting stereotype management strategies to navigate relationships, situations, and culture (Carlone et al., 2015; McGee, 2016, 2018; McGee & Martin, 2011; Ong, 2005; Ong et al., 2018). Depending on their own lived experiences and difficulties being recognized as a woman with a salient science identity, women of color will assess risk, define success, and hold responsibility differently from their peers (Carlone et al., 2015; Page-Reeves et al., 2019). This study confirmed these factors play a significant role in whether women of color choose to address incidents that contribute to an oppressive science culture or not.

Recent increases in social activist movements, such as the Movement for Black Lives and March for Our Lives, have led to more mainstream organizations making adjustments and affordances in the name of racial and social justice. With some camps questioning the validity of some scientific claims, science has not been void of its own advocates (Moore, 2008; Otto, 2016; Posselt, 2020). Even before the days Galileo was expelled from the Roman Catholic Church for proposing the Earth was not the center of our Universe, scientists have had to navigate political power structures to further scientific knowledge (Dreger, 2015; Moore, 2008; Otto, 2016). With climate scientists being the recent pariahs of conservative politics, scientists today continue to promote discoveries and advocate for large-scale policy and behavioral changes (Otto, 2016).

Subsequently, a growing number of scientists of all ethnicities and genders are recognizing the need to advocate for changes to the status quo in society and science culture itself (Baber, 2020; Dreger, 2015; Griffin, 2020; Otto, 2016; Posselt, 2020). The current toxic

culture of the sciences not only disproportionately negatively affects women of color, but it also indiscriminately affects everyone negatively (Baber, 2020; Griffin, 2020; Posselt, 2020). While changing a whole culture can seem daunting, some scientists across disciplines are recognizing their sphere of impact and are attempting to make incremental changes to how they welcome and train undergraduate students into research groups, how they advertise and select for graduate students and post-docs, and how they train skillsets related to science communication (Griffin, 2020; Posselt, 2020). Studying inclusive and equitable culture change within graduate science education, Posselt (2020) highlights the importance of cultural translators in these efforts. Cultural translators are individuals who “used the language and sensibilities of the existing culture to communicate and collaborate across boundaries—decoding, valuing, and applying perspectives different from those to which long-standing members [of a culture] had been socialized” (Posselt, 2020, p. 150). It seems that outspoken women of color in the sciences could serve as persuasive cultural translators within the science community and between science and racially marginalized communities. Cultural translators tremendously benefit the science community (Posselt, 2020), but being a truth speaker comes with some risks regardless of intent.

The purpose of this study was to understand the ways outspoken women of color in the sciences negotiate and navigate risk, responsibility, and reward when choosing to speak truth to power. Redefining anti-racist and anti-patriarchal notions of success and purpose for themselves, women of color are finding success in the sciences (Carlone & Johnson, 2007; Page-Reeves et al., 2019). While science education researchers seek to find systemic and policy solutions to diversify the STEM workforce, some women of color in the sciences, like the participants of this study, are challenging the competitive, isolating, color-evasive, and patriarchal culture from the inside (Cannady et al., 2014; Metcalf, 2010; Seymour & Hewitt, 1997). These challenges may

not come without some risk to self or career. This study's objective was to better understand the ways women of color negotiate their intersecting identities, relationships, and career with the responsibilities they hold to themselves and their communities.

In an effort to understand the risks, responsibility, and rewards that women of color in the sciences negotiate, I employed the theoretical perspectives of Standpoint Theory, Critical Race Theory, and Critical Race Feminism, and the conceptual framework of *parrhesia*. Each perspective served as an opportunity to gain a better nuanced understanding of the power structures and systems women of color learn to navigate in their personal and professional lives. Using a Critical Race method of narrative inquiry called the *counternarrative*, I asked participants (women of color in various science disciplines), to reflect on their intentions, motivations, and behaviors when choosing to be outspoken about oppression in their personal and professional settings. The research questions for this study were:

1. What motivating factors guide women of color in the sciences to choose to speak truth to power?
2. How do women of color in the sciences envision the future of science culture?

With the data generated from 13 individual semi-structured interviews, one focus group, and field notes, I offer further insights behind the actions women of color take to carve out a space for themselves within science environments. Using Foucault's analysis of *parrhesia* as a game, I identified five rules participants used to influence their actions. Additionally, I highlighted two popular stereotype management strategies participants used that helped them mitigate risks when speaking truth to power. This study confirmed the lengths that women of color in the sciences will go to before choosing the path of resistance. Privileging the participants' stories amongst a profession that has yet to fully acknowledge or come to terms

with its undercurrent issues of racism and sexism, I aimed to empower more women of color in the sciences to speak truth to power. I hope current and aspiring women scientists of color, regardless of age and experience, will see themselves reflected in this work and realize there are women across science disciplines fighting for each other to use their voice and find their places within the sciences and beyond.

Chapter 2: Literature Review

The numbers are complicated. For at least fifty years, the United States government has attempted to explore the chasm between gender and racial gaps in the science, technology, engineering, and mathematics (STEM) industry. This research has popularized terms, such as “leaky pipelines,” “traditionally underrepresented students,” “underrepresented minorities,” “deficit mindset,” and “chilly climates,” all with the purpose of explaining the numbers. The National Center for Science and Engineering Statistics (2019) compiled a report gathered from data collected over a course of 20 years from the National Science Foundation, National Center for Education Statistics, Census Bureau, and the Bureau of Labor Statistics. While close to half of the science and engineering bachelor’s degrees awarded in 2016 went to women, we have only seen a gradual increase in those degrees going to Black or African American, Hispanic or Latina, American Indian or Alaska Native, and Native Hawaiian or Other Pacific Islander (or traditionally underrepresented) women graduates. The increases have been gradual when compared to the statistics for White women. Hispanic or Latina women have rapidly increased the amount of bachelor’s degrees earned in psychology, social sciences, and biological sciences by 18% from 1996 to 2016. Black or African American women have experienced similar increases in these sciences, but earned bachelor’s degrees in computer science, physical science, and engineering have steadily declined for Black or African American women since 2006. The representation for American Indian and Native Hawaiian populations were too small to glean significant statistical data, which does tell us that there is still much that can be done to create educational environments that are conducive to their academic success in the sciences. Not considered an underrepresented minority in the sciences, Asian women earning a bachelor’s degree has steadily increased in all science disciplines. Even these numbers create a problematic

narrative as many researchers have called for the Asian racial demographic to be disaggregated in order to expose the different racialized experiences of people with familial connections across various Asian-identified ethnicities (Poon et al., 2016; Nguyen et al., 2017).

Women of color are realizing their talents in the sciences. They are choosing science majors. Beating overwhelming odds, they are successfully earning bachelor's degrees (McGee, 2020). Some are continuing in their science education by earning Master's and/or Doctoral degrees (National Center for Science and Engineering Statistics, 2019). While the numbers of women scientists of color choosing a science career have slightly increased over the years, the experience is far more labored and riddled with systemic booby traps than that of their white or male peers (McGee, 2020). About half of underrepresented minorities, inclusive of gender, employed full- or part-time reported working directly with or in a related science and engineering position as compared to 67% of Asian or 54% of white scientists and engineers (National Center for Science and Engineering Statistics, 2019). As the percentage of unemployed white scientists and engineers (2.1%) is far below the national average for unemployment (4.4%), the rate of unemployment for Hispanic or Latino and Black or African American scientists and engineers is overwhelmingly high in comparison (4.6% and 4.3%, respectively) (National Science Foundation, National Center for Science and Engineering Statistics, 2019). These numbers indicate that the demand for scientists and engineers is high, but only white scientists seem to be hired in the majority of positions. While some researchers are asking what more can be done to increase the diversity of race and gender within science and engineering fields, these numbers suggest that we should be asking what is happening with scientists and engineers of color that are *already* in these fields (Bettez et al., 2011; Cannady et al., 2014; McGee, 2020; Metcalf, 2010; Posselt, 2020).

Review of Relevant Literature

By examining the experiences of women of color in science, I propose that we can learn more about the culture and structures that might limit women of color's achievements in the field. In this section, I outline research that is relevant to the ways women of color might navigate these structures. First, I problematize the often-used STEM pipeline metaphor as a poor and limiting concept to understand the connections between educational and professional journeys. Second, I explore the concept of and the various paths toward a salient science identity. Third, I make the argument that the culture of science has made it difficult for women of color to succeed by perpetuating competition, isolation, color-evasive, and patriarchal ideologies in the classroom and beyond. Finally, I list several strategies women of color can choose to employ when attempting to navigate potential risks and negotiate responsibilities on their path to a salient science identity and success in the sciences.

Problematizing the STEM Pipeline

Concerned for declining scientific literacy and economic nationalism with federal government agencies, the National Science Foundation (NSF) continues to aim a tremendous amount of financial resources to identify ways to increase the number of scientists and engineers in the U.S for the past six decades (McGee, 2020; Seymour & Hewitt, 1997). Using supply-side economics, flow modeling, and social engineering as guides, the STEM pipeline model has become popular in the STEM research lexicon. "Depicted as a balance equation, the model describes the linear sequence of steps necessary to become a scientist or engineer and shows the large numbers of scientists and engineers that would be needed to maintain national competitiveness" (Metcalf, 2010, p. 2). Using this model, STEM policy began to focus on increasing the number of people on the supply side of the equation with hopes that it would

increase the number of scientists and engineers in the workforce to little or no avail. With women and people of color notably absent in the STEM workforce, several programs directly aimed at this specific population were started and assessed for efficacy (McGee, 2020; McGee & Robinson, 2020; Posselt, 2020). While there are several moral cases for society to call for equitable education, McGee (2020) addresses the economic benefits of doing so: “[I]f the overall educational achievement of underrepresented students was raised to that of [w]hite students, the [U.S.] economy would increase by \$2.3 trillion by 2050” (p. 5). STEM’s reliance on a color-evasive, White supremacy ideology may inevitably lead the U.S. to its greatest fear—the end of its supremacy in global STEM innovation (McGee, 2020).

Simple and clear in its description, the STEM pipeline metaphor’s use in science education literature is profound. Yet, the STEM pipeline metaphor is problematic in many ways (Basile & Lopez, 2015; Cannady et al., 2014; Metcalf, 2010; Seymour & Hewitt, 1997). In a critical review of literature, Metcalf (2010) suggests that the metaphor leaves many people out for its considerable use in policy making. First, there is too much emphasis on the supply-side of the pipeline. Policy makers desire to increase the number of people going through the pipeline with little to no attention given to the nature of people’s experiences going through it. Second, government surveys and reports have discrepancies on what constitutes a STEM job, unable to provide a full picture of the STEM employment landscape. Additionally, the research using the pipeline metaphor does not account for the non-linear career paths full of exits, stops, and re-entries of a diverse population with STEM interests. Finally, the pipeline metaphor perpetuates a heteronormative and sexist bias on the definition of success with several research studies defining success as a rewarding STEM career with little to no regard of the diversity of family, partnerships, and financial situations of those working toward a STEM career (Metcalf, 2015).

Basile and Lopez (2015) critically examined 17 federal educational policy briefs to determine how they address the inequities that exist for students of color in science education. They found that these policy briefs, though intending to take on a “color-blind, one-size-fits-all approach to access and representation” for students of color in the sciences, actually perpetuated White dominance that students of color are the ones to blame for the inability of the U.S. to compete in the science and technology world arena. Furthermore, they exposed the government’s desire to increase diversity within the STEM pipeline as another form of racial commodification (Bridges, 2002), using people of color for their potential of economic benefits (Basile & Lopez, 2015).

Cannady et al. (2014) continued to problematize the metaphor of the pipeline as an ill-served tool for policy makers and researchers of science. The pipeline metaphor assumes there is only one linear trajectory through a set of academic gatekeepers, inviting questions of “who ‘leaks out’ and who does not, where is the leaking most severe, and how may the flow through each milestone be increased” without scrutinizing the gatekeepers themselves (p. 444). Additionally, the metaphor lacks the acknowledgement that science culture is encompassed by societal norms that “reflect the socialization and learning styles of [w]hite men” (p.447). Instead of the pipeline, Cannady et al. (2014) proposed an alternative metaphor of a pathway model that is more malleable and allows for an exposed scrutiny of systems and processes that might inhibit or alter a path to the STEM workforce.

In one of the first ethnographic, longitudinal studies to assess one of the most common assumptions of leaks in the proposed pipeline model — why students switch out of science majors — Hewitt and Seymour (1997) alerted the science community that the students were not the problem. Students who switched to a non-science, mathematical, or engineering major and

students who stayed as a science, mathematical, or engineering (S.M.E.) major were more alike than different from each other. They both had similar concerns regarding their academic experiences. Hewitt and Seymour's (1997) research suggested that the problem was more systemic to the overarching science culture versus unique to the type of institution, major curriculum, or student characteristics.

Hewitt and Seymour (1997) used the metaphor of an iceberg to depict the problem they were starting to uncover. While students were making a choice to leave their science major, that choice depicted just the tip of the iceberg. Lying underneath the water were a host of different concerns that were held by all S.M.E. majors current and changing. Some of the most similar concerns switchers and non-switchers held included: lack or loss of interest in science, belief that a non-S.M.E. major holds more interest, or offers a better education, poor teaching by S.M.E. faculty, and feeling overwhelmed by the pace and load of curriculum demands.

Some of the most commonly held beliefs of science faculty and science organizations concerning the decline of science majors included students' inability to cope with "the intrinsic hardness" of science, mathematics, and engineering (Hewitt & Seymour, 1997, p. 35). By comparing S.M.E. major switchers and non-switchers academic skills, Hewitt and Seymour (1997) found this to be an irrelevant reason. S.M.E. faculty's inability to teach effectively and support students coupled with a desire to "weed out" uncommitted students were more likely to be the cause for attrition.

Specifically addressing the absence of women in the sciences, Clark Blickenstaff (2005) reviewed science literature attempting to explain this absence in an attempt to figure out which explanations put forth were valid and useful in thinking about the problem. Researchers proposed biological differences in the ability to grasp science and math, girls' lack of academic preparation

for a science major, girls' poor attitudes toward science and lack of positive experiences in science, absence of women science and engineering role models, irrelevant science curriculum, male-favored science pedagogy, sexism and harassment in science classes, gender roles, and masculine worldview of scientific epistemology as possible explanations for the absence of women in the sciences. The literature suggested the explanations blaming biology or girls' preparation and attitudes were not valid reasons to explore further because they offered no ability to change the status quo or were negated by other research studies. For example, researchers found that even academically prepared girls still decided to leave STEM majors (Brainard & Carlin, 1998). Fries-Britt et al. (2010) would later find similar results with high achieving college students of color. Instead, Clark Blickenstaff (2005) suggests that the way we do science should be changed. Confirming earlier research, there's something in the culture of science itself that needs to change to create an atmosphere that women would find more favorable to be part of.

For too long, the pipeline has been a dark and closed off space. With dreams of a financial pay off and the ability to help people on the other side of the pipeline, women of color have chosen to enter with little knowledge of the possible risks awaiting *inside* the pipeline. Despite these well-documented inefficiencies and thoroughly disputed falsehoods, the STEM pipeline is still a prevailing model that is perpetuated throughout the literature. I align my research with researchers who continue to problematize the pipeline and expose the systemic shortcomings of science culture. By stitching the narrative of the experiences of women of color in the sciences, I show how science, itself, has created and continues to perpetuate a toxic culture.

Science Identity

In *Letters to a Young Scientist*, Edward O. Wilson (2013), renowned sociobiologist, spoke of the importance of passion, perseverance, skill development, ethics, mentorship, the ability to work with others, and an understanding of math as essential elements to a successful career in the sciences. In her memoir, *Lab Girl*, Hope Jahren (2017), a geobiologist, doubled down on the importance of creating and sustaining relationships. From their perspectives as white scientists, both Jahren and Wilson recognize the significance of relationships with mentors, faculty, peers, and colleagues among similar research fields. These two pieces of literature combined have been used and celebrated in Honors first-year seminar courses for science majors. While Jahren introduces concepts related to class and gender in the sciences, neither offers an alternative solution to the competitive, isolating, and color-evasive science culture. The lack of emphasis on the different experiences of women scientists and scientists of color only confirms the prevalent color-evasive ideology in science. In general, the success factors Jahren and Wilson describe in their memoirs have been widely studied for their effectiveness on student success in the sciences. While researchers may disagree to what extent each one of these factors has the most impact on the path for students to be retained in science education, the literature generally concurs that all of these factors play some role in the formation of a science identity. Mentorships and relationships with faculty and other students seems to play a significant role for women of color in the sciences (Carlone & Johnson, 2007; Griffin, 2020; Jackson & Seiler, 2013; McGee, 2020).

Carlone and Johnson (2007) set out to understand how women of color experience, make meaning of, and persist in science. They were particularly interested in exploring the relationship between the women's science identities and their marginalized social identities. They initially interviewed 15 women of color as undergraduate students, representing the following ethnicities:

Mexican American, Southwestern Hispana, African American, African immigrant, American Indian of various Nations, Taiwanese, Filipina, and Indian.

With their narratives, Carlone and Johnson (2007) constructed a science identity model of interrelated dimensions: competence, performance, and recognition. The model is depicted as three concentric circles. Competence is defined as the ability to understand science content. While the understanding of scientific content can be discipline specific, a baseline understanding of biology, chemistry, physics, and math are considered to be the cornerstones of scientific inquiry regardless of discipline. Performance is defined as the ability to execute relevant scientific practices. They described the inherent social aspect of the performance dimension. In this dimension, a person is performing to their own or another's definition of "scientist." Therefore, recognition is defined as the ability to recognize oneself and be recognized by others as a "scientist." Within this framework, "someone with a strong science identity would rate themselves highly and be rated highly by others in each of these dimensions, but one can envision various degrees and different configurations of science identity" (Carlone & Johnson, 2007, p. 1190).

Out of this conceptual model, three separate science identities were distinguished: research scientist, altruistic scientist, and disrupted scientist. The women of color who fit the research scientist identity were mostly described by the prototypical aspect of science. Science as a way of knowing and doing science for science's sake were exciting and important to them. They described themselves strongly as scientists and aligned themselves with professional or graduate laboratory research positions five years later. While the study was not set up to analyze the women's science competence, the women who were labeled as having a research scientist identity reported having considerable engagement in a research laboratory in an early stage of

their undergraduate experiences. The researchers were not trying to cite cause and effect in this study, but the women interviewed connected their experience in research environments with senior research faculty as an opportunity to receive consistent and repeated recognition, ultimately contributing to their strong sense of self within the science community.

The women who were identified as altruistic scientists took it upon themselves to redefine what being a scientist meant for them. While they reported an affinity or excitement for scientific knowledge, inquiry, and skills, the altruistic scientist's motivation to pursue science was to give back to their communities and/or be in direct service to others. All of the women in this category planned on becoming medical doctors. These women did receive recognition from faculty and other external members of the scientific community, but they were more appreciative of the feedback they received from the people they helped or from other people with altruistic values. The altruistic scientist participants were more likely to bring up how their science identity conflicted with the values the women attributed to their racial/ethnic or gender identities.

Carlone and Johnson (2007) named the final category of women disrupted scientists due to their unexpected derailment to their pursuit of a profession in science. This group, unlike the others, dwelled on their collegiate experiences with bitterness. Each one of the women were able to recognize themselves as scientists, but the external recognition from others was missing. This left them feeling alienated and invisible within their discipline. The women often attributed their lack of recognition from others as an affront to their racial/ethnic and gendered identities. The researchers noted the fact that these women persisted toward a science profession was a testament to their resolve and connection to seeing themselves as scientists.

Looking at the experiences of latecomers to science, Jackson and Seiler (2013) offered an alternative science identity framework that emphasizes trajectories. Utilizing journal entries,

discussion forums, and reflective journals of 41 students of various races and genders in a make-up physics course, the researchers constructed education trails for each student. The education trails consisted of life-events, science-related activities, courses, and programs. With the education trails and narratives for how students made meaning out of these experiences, the researchers were able to categorize science trajectories for each student and developed a conceptual model of three trajectories to describe how students engage with a science identity. Jackson and Seiler (2013) created a conceptual framework utilizing a physics metaphor of an object (student) traveling through space and time. A force (positive or negative science experience) is applied to the object causing the object (student) to go into motion with velocity. Depending on the object's velocity, a slope and acceleration can be calculated to determine the object's trajectory and eventual location for that moment in time. Due to the object's momentum (motivation) following a certain path, one is able to discern a likelihood of where the object will land (in or out of the science discipline).

Using this analogy, Jackson and Seiler (2013) identified three science identity trajectories. The inbound science identity trajectory is “characterized by *increasing* identification with science over time (acceleration towards science)” (p. 832). A student on an inbound trajectory is likely to experience several successful efforts in science and math which provides a large forceful push toward the sciences. With each successful effort, momentum increases making it difficult for that student to shift away from the field. Students with an inbound science trajectory are likely to follow a traditional “paradigmatic trail” and hold a strong belief that the good grades they receive in science are due to their individual hard work. The second trajectory, the outbound science identity trajectory, is “characterized by *decreasing* identification with science (accelerating away from science)” (p. 832). A student with this trajectory may have had

early trouble with math and science courses and is likely to stop interacting with science in school and personal interests. Third, the peripheral science identity trajectory is “characterized by identification that remains near the dividing line between identification and misidentification with school science (no acceleration, slow velocity)” (p. 832). A student on this trajectory is most likely to be *most* impacted by intentional programmatic efforts. They are more likely to blame teachers for poor grades or be bumped off their educational trajectory by life experiences. These students “remain precariously on the margins” until a force or significant opportunity accelerates it toward or against a science identity trajectory (p. 833).

While Carlone and Johnson’s (2007) and Jackson and Seiler’s (2013) frameworks offer different ways of visualizing science identity formation, they both agree that early, frequent, and positive experiences with science are important. Being able to see themselves and be recognized for their science performance or achievements played a crucial role in their participants’ formation of a science identity. What I appreciate about both of these frameworks is that they continue to problematize the traditional pipeline theory, or “paradigmatic trail” (Jackson & Seiler, 2013), of development in the sciences. While the frameworks note there are students who do walk along this paradigmatic trail, they create space for narratives of a more creative, non-linear, and yet still “successful,” path to a science identity. All of the women of color in Carlone and Johnson’s (2007) study would have either been on Jackson and Seiler’s (2013) inbound or peripheral science trajectories. Carlone and Johnson’s (2007) work allows us to witness how racial and gender dynamics affect those trajectories. Yet, there are still so many questions to answer. What I appreciate about Carlone and Johnson’s (2007) framework is the capturing of these women’s process toward resilience in the sciences. Many of the disrupted scientists and altruistic scientists brought up their own personal redefinition of what science meant for them.

This study examined how women of color redefine their roles in science culture to make room for themselves. Evidence suggests that the women of color who have spent time on the periphery and disrupted paths toward a science identity may be more likely to be outspoken regarding oppressive behaviors in the science field. Theoretically, they may be more likely to experience first-hand those oppressive behaviors toward themselves and recognize that they can now use their affirmed science identity to positively influence the culture for themselves and others. Contrastingly, the women of color who have experienced an affirmed research scientist or inbound science identity may have more at risk when choosing to speak up against such things for they have somehow figured out ways to be successful academically and relationally despite the toxic environment. The value alignment of their sense of responsibility to their science and racial communities may cause affirmed research scientists with an inbound science identity to seek actions as a change agent. Women of color with an altruistic science identity may highly align their outspoken behaviors with integrity to their personal values and responsibility to their racial and gender communities. This study uses Carlone and Johnson's (2007) and Jackson and Seiler's (2013) science identity frameworks to better understand the ways outspoken behaviors impact the women of color's science identity.

Science's Chilly Climate and Unwelcoming Culture

Many researchers have offered detailed descriptions of how science education has been a "chilly" environment for women. In this section, I explore the implicit and explicit ways those within the science community, specifically science educators of all education levels, have perpetuated stereotypical messages that women of color do not belong. As Carlone and Johnson (2007) and Jackson and Seiler (2013) noted, there are women who are persistent resisters of these messages. The concepts of stereotype threat and stereotype management are introduced to

reveal how women scientists of color manage to maneuver the barriers in their trajectories. Through the stereotype management strategies of gendered and racial passing, negotiating *counterspaces*, proving oneself, and finding their voice, the research suggests that women of color described in these studies became proficient at recognizing and navigating risk with a particular goal in mind. For some women, the goal is simply becoming a scientist, but for those moving toward collective social action for their communities and women like themselves, these women must hold a deep sense of responsibility for their communities and display an insurmountable amount of courage in the face of oppressive power. As the boundary between scientific research and political action narrows, this study explores how women scientists of color navigate and manage risk when speaking “truth to power” within their science field and social communities.

With roots in gender and feminist theory, Hall and Sandler (1982) detailed the ways university faculty and staff treated women differently from their male counterparts in ways that affected the women’s confidence, academic goals, and sense of belonging to their major and institution. Faculty were said to have created a “chilly” or unwelcoming environment for women. Behaviors observed included, but were not limited to, “discouraging women’s participation in class; preventing women from seeking help outside of class; causing women to drop classes or switch majors; making disparaging comments about women; disparaging women’s intellectual abilities; [and] implying that women lack commitment” (Morris & Daniel, 2008, p. 258). In their ethnographic study interrogating the culture of science, math, and engineering (S.M.E.) departments, Seymour and Hewitt (1997) probed for reasons students left their science major and examined whether the reasons were intrinsic attributes of the student or external to science culture and pedagogy of the faculty and institution. They provided a detailed overview of science

culture that leaves one wondering why any student would want to stay for its seemingly “poor profit-to-grief ratio” (Seymour & Hewitt, 1997, p. 129).

Seymour and Hewitt (1997) highlighted four characteristics of science’s culture that make it difficult for all students, but significantly more discouraging for all women and men of color. Students in their study described science as unnecessarily hard, competitive, and unsupportive, with a desire to weed out student. While students recognized any form of knowledge should have varying levels of difficulty, students were frustrated with the fast pace nature of science and math courses. Despite great effort and time spent on course work, the fast pace did not allow them “enough” time to “get it,” specifically when the work related to the abstract or theoretical nature of science. Students blamed faculty for their lack of helpful teaching techniques, while faculty blamed students for being unprepared. Some students did admit to feeling unprepared for collegiate science and math courses. They would attempt to take remedial courses to catch up. These efforts often led to disastrous and futile outcomes because students “were trying to acquire material not previously encountered at the same time as undertaking introductory class work in which the same knowledge and skills were assumed” (Seymour & Hewitt, 1997, p. 89). Students reasoned a desire to stick to the tight course sequencing related to graduation planning for this decision. Regardless of preparation, students eventually would hit a mental block of knowledge or skillset. Some students ascribed to the belief that there was a natural limit to one’s understanding of conceptual science and math, while others believed that these “conceptual barriers were surmountable—given a certain level of ability and academic preparation, decent teaching, sufficient time, and help from faculty, T.A.s, or peers” (Seymour & Hewitt, 1997, p. 92). When one or more of those items needed to succeed were not accessible, students described the overwhelming emotions that caused them to go into a

downward spiral—out of the sciences. Students would often justify their departure from their science major to their peers and family as science just being too hard for them to keep up, but the problem was much more complicated and complex than “science is hard.” “Students caught in this downward spiral struggled to reconcile their low grades and feelings of overwhelm with a depleted sense of self-worth” (Seymour & Hewitt, 1997, p. 99).

The competitive nature of science is also highly connected to grades. “Grades are not objective, neutral, facts about people; they are labels to which people react emotionally, and in terms of behavioral and identity adjustments” (Seymour & Hewitt, 1997, p. 107). Good grades in science became something students desired to protect at all costs. With a reliance on curve-grading in the sciences, students would find little reason to collaborate or learn how to work in a team until later (junior, senior level) in their educational experiences. Curve-grading “creates isolation, mutual suspicion, and promotes a grossly protective attitude to the acquisition of knowledge and skills” (Seymour & Hewitt, 1997, p. 119). For Latinx students, curve-grading reinforced a hyper-competitive environment that did not support fostering positive relationships with other students (López et al., 2019). Students often dealt with the competitive nature of science in one of two ways: cheating or redefining purpose. Students justified cheating as a way to play and beat the system. Students who struggled with grades, but decided not to cheat, were able to “redefine the purpose of grades, and re-evaluate their criteria for self-esteem” (Seymour & Hewitt, 1997, p. 109).

One of the most unique aspects of science is its weed-out culture. “‘Weed-out’ strategies are perceived as a test for both ability and character and are the main mechanism by which S.M.E. disciplines seek to find those students presumed to be the most able and interested” (Seymour & Hewitt, 1997, p. 122). The unique aspect of this characteristic is that “weeding-out”

was never explicitly named by administration or faculty, but it was culturally referred to or described by academic deans and faculty members, students, and demonstrated by the construction of curricula and faculty pedagogy. Lopez et al. (2019) likens the “weed-out” culture to identifying “la crème de la crème”—the process of triglycerides and fatty acids separating from the less dense parts of milk and rising to the top. Unlike the natural process of cream rising to the top, “identifying the ‘cream’ of the classroom is a complex process that includes personal, social, cultural, and historical facets that can be organized to promote learning or stifle it” (p. 103). While aptly problematic in pedagogy, the “weed-out” culture made sense to many successful and unsuccessful science students in Seymour and Hewitt’s (1997) study. Students respected others who were able to persevere in science majors, often citing character traits like determination and other admirable qualities. Others were able to critically examine and express what they thought was actually occurring, such as this student participant:

What it does to people is to weed them out psychologically. When people come in with the inherent doubts about whether they are meant for the field—especially women, and minority students—they don’t have that base of self-confidence. They are less likely to tell themselves that everyone else is having the same problem, because their confidence is more fragile... The teacher believes he is testing for ability, but in fact, he’s testing for self-esteem and self-confidence. I don’t think he consciously knows that, but it still has that effect... The weed-out system has side-effects that professors are not aware of. They accept that they are losing people, but may not realize that they are losing people unevenly from different categories... They’re fine with the fact that people are weeded out. They want a core of dedicated people. But, what they’re not realizing is that people

are also being weeded out, not so much in terms of ability, but in terms of other qualities.
(Seymour & Hewitt, 1997, p. 131)

While students were able to recognize and, in some cases, forgive the competitive and weed-out aspects of science culture, they were least capable of forgiving the unsupportive nature of science. During their collegiate experience, students expressed difficulty in finding people who could help them with a myriad of problems, from course registration advising to understanding academic material. Many institutions had a decentralized process of assisting students which was confusing to navigate. The students in this study shared that they most wanted to have an advisor and/or faculty member take an interest in them personally. When this did not happen, or rather students had a negative or painful experience with a faculty member, it was usually “the final straw” in a student deciding to leave a science, engineering, or math major (Seymour & Hewitt, 1997, p. 142).

Faculty play a large role in students’ success and overall sense of belonging in their chosen discipline. Since being identified as a high impact practice (Brownell, 2010; Kuh, 2008), the relationship between student and faculty member has been heavily researched within science disciplines. Student-faculty interactions have been linked to a greater sense of belonging and classroom engagement for students of color within science disciplines (Kim & Lundberg, 2016; Strayhorn, 2010). The level of understanding and importance of mentorship varies among faculty. A faculty member’s assumptions of college readiness can affect how they engage with and serve as advocates for students (Schademan & Thompson, 2016). Being recognized for their potential in the sciences by faculty teachers and mentors is key for women of color in developing a salient science identity (Carlone & Johnson, 2007). In their qualitative study following one faculty member as she mentored several students, Griffin et al. (2015) noted the importance of

approachability, challenge, support, encouragement, and problem-solving in students' development of self-agency within the sciences. Experience within research environments is key to the development of a science identity. Studying a summer undergraduate research program among four liberal arts institutions, Hunter et al. (2007) found that students' experiences with faculty working on a research project led to increases in professional (science) identity.

The benefits of increased student-faculty interactions have been examined, but impacts do change when race and gender become factors within the relationship. The lack of racial and gender diversity within the science field has been described time and time again (Griffin, 2020; McGee, 2020). The likelihood of a science major of color having a white faculty member serve as a mentor is high given the number of white science research faculty (Griffin, 2020). Even though white faculty might have the best intentions in mind when engaging with students of color, McCoy et al. (2015) found that white faculty mentoring students of color within the sciences often do so with a "colorblind mentality." Instead of honoring the racial experiences of students of color in the sciences, these white faculty mentors end up ignoring or minimizing the students of color's experiences completely. Women science faculty, who are likely to be the only ones in their department, reportedly struggle balancing the research and teaching expectations of their department and the mentoring expectations of women science students (Griffin, 2020; McGee, 2020; Seymour & Hewitt, 1997). Also, science faculty were less likely to advocate for diversity initiatives than non-science faculty, yet science faculty of color were more likely to advocate for diversity initiatives than non-science white faculty (Park & Denson, 2009). It seems that white faculty are more apt to perpetuate the competitive, isolating, color-evasive, and patriarchal culture of the sciences. While many faculty of color advocate for changing this culture, not all faculty of color line up to do so (Park & Denson, 2009).

Having been through the ceremonial indoctrination into the science community, faculty of color and women in the sciences can help these students navigate the white, male dominated structures that exist within higher education (Griffin, 2020). Faculty have the most power to wield within the classroom. While faculty experiences and desires to engage in racial and gendered conversations within the classroom vary (Griffin, 2020; McCoy et al., 2015; Park & Denson, 2009), there are times when racist and sexist comments or situations arise. Expectedly, Garcia & Van Soest (2000) found that faculty of color were more likely to challenge racist viewpoints or actions within the classroom than their white counterparts. Although this trend could be found among most disciplines, it must be noted that white social science faculty were more likely than science faculty of color to engage in critical discourse about racist behavior (Garcia & Van Soest, 2000). Women students were increasingly bothered by their science faculty's disinterest and inability to address the sexist attitudes and statements of their male peers (Seymour & Hewitt, 1997). Interviewing faculty of color, Baez (2000) was interested in how faculty navigated the institutional construct of service within the tenure and promotion process. Overwhelmingly, faculty of color often used "service" to work with students of color to promote racial equality among their disciplines. Unfortunately, this service is not factored as much as teaching and research in the tenure and promotion process, leaving many faculty of color to make difficult decisions regarding time and expectations (Baez, 2000; Griffin, 2020; McGee, 2020; Posselt, 2020). For those faculty of color who do choose to make time for this type of service to students of color, research suggests that this is another way women of color in faculty positions have to negotiate risk for the responsibility they feel toward mentoring students of color.

Several research studies have highlighted the relationship that student-faculty interactions and undergraduate research experiences have on a student of color's science identity development (Carlone & Johnson, 2007; Jackson & Seiler, 2013). In a large quantitative study of over 5000 undergraduate students, Kim and Lundberg (2016) identified a large disparity between the quality of student-faculty interactions depending on racial/ethnic identities. Their findings suggest that student-faculty interactions among racially minoritized students is the largest factor that hinders students' cognitive development. Focusing on Latinx students in higher education, Edens et al. (2016) found that frequent and positive student-faculty interactions led to Latinx students' overall academic satisfaction in their disciplines. Specifically related to science, Micari and Pazos (2012) surveyed over a hundred students taking one of six organic chemistry courses at one institution in a mixed-methods study. Their findings suggested a direct correlation between positive student-faculty interaction factors, for example "students looking up to the professor, feeling comfortable approaching the professor, and feeling that the professor respects the students," and confidence in receiving a high grade (p. 45). Einarson & Clarkberg (2010) found that out-of-class experiences with faculty in office hours or undergraduate research experiences benefitted African American and Latinx students more than white students. Similarly, Lane's (2016) qualitative study on Black students' undergraduate research experiences in a science living and learning community provides some insight into how research experiences help develop a science identity in students of color. In short, going through the research process with faculty made students feel like scientists, a critical element to retaining students of color in a science major (Carlone & Johnson, 2007; Jackson & Seiler, 2013).

These characteristics of science culture do not begin or end with the collegiate experience. Researchers have looked to K-12 education to better understand the socialization of

girls of color in science education. It is clear that girls of color who show an enthusiasm for science must learn to protect that enthusiasm and passion with all their might. Science education of all levels has perpetuated “an education system which has evolved to support the ongoing socialization process of only one group—namely, white men” (Seymour & Hewitt, 1997, p. 259).

Early Science Socialization

K-12 science educators have a huge impact on students’ decisions to pursue science majors in college (Aschbacher et al., 2010; Bettez et al., 2011; Brickhouse et al., 2000; Carlone, 2004; Carlone et al., 2015; Jackson & Seiler, 2013; Johnson et al., 2011; Liu, 2018; Palmer & Maramba, 2015; Seymour & Hewitt, 1997; Young et al., 2019). These teachers establish relationships with individual students, see their students’ potential, and encourage them to continue their interests in science with further education.

With training, some teachers have included inclusive pedagogies, such as using diverse teaching methods, preparing inclusive classroom environments, developing inclusive curriculum content, and taking account of personal biases (Aragón et al., 2017). Even when teachers do practice inclusive teaching techniques, the societal expectations for girls of color to perform gender norms may be too strong to make a significant impact. One of the many researched suggestions to creating a more inclusive science experience for girls and students of color is to open science pedagogy to more hands-on, altruistic problem-solving strategies beyond rote memorization (Bettez et al., 2011; Carlone, 2004; Clark Blickenstaff, 2005; Metcalf, 2010). Carlone’s (2004) ethnographic study followed 14 girls’ engagement in a hands-on, problem solving-focused high school physics class. Not all the girls appreciated this alternative take on their science class. Three girl participants often expressed their disdain for the class. These girls shared a proficiency in rote memorization of facts and equations. Thinking this would lead to

success in their physics course, they were dismayed when the course focused on the application of physics and the ability to collaborate with other students on lab projects. The girls actively “resisted the new meaning of science and the accompanying implied science learner identities (energetic, problem-solver, hard-worker)” (Carlone, 2004, p. 402). This new way of doing science challenged some girls’ identity as a “good student.”

Conversely, the girls who did find success in the course and enjoyed the hands-on physics’ lab assignments also did not self-identify as “science people” because science was supposed to be hard. If they were successful, then what the girls were experiencing in their classroom was not “real science.” Carlone (2004) sums up her study:

The story about girls’ eager embrace of the dominant educational paradigm highlights a complexity about gender-fair science that needs serious consideration. We attempt to transform school science by coming up with ‘empowering’ alternatives to the prototypical school science curriculum. Yet, where is one left when the girls reject empowering science in favor of prototypical science that makes their role as good students and their quest for their end of the exchange (i.e., good grades and college admission) easier? (p. 410).

Furthering these ideas, Carlone et al. (2015) were interested in how 4th-7th grade girls performed gender in a way that connected or rejected their science abilities. Sixteen racially and socioeconomically diverse girls were followed through their formative years of elementary and middle school. The researchers observed videos of the girls in small group and whole-class settings looking for patterns of what have been deemed “performances of femininity,” such as “pleasing adults, belonging or minimizing otherness, nurturing or helping others, standing up for others, and making self submissive or invisible” (p. 478). They also looked for actions related to

leadership, dominance or superiority, as well as being an outsider or emphasizing “otherness,” which were deemed as counter-feminine behaviors. The study highlighted how quickly the girls, who once shared an affinity and prominence in the classroom as great science students, conformed to the structural and systemic constraints of their gender and culture. By the 7th grade, only two girls (both identifying as Latina from working class backgrounds) still shared an interest in and proficiency in their science classes. With these and the former results in mind, Carlone et al. (2015) asked: “Are these larger structures so entrenched and enmeshed by middle school that there is no escaping the ever-more precarious and complex identity work that all adolescent, science-interested girls confront?” (p. 485).

In another longitudinal ethnographic study, Carlone et al. (2014) set out to see how students’ racial and gender identity development played a role in their affinity toward science. They followed a group of diverse students from 4th-6th grade, identifying those who either labeled themselves or were labeled by others to be a good student in their science class. The researchers wrote of one student—Aaliyah. She specifically caught my attention because she was adept at claiming space and voice. In her 4th grade science class, Aaliyah found great success in using her voice to add to classroom discussion and answers to collective group work. When students would miss class, she was asked by the teacher to help the student catch up. This was a position that Aaliyah visually and verbally expressed great pride in. By the end of 4th grade, science was Aaliyah’s favorite subject. When researchers caught up with her again in 6th grade, the classroom environment was remarkably different than the one that had set the foundation for Aaliyah’s appreciation of science. In her 6th grade science course, the desks were individually spaced out, unlike the grouped desks in 4th grade. Students were expected to ask permission to leave their seats at any time during class. These changes perpetuated individualistic characteristics of

science culture. In 6th grade, Aaliyah would attempt to claim space and voice in a variety of ways that admittedly annoyed the teacher. Her attempts to claim voice either by using humor or contributing to class discussions would get shut down because the teacher interpreted her attempts as silly or off-topic. Still considered to be good at science, Aaliyah would try to help other students by assisting them with their work or standing up for them when the teacher made fun of or accused them of something. She often navigated these situations with the teacher in a "light-hearted, mock-offended affect" that would get the teacher's attention, but not land her in detention. Carlone et al. (2014) attribute Aaliyah's academic success in her 6th grade science class to her ability to navigate structures, rules, and social influences. A skill she honed while also learning how to navigate the world as a "confident, African-American, physically mature girl who liked to claim voice and space in service of creative, divergent thinking. ...[S]he played the game well enough to earn decent grades (As and Bs)." (p. 862).

These studies depict the confluence for how the characteristics of science culture embed early in girls of color's educational experiences. Aaliyah's proficiency at navigating the structures, rules, and social influences spoke to a different intelligence and skillset that are not often publicly celebrated in our education system. She was learning early in her educational experiences how to quickly identify the risks and punishments of certain decisions. These skillsets are absolutely needed to survive and overcome the many barriers and obstacles that are put in front of girls and women of color as they continue to work toward a science career. The most prominent barrier for women of color in the sciences is stereotype threat related to their gender and race (Beasley & Fischer, 2012; Johnson et al., 2011; McGee, 2016; McGee & Martin, 2011). Next, I introduce research related to stereotype threat and describe further examples of women navigating structures, rules, and social influences of science education.

Managing Stereotype Threat and Expectations in the Sciences

The relationship between women of color and math and science education is deeply rooted in systemically racist and sexist policies both in education and society. Women and girls of color work hard to avoid negative stereotypes (Brickhouse et al., 2000; Carlone, 2004; Carlone et al., 2015; Johnson et al., 2011; Seymour & Hewitt, 1997). I explore the role stereotypes play in women of color's engagement in science and math preparation. For those women who find success in this space, they manage stereotype threat and build resilience within the unwelcoming, chilly climate of science.

Stereotype Threat

Stereotype threat describes the psychological turmoil that one goes through in “the event of a negative stereotype about a group to which one belongs becoming self-relevant” (Steele, 1997, p. 616). Black, Indigenous, Latina women have been stereotypically described as bad at math and science, while Asian women are stereotypically described as good at math and science (McGee, 2020). One with a less critical perspective could argue that representation in the STEM disciplines is all the evidence you need to prove these assumptions. What Steele's (1997) stereotype threat offers is an alternative to understanding the cause and effect of the stereotype on an individual's psychological process. Later, we will also explore how Asians and Pacific Islanders, mythologized as the “model minority,” negatively affects Asian and Pacific Island students and its role in perpetuating racism of Black, Indigenous, and Latinx communities.

According to Steele (1997), stereotype threat can occur whenever a negative stereotype exists and affect members of the stereotyped group differentially. The threat is ever present and “cannot be escaped” (p. 618). If one is able to prove herself against the stereotype in one setting, the threat can follow her into another setting. As the women of color in Johnson et al.'s (2011)

study noted, “every time [the women scientists of color] entered a new setting, they had to return to making careful orchestrations and tentative bids for recognition and warding off unwanted ascriptions” (p. 361).

Pennington et al. (2016) reviewed psychology and educational psychology research related to stereotype threat. Most of the earlier stereotype threat studies used it as a way to measure test anxiety. Stereotype threat’s initial study was a comparison experiment on the effects of students having to share their racial/ethnic identity before taking a test (Steele & Aronson, 1995). They discovered that African American students who shared their racial/ethnic identity before taking the test fared worse than those African American students who were not made to share their racial/ethnic identity. The subtle nuances of how stereotypes infiltrate our psyche and affect our performance has caused a steady stream of new developments to look for. For instance, stereotype threat has been linked to cognitive overload (when the act of combating a stereotype depletes one’s cognitive and emotional resources to the point one cannot concentrate on the task any longer), cognitive appraisal (when one measures her ability to control and achieve a challenge before deciding to actively work toward it or not), and implicit stereotype endorsement (when one unconsciously lives up to the stereotype) (Pennington et al., 2016).

Stereotype Management

Knowing that women of color have had to negotiate the effect of stereotype threat within their science careers, I am interested in stereotype threat research related to motivation and management. Stereotype threat initially focused on decreased performance (McGee, 2016; McGee, 2020; Steele & Aronson, 1995), but it can also be highly motivating (McGee, 2020; McGee & Martin, 2011; Pennington et al., 2016). Even the motivating factors have limitations and might cause long-term negative effects (McGee, 2020). For instance, paying extra attention

to a task in order to avoid errors, otherwise known as vigilance (Pennington et al., 2016), can lead to unhealthy reliance on perfectionism. When perfectionism is tied to thoughts that downplay one's racial/ethnic identity, it can lead to internalized oppression and actions that perpetuate white supremacy (McGee, 2020).

Specifically researching students of color in the sciences, others have offered alternative concepts relating to stereotype threat. McGee and Martin (2011) introduced the concept of stereotype management. Using Critical Race Theory (CRT) to problematize stereotype threat, they define stereotype management as “the strategies high-achieving students develop and utilized to cope with the strain of being racially stereotyped while maintaining traditionally high standards of academic success” (p. 1363). In an affront to stereotype threat research's manufactured environments to study stereotype effects, stereotype management recognizes that stereotypes are “omnipresent” within “everyday micro-aggressions inside and outside the classroom” (McGee & Martin, 2011, p. 1355). Ong (2005) offers a further nuanced understanding of stereotype management strategies by introducing fragmentation and multiplicity strategies. Fragmentation is the “process of temporarily splitting oneself to minimize cultural differences between oneself and other members of a community,” while multiplicity refers to “the more holistic occupation of multiple, but sometimes competing, identities and membership” (Ong, 2005, p. 600). Regardless of what you call it, women of color have been employing a variety of strategies from their vast arsenal to survive, negotiate, or navigate their unique paths within the unwelcoming, chilly science environment.

Moving forward, I use the term stereotype management strategies to encompass the full arsenal available to women of color. When warranted, I will use Ong's (2005) conceptual framework of fragmentation and multiplicity strategies to identify the impact to the racial,

gendered, and science identities of women of color. It is evident that women of color have a choice of which strategy to employ. Next, I highlight several examples of stereotype management strategies. Since a completed level of higher education or formal degree is often a significant and shared rite of passage toward a science career, I focus my attention on women of color's experiences in higher education as context.

Toward a Sense of Belonging. Many women of color choose science majors because of the promise of economic gains, a strong interest and skillset in the topic area, and a passion to give back to their families and/or community (Morris & Daniel, 2008; Page-Reeves et al., 2019; Seymour & Hewitt, 1997). Because of their prior experiences in middle and high school science classes and the well-documented “chilly” culture of science, most women are very aware of the challenges in front of them (Johnson et al., 2011). Although, they may not be attuned to how those challenges will personally affect their health and psyche.

Ultimately, students of color incorporate stereotype management strategies because they want to find a sense of belonging within the science field (López et al., 2019; McGee, 2016; McGee & Martin, 2011; Ong, 2005; Palmer et al., 2011; Strayhorn, 2012). For students of color, and particularly for those in the sciences, a sense of belonging and recognition as a scientist are crucial to a student's persistence within the discipline (Carlone & Johnson, 2007; López et al., 2019; Palmer et al., 2011; Strayhorn, 2012). Women of color in science majors describe how isolating it feels when they see no one else like them in the classroom (Aschbacher et al., 2010; Fries-Britt et al., 2010; Johnson et al., 2011; McGee, 2018; Ong, 2005; Ong et al., 2018; Page-Reeves et al., 2019; Palmer et al., 2011; Strayhorn, 2012). This isolation either moves a woman to leave the sciences altogether or motivates her to stay (McGee & Martin, 2011; Ong, 2005). In choosing to stay, women of color adapt to the science culture by employing stereotype

management strategies. Some of the most prevalent strategies in the literature include gendered or racial “passing” (McGee, 2016; Ong, 2005), participating in *counterspaces* (Castro, 2014; Lane, 2016; Ong, 2005), proving oneself (McGee, 2018; McGee, 2015, 2016; McGee & Martin, 2011), and openly resisting by using their voice (Baker, 2019; Ong, 2005; Perdomo, 2012). Women of color employ these strategies at various levels with peers, faculty, their families, and their communities. With each strategy employed, there are consequences to self and identity (Ong, 2005).

Gendered and Racial Passing. Several studies have focused on the tendency for women and men of color to go to great efforts to appear “normal”—ascribe to white, male norms—in order to feel a sense of belonging in the sciences (McGee, 2018; McGee, 2016; McGee & Martin, 2011; Ong, 2005; Seymour & Hewitt, 1997; Strayhorn, 2012). The students in McGee and Martin’s (2011) study on Black students’ coping, or stereotype management, strategies called it “frontin’.” Frontin’ described Black students’ ability to code switch and act white by appearing and speaking in a friendly and approachable manner. Students discussed the agency they felt they had over what information to disclose and to whom. One Black student said he went so far as to get a PO box in a more affluent neighborhood in order to avoid negative stereotypes regarding where he was from (McGee, 2016). Latinx students pretended not to speak Spanish, stopped hanging out with same-race friends, and chose not to correct people who wrongly assumed they were white (McGee, 2016). For some students who employed racial passing as a strategy, the partial or full rejection of their racial and cultural identity led to “a heavily conflicted conscience” (McGee, 2016, p. 1654).

Women of color also tried gender passing (Ong, 2005; Seymour & Hewitt, 1997). Gender passing was used as a strategy to avoid unwanted attention from their male peers and faculty.

Some of these strategies included wearing pants, drab colors, and loose-fitting clothes (Ong, 2005; Seymour & Hewitt, 1997). Others were performative in nature. For instance, one of the women in Ong's (2005) study spoke about her noticing other women performing masculine speech—saying “this is the way it is” versus “this is what I thought” (p. 605). Where science “promotes and rewards interactional displaces of self-assurance,” there seems to be no space for “uncertain speech” (p. 606). Many women spoke to the “fake it 'til you make it” strategy of passing. Attempting to act confidently makes one appear competent to her peers and faculty (Ong, 2005; Seymour & Hewitt, 1997).

Students and researchers agree that gender and racial passing, assimilating, and frontin' take a toll on an individual's psyche and identity. I consider these to be examples of a “fragmentation strategy” (Ong, 2005), where passing feeds into stereotypes rather than addressing them. It is an oxymoron at best; a deep cut into one's psyche at worst. Its purpose being to become invisible, while the ability to be recognized as a scientist is crucial to fostering a science identity (Carlone & Johnson, 2007; Johnson et al., 2011).

Negotiating Counterspaces. Exhausted from isolation and the constant barrage of microaggressions, women of color attempted to seek others like them by participating in organizations or activities specifically for women or students of color. These *counterspaces* “are often considered ‘safe spaces’ that, by definition, lie in the margins, outside of mainstream educational spaces, and are occupied by members of non-traditional groups” (Ong et al., 2018). In their study looking at the social factors led to women of color persisting in the science environment, Ong et al. (2018) identified several reasons women of color engaged in *counterspaces*: “to seek support to counter personal attacks, to get emotional support and strategies to counteract isolation, to build a cohesive identity in a culture that does not

consistently reflect or respect people who look like them, and to seek ways to advance academically and professionally that acknowledge their racial/ethnic and gendered selves” (p. 233). Unlike gender or racial passing, I contend participating in a *counterspace* afforded women of color a more holistic, rooted in multiplicity, strategy in establishing their science identity.

Some examples of *counterspaces* include, but are not limited to student and campus-based organizations, residential learning communities, mentoring programs, national STEM diversity conferences, undergraduate research programs, STEM departmental programs, and recruitment and retention programs that were specifically oriented to women, students of color, or women of color (Castro, 2014; Lane, 2016; López et al., 2019; Ong et al., 2018). Women of color have mixed feelings about some of these *counterspaces*. Some women refused to participate because they did not want to feel singled out or questioned about their competency by their white, male peers (Seymour & Hewitt, 1997). For those women of color who did participate, they saw it as an opportunity to level the playing field—to find mentors who could help them navigate the tumultuous terrain of the science industry (Ong et al., 2018).

While many *counterspaces* provide instrumental support for persistence of women of color, Castro (2014) warns how pervasive racist stereotypes are within STEM culture. Using critical discourse analysis, Castro (2014) explored the assumptions and connections to deficit-minded thinking when using the terms “at-risk” and “underprepared” to describe students of color. Genetic inferiority theory (the belief that populations of color and women are inherently inferior to white men) and cultural deprivation (the belief that populations of color are victims of an impoverished culture) theory have led to a culture of deficit mindset when educating students of color (Castro, 2014). These beliefs emphasize individual and group shortcomings and foster youth of color as charitable concerns and in need of repair. Castro (2014) specifically looked into

college STEM recruitment and retention programs, analyzing the staff's use of deficit mindset language in describing their work with students of color in STEM. Interviewing 11 coordinators and directors of STEM intervention or diversity programs, she found that some of her participants perpetuated a deficit mindset culture in their programs by describing their students as "underprepared" or "at-risk." By using the term "underprepared," some of the participants either directly or unconsciously placed blame upon the individual student, while others used the term to offer a critical examination of the social structures, patterns, and systems that dictate opportunity for STEM preparation. In using the term "at-risk" to describe their students, staff are insinuating an everlasting potential for the student to fail. Castro (2014) found that participants would use the term "at-risk" nonchalantly assuming the interviewer knew exactly who they meant. In fact, "at-risk" was met with several assumptions. "The program, major, department, college, or university are not 'at-risk' for failing the student nor for causing the student to exit the program; instead, the risk for possible failure applies only to the student" (p. 415). In this case, that "at-risk" student describes a student of color, lower-income student, or any combination of the former (Castro, 2014). This work is enlightening because it exposes the heartbreaking reality that programs developed for students of color to be successful in STEM feed into the stereotype that these students are already ill-prepared and unwelcome. While *counterspaces* exist as safe spaces for women of color to turn to for relief, the programs and the people who work for them may also subconsciously continue to perpetuate the culture women of color are trying to avoid.

Proving Oneself. Proving oneself as a stereotype management strategy is precariously rooted in the tension between faculty and student peers reportedly having low expectations of students of color and families and communities of students of color having extremely high expectations of the women of color. Women of color report a never-ending proving process that

they have to go through to prove they are capable of doing science work (Fries-Britt et al., 2010; Johnson et al., 2011; Ong, 2005).

Depending on the racial and ethnic background of the student, the stereotypes that she has to navigate changes. For instance, Black, Latina, and Native American women, who are stereotyped as being lazy and bad at math and science, report the shock and surprise their peers and faculty have when the women do well on a difficult test. Their faculty and peers say things like the women must be “geniuses,” without recognizing these comments as microaggressions against the women’s hard work. Some students of color report being accused of cheating (Seymour & Hewitt, 1997). If they do well academically, women of color must either be “geniuses” or “cheaters”—an abnormality or stereotype of their race and gender (McGee, 2018).

On the other hand, Asian and Pacific Island women must contend with the model minority myth, which describes the Asian population as “intelligent, gifted in math and science, polite, hardworking, family oriented, law abiding, and successfully entrepreneurial” (Wu, 2002, p. 40). Initially coined to describe Japanese Americans as a stark contrast to Black and Latinx Americans during the Civil Rights era (Takaki, 1998), the term, model minority, came to be widely used to describe *all* Asians. The model minority myth’s original purpose was to maintain anti-Black racism and perpetuate White supremacy (Poon et al., 2016). Critically reviewing higher education research on Asian Americans and Pacific Islanders, Poon et al. (2016) problematize the ways the model minority myth has been used in research. The researchers found specific problems with the lack of critical perspectives on how the model minority myth is used to perpetuate “disciplining and shaming other people of color,” to reinforce deficit thinking, and to lump all Asians together. When internalized, the model minority myth does a considerable amount of damage to Asian and Pacific Island women who are trying to find success in their

science courses and create a community with other women of color. When Asian and Pacific Island women openly share their struggle in their math and science courses with other students, their peers reportedly express shock and disbelief (McGee, 2018). The notion that Asian students do not also work hard or that their academic success comes naturally has reportedly caused extreme stress in Asian and Pacific Island science students (McGee, 2018). In their study on the effects of the model minority myth on STEM Asian students, McGee et al. (2017) interviewed 23 Asian students of various ethnicities (Indian, Thai, South Korean, Chinese, Malaysian, and Pakistani). Many of these students reported concern for conforming to the model minority stereotype. The students wanted to do well in their science courses, but not ascribe to the stereotype. Asian and Pacific Island students seem to be in a precarious damned if they do, damned if they don't situation, feeling "trapped into perpetuating the [model minority] myth" with peers and faculty as they worked toward a science degree and profession (McGee, 2018, p. 9).

Other motivating factors for women of color to prove themselves include a desire to give back to their families and communities. Students of color who are able to connect their research studies to an altruistic goal of helping and giving back to the community are more likely to find value in this research and, consequently, are more likely to be retained in their science major (Seymour & Hewitt, 1997; Thoman et al., 2014). Having had trouble finding mentors themselves, a desire to serve as a mentor or guide to younger students in the sciences seems to be a recurring theme among science students of color (McGee & Bentley, 2017; McGee & Martin, 2011; Page-Reeves et al., 2019; Stevens et al., 2016). Page-Reeves et al. (2019) examined how Native STEM professionals reflect on their success in educational and professional experiences through the concepts of navigating and wayfinding. Rooted in the cultural reliance on

experiential wisdom, the Native participants described navigating and following paths that have been “laid out and traveled before” by others (p. 184). “Navigating is learning who to go to for help, who has knowledge or capacity that you do not have yourself, and how to tie yourself to people who can help you now or in the future” (Page-Reeves et al., 2019, p. 186). Wayfinding describes the “process of transformation that involves using contextual cues in the environmental and experiential field to attentively weave the fabric of one’s life and to create one’s own path in a way that connects with culturally defined values and relationships” (p. 184). Participants described emergent strategies of learning how to adapt to situations, while also learning “strategic foresight”—a self-reflexive strategy rooted in learning from past mistakes (p. 189-190). Navigating and wayfinding strategies serve as an interconnected tension between an individual’s journey to self-actualization and a duty to shared experiential wisdom for the benefit of others. In support of Ong’s (2005) multiplicity strategies—holistic holding of “multiple, but sometimes competing, identities and membership” (p. 600)—Page-Reeves et al.’s (2019) participants did not see themselves as resisters or adversaries in their STEM educational process. They fully gave of themselves toward a more holistic definition of success. Success was conceptualized to include “academic and professional achievement, participation in supporting Native community goals, expanding spaces of participation for others and increasing access and ways of participating to include multiple worldviews” (p. 180). Proving oneself became a collective goal versus an individual achievement.

Finding Voice. Women rarely entered the science education arena speaking up for themselves and others (Johnson et al., 2011; McGee, 2020; Ong, 2005). This tactic came as a practiced response to faculty and peer’s continuous racial and gendered microaggressions. In order to succeed in the sciences, it is likely that women of color gained *la facultad* throughout

their educational experiences (Anzaldúa, 2012). Similar to Page-Reeves et al.'s (2019) wayfinding, Anzaldúa's (2012) *la facultad* refers to the survival tactic of instantly reading and responding to a situation in a way that preserves self. The strategy is available to those who are powerless, yet "choose to deepen their understanding of themselves" and "navigate [the situation] rather than resist" (Johnson et al., 2011; Muñoz, 2018). Women of color have continuously practiced their strategies on teachers and peers throughout their lives (Carlone et al., 2014). Some women of color choose a tactic of becoming hyper-visible. Depending on the racial and ethnic stereotype of women, hypervisibility can either perpetuate stereotypes or fly in the face of them. For example, a Black woman participant in Ong's (2005) study "assumed a strategic, situational character—the "loud [B]lack girl"—as an act of resistance" (p. 607). She made the conscious decision to code-switch from "her own middle class persona" to one more stereotypically recognizable by her peers and faculty (p. 607). By perpetuating this stereotype, she was seen as less of a threat and gained unique access to professors and opportunities to further her education and career (Ong, 2005). With a goal of becoming a Black woman physicist, this participant did what she felt she had to do to get there.

There are many ways to use voice to attain specific goals. Perdomo (2012) noted four kinds of voice she observed Black and Latina women using in response to various situations in a college classroom. Raw tongue, an unfiltered language that is "real, untrained, honest, full of emotions, passion, and often filled with hostility," was reserved for the most egregious situations, in which the women were fed up with the situation at hand (p. 209). It was used out of a desire to protect oneself, but with full confidence in putting the offender on watch. Instrumental voice was used in the classroom "as a tool to ask questions, to clarify academic content, and to share their comments and/or perspectives" (p. 229). In Perdomo's study, there were three kinds of silence:

engaged silence, holding silence, and discursive silence. When the participants valued what was being shared, they were using engaged silence. Holding silence was an intentional tactic used as a shield to protect oneself from judgment of others. Discursive silence was “understood as a deliberate act of empowerment and resistance to the behavior of their peers, the discourse and/or content of material being discussed” (p. 258).

The current study focused primarily on symbolic voice, the last kind of voice observed of Perdomo’s participants. Symbolic voice “is a political voice that allows participants to speak as empowered subjects” (Perdomo, 2012, p. 207). Women of color who use the symbolic voice as a strategy are able to hold the tensions of self-confidence, agency, and critical consciousness of their multiple identities while also leaning into and addressing the systemic, oppressive impacts of the situation at hand (Perdomo, 2012). Symbolic voice offers an empowered visibility in an oppressive science discipline.

Johnson et al. (2011) interviewed three women of color who had established successful science careers: a Black public health expert, a Latina toxicology researcher, and an American Indian pharmacist. The researchers were interested in how the women’s racial/ethnic and gender identities affected their science identity, as well as how structures constrained or provided opportunities for these identities to take hold. The women highlighted many of the concepts I have laid out before you. In obtaining a science identity, they had several experiences in early educational environments that piqued their interest in science. They each described being good at science. They were either lucky enough to be supported in school or an after-school program related to their science interests—an opportunity that many young girls of color don’t have access to. In terms of the science culture they experienced, the women expressed the collection of microaggressions that made them question their legitimacy as “science people.” In college, the

women reflected on their fear of being racially and gender stereotyped but found solace in programs specifically for students of color or women in the sciences. These *counterspaces* allowed them to “participate in science in the way that [w]hite men almost always participate; comfortably, without compromising valued parts of themselves, without being seen as outsiders” (Johnson et al., 2011, p. 361). As the women entered new stages in their careers, they expressed a cyclical nature of having to prove themselves to new people and harboring familiar fears of being stereotyped. “Every time they entered a new setting, they had to return to making careful orchestrations and tentative bids for recognition, and warding off unwanted ascriptions, to see if they could find ways to author science identities that were not at the expense of other identities they valued” (Johnson et al., 2011, p. 361). When asked to describe ways the women are giving back to their families and communities, Johnson et al. (2011) discovered all three women in their study embraced a political or radical stance in their science careers. The researchers linked this dynamic to Anzaldúa’s *la facultad*—“the capacity to see in surface phenomena the meaning of deeper realities, to see the deep structure below the surface. It is an instant ‘sensing,’ a quick perception arrived at without conscious reasoning[;].... An acute awareness mediated by the part of the psyche that does not speak, that communicates in images and symbols which are the faces of feelings” (Anzaldúa, 2012). The researchers could have easily made connections to McGee and Martin’s (2011) *stereotype management*, Page-Reeve et al.’s (2019) *wayfinding* or Perdomo’s (2012) *symbolic voice*. The “chilly,” unwelcoming science culture creates a unique opportunity for women of color to practice a variety of strategies, each with their own consequences. Those who choose holistic strategies while continuously navigating possible pitfalls and strategic opportunities are provided many chances to embrace their political and

radical stances by speaking truth to power. As an implication for further research, Johnson et al. (2011) stated:

“We need to consider whether these overt political and cultural commitments are not just results of these women’s individual temperaments but rather are related to the fact that they have been able to stick it out and attain their current positions in science. If Anzaldua is right about *la facultad*, it seems possible that the more conscious a person is of inequity, the more identified they are with their own cultural background, the more likely they are to develop the very skill that let these women persist. Science settings, by demanding that women of color face additional obstacles in authoring a science identity — by demanding that they not just be competent in science but also be skilled at mediating competing identities and at heading off negative ascription — require facility in *la facultad*. Settings like this may actually be selecting for more politicized, more racially identified women of color. These women have survived because they are particularly good at playing the game; but they are good at playing it because they have had to play a harder game than anyone else” (p. 362).

Using the following theoretical and conceptual frameworks of Harding’s strong objectivity, Critical Race Theory (CRT), Critical Race Feminism (CRF), and Foucault’s *parrhesia*, I continue the exploration of outspoken women of color in the sciences and the ways they navigate these tensions between self, community, and science.

Theoretical and Conceptual Frameworks

To examine the experiences of women of color in the sciences, I have chosen to situate this study at the intersection of three theoretical perspectives and one conceptual framework. Each one of these perspectives and framework were developed to name and expose the concept

of *power*. They address power's exploitative and nuanced relationships among society. Each is meant to be liberatory. Standpoint Theory, Critical Race Theory (CRT), Critical Race Feminism (CRF), and Foucault's *parrhesia* aim to dismantle oppressive power over subordinated identities by exposing its nature in the prevailing U.S. power structures and systems. They each address the social constructs of objectivity, race, gender, and risk, respectively, while also recognizing the reality of the implications of these constructs.

I start with Sandra Harding's Standpoint Theory. Harding called for science to end its love affair with "weak objectivity." She argued that a value-free research approach led to a false narrative that perpetuated androgyny, white supremacy, and other oppressions. By using Standpoint Theory as an opening, I continue with Critical Race Theory and Critical Race Feminism to explore specific aspects of racial and gendered dynamics of power that continue within higher education, society, and science. Finally, I introduce Foucault's conceptual framework of *parrhesia*. Whereas Standpoint Theory, CRT, and CRF are used to problematize the systems and experiences of women of color in the sciences, *parrhesia* is used to explore intentions and strategies women choose to protest, engage, and liberate themselves from power structures that exist around them.

Standpoint Theory and "Strong Objectivity"

In 1986, Sandra Harding released her book, *The Science Question in Feminism*, to both significant criticism and intrigue. In that book, Harding (1986) introduced the concept of standpoint theories and its use in the sciences. She denounced the concept of "objectivity" and its absurd call for value-neutrality in scientific research. While I found her past philosophy helpful, it is Harding's more recent work that I ground my perspective for this study.

In *Objectivity and Diversity*, Harding (2015) clarified her arguments for Standpoint Theory in the sciences and further addressed her critique of objectivity. Widely used in feminist epistemologies, Standpoint Theory calls for (a) researchers to address the values that drive the research questions for a project (e.g., positionality) and (b) research to start from “outside the dominant conceptual framework” (p. 30). For Harding, this meant including marginalized communities in establishing research questions—addressing the questions the community wanted answered—and using community-focused methodologies, such as participatory action research, to answer those questions.

Addressing the use of objectivity in the sciences, Harding distinguished between “weak objectivity” and “strong objectivity.” “Weak objectivity” neglects to name the power structures, such as research funders, global industrialization, and capitalism, that affect what research questions get asked and have priority. It feigns a value-neutral perspective when in reality it perpetuates a Eurocentric, white male perspective. The lack of racial, gender, and other diversity within the sciences affects the diversity of experiences and questions that have historically been asked. “‘Weak objectivity’ is too narrowly focused to maximize the objectivity of research” (p. 34).

Some earlier critics of standpoint theory described Harding’s perspective as a repackaging of identity politics or cultural relativism. Just because she called for a widening of perspective— “a rejection of the value-free ideal” of objectivity—she does not lose sight of the necessity for objectivity in research. In her defense of Standpoint Theory in science, she stated “objective research should be fair to the evidence, fair to one’s critics, and fair to the most severe criticisms one can imagine even if no one has yet articulated them” (p. 33). Naming and problematizing the power structures that often direct research questions only makes objectivity

stronger. Harding called for a “strong objectivity” that still does all of the above *and* allows for the researcher to name the values underlying research questions at hand.

The basic characteristics of “strong objectivity” include (a) an understanding that objectivity is rooted in its political and historical context, (b) a commitment to objective research (named more specifically above), (c) co-constructing and co-producing research with and for marginalized communities, and (d) working with and among diverse and interdisciplinary research groups. Harding’s work continues to problematize the culture of science and its impact on society. The evidence suggests women of color in the sciences are more likely to co-construct and co-produce research with a sense of responsibility to marginalized communities. Having lived experiences that have also been rooted in political and historical contexts, their ability to ask questions that meet the tenets of strong objectivity may be more accessible for women of color. Celebrated immunologist and Black woman who worked on the groundbreaking COVID-19 Moderna vaccine, Kizzmekia Corbett, highlights this tension: “I could never sleep at night if I developed anything—if any product of my science came out—and it did not equally benefit the people that look like me. Period” (Subbaraman, 2021). In defense of Standpoint Theory and “strong objectivity,” Harding is clear about its use to explore all kinds of oppression though it is heavily rooted within feminist epistemologies. I have chosen to reinforce it with other theoretical frameworks that intentionally situate racial and gendered experiences in science and society. In the next sections, I include CRT and CRF as an opportunity to zoom into the unique aspects of racial and gender oppression that might be highlighted in my participants’ lived experiences.

Critical Race Theory

Over the past few decades, Critical Race Theory (CRT) has been heavily adopted within educational research, especially higher education research. Its use in framing race as an

underlying power structure in the United States has been useful for higher education researchers to examine the historical racial tensions that colleges and universities were established upon and continue to propagate.

Like many CRT scholars before me, I use CRT to establish a framework for interrogating racialized experiences in the sciences. The science community hides behind philosophical notions of scientific neutrality. As long as one sticks to the scientific method, researchers act as if bias cannot affect their inquiries. For far too long, science acts infallible with little to no acknowledgement of the humanity that muddies its virtues. Many scientists romanticize the scientific method, put too much faith in the institutional ethics and peer review processes, and balk at the mention of social identity clouding the interpretations of their experiments (Harding, 2015). I dream of a critical science community who accounts and makes reparations for its past afflictions on marginalized communities, acknowledges the very systems (e.g., peer review) that have been infiltrated to enforce systemic power structures, and is prepared to dismantle the current toxic science structure from the ground up. As a theoretical framework, CRT can assist in making “weak objectivity” science stronger.

I appreciate CRT for its ability to expose what is felt yet seems invisible. CRT is rooted in the reality that racism exists within the basic structures of U.S. society. Stemming from the study of legal cases in the Civil Rights era, Critical Race scholars aim to expose the “unequal and unjust distribution of power and resources along political, economic, racial, and gendered lines” (Taylor, 2009, p. 1). Ladson-Billings and Tate (1995) introduced CRT as a framework in education. Along with DeCuir and Dixson (2004) and Solorzano and Yosso (2001), educational CRT scholars developed an educational framework of CRT with the following tenets: (a) racial realism, permanence, and foregrounding of race and racism; (b) centering the experiential

knowledge of students of color; (c) interest convergence; (d) intersectionality; (e) whiteness as property and racial commodification; (f) critique of liberalism, neoliberalism, and education practices that assume “neutrality” and “objectivity;” and (g) commitment to work toward social justice.

Racial Realism and Permanence of Racism

The foundational tenet of CRT is called racial realism. Simply stated, racism exists. Even though race is a socially constructed concept, CRT asserts the reality that race has been used to phenotypically categorize and marginalize groups of people (Solorzano & Yosso, 2001). Race is the central theme in our experiences of interacting and relationship building. In the U.S., racism is inherently braided into our government and educational structures, but it can be difficult to recognize due to its pervasive ideology (Brown & Jackson, 2013; Gloria Ladson-Billings & Tate, 1995). CRT scholars intend to shed light on racism as it relates to policies and social structures, so CRT research intentionally foregrounds race and racism. Bell (1992) specifically addressed racism within the judicial power structures of the U.S. Within science, CRT researchers find fault with metaphors, like “the leaky pipeline,” to describe the absence of people of color pursuing a profession within the science disciplines (Cannady et al., 2014). Scholars studying student activism have used CRT to expose the seemingly coincidental timing of developing institutional policies created to subdue outspoken students just as more students of color were entering the university landscape (Linder, 2018). Higher education history is riddled with *coincidences* like these. “The central paradox of American history is that the rise of liberty and equality was accompanied by the rise of slavery” (Cleaver, 2003, p. 51).

Centering the Experiential Knowledge of People of Color

CRT research serves to offer *counternarratives* or *counterstories* as alternatives to “master narratives” that dominate society’s understanding of people of color. These offerings are rooted in the fact that people of color’s stories have not been prioritized or allowed to be told *without consequence*. Solorzano and Yosso (2001) claimed that racially marginalized students’ voices should be valued and served as legitimate sources of knowledge to expose dynamics of power and racism that exist within the education system. In CRT, the main purpose for the inclusion of *counternarratives* is to critique the normative ideology of white supremacy. What we have come to learn through these *counterstories* is that the application of whiteness can be subtle as opposed to overtly racist acts.

Dugan (2017) describes the nuanced differences between ideology and hegemony: “Whereas ideology typically functions through coercion and fear of punishment, hegemony is a result of individuals’ consent or silent acceptance of a dominant group” (p. 36). People of color within a variety of industries speak of experiencing microaggressions—“brief and commonplace daily verbal, behavioral, or environmental indignities, whether intentional or unintentional, that communicate hostile, derogatory, or negative racial slights and insults toward people of color” (Sue et al., 2007, p. 271). For women graduate students of color in the pervasive white science spaces, these microaggressions reportedly left them questioning their sanity. In an act of liberation, the ability to tell their story offered them opportunities to combat self-censorship and questioning of their self-worth to organizations and society at large (Gildersleeve et al., 2011).

Counterstories in the sciences are continually growing and exposing the harsh realities of people of color in the field. These studies offer ideas for action from the stagnant request for more research to be done to the transformative call for a complete overhaul of the scientific field.

Harding (1998) contended that all new scientific inquiry should be based on the experiences and social relations of marginalized people. As people of color continue to share their experiences with science, we must be prepared to truly listen to the pain and anguish science has physically, emotionally, and psychologically inflicted upon them and work toward collective healing actions.

Interest Convergence

Considered to be one of the founders of CRT, Derrick Bell (1987, 1992) introduced the concept of interest convergence by using the *Brown v. Board of Education* Supreme Court case on school desegregation as an example. He argued that progress for racial equality is only made when people of color's interests converge with the interests of white people or those in power (Bell, 1987, 1992; Brown & Jackson, 2013; Ladson-Billings & Tate, 1995). Using interest convergence, Baber (2014) scrutinized an institution's initiative to increase compositional diversity in science programs to showcase their diversity-related efforts. He highlighted how these science programs for students of color encourage their assimilation to current institutionalized science-based norms (Baber, 2014). The effort to increase "access" for students of color juxtaposed with the lack of resources required to make the program beneficial for these students exposed the true purpose—to increase the number of students of color without the backing of resources to help them while enrolled at the institution, something akin to entrapment. This example and other studies have shown the impact of students of color in a learning environment benefit the cognitive academic learning outcomes of white students in the classroom, but the effects of being in a diverse classroom directly impact students of color negatively (Goodman, 2017; Goodman & Bowman, 2014; Guinier, 2004). In order to create change on campuses, current student leadership education has incorporated the recognition of

interest convergence as a legitimate leadership and bargaining skill to encourage social justice action (Dugan, 2017).

Intersectionality

Kimberlé Crenshaw (1991) focused CRT by incorporating the concept of intersectionality. Originally introduced by exploring Black women's race, gender, and class experiences, Crenshaw examined the ways the law and policing systems silenced and further marginalized Black women on several affronts. Adopted by educational CRT scholars, intersectionality is employed as a way to explore the intersections of identity development among multiple marginalized student populations (Crenshaw, 1991). CRT scholars denounced the binaries that exist within social identity constructs and explored the interplay of several forms of oppression within intersecting subordinated identities (Ladson-Billings, 2013). Employing intersectionality, critical race theorists purposefully expose *power structures* at the intersections of subordinated identities. Intersectionality has been adopted by a second wave of CRT that consists of Critical Race Feminism (CRF). Later, I will explore intersectionality further as it relates to CRF.

Whiteness as Property and Racial Commodification

Bell (1992) and Harris (1993) pointed out a unique connection between race and capitalism in the U.S. Similar to interest convergence, Bell gave voice to the concept of racial commodification—the nature of Black bodies being used as a source of capital. Dated back to the enslavement of Black and Indigenous peoples, nuanced examples of racial commodification are aplenty within higher education; it essentially describes any time students of color are being *used* for the benefit or profit of a program or institution without regard for the students' physical, emotional, or psychological well-being.

Harris (1993) provided a historical analysis of how whiteness became a valuable source of power that was to be protected by social and legal structures of U.S. society. Examining whiteness through the laws for property rights, Harris argued that the benefits of owning or possessing whiteness included access to rights and privileges from which *perceived* people of color are excluded. People of color *perceived* to be white also benefited from privileges whiteness afforded them. Whiteness decided whether you were seen as slave or free citizen; it became an aspect of property that was meant to be valued and protected at all costs from Black and Brown people who would seek to gain access and privilege to organizations and systems that were afforded to white people simply because of the color of their skin. Whiteness became synonymous with having all of one's rights (Harris, 1993, p. 280).

CRT scholars in education used whiteness as property to explore the role of curriculum and school administration to perpetuate the cycles of socialized oppression (DeCuir & Dixon, 2004; Ladson-Billings, 2013). Similarly, "scientific truth" is seen as a property of whiteness to be protected from the subjectivity of identity and politics (Harding, 2015; Otto, 2016).

Critique of Liberalism, Neoliberalism, and Education Practices that Assume "Neutrality" and "Objectivity"

Described as one of the contextual differences that led to CRT scholars breaking away from critical legal studies (Brown & Jackson, 2013), the neoliberal ideology of incremental change toward anti-oppressive policies is not acceptable (DeCuir & Dixon, 2004; Delgado & Stefancic, 2017). CRT calls for revolutionary, sweeping responses to individual, group, and systemic oppressive norms (Ladson-Billings, 1995). The concepts of neutrality, objectivity, color-evasiveness, and meritocracy perpetuate a white self-interest ideology (DeCuir & Dixon, 2004; Harding, 1986, 1998, 2015; Solorzano & Yosso, 2001). These concepts are neoliberal tactics that

attempt to show up as being part of a post-racial society but has yet to do the work to heal the harm that has been caused by centuries of racial marginalization.

Science programs nationwide boast ties to McNair scholarships and undergraduate research programs as ways to incrementally assimilate students of color within the norms of objective science. These science programs attempt to promote involvement by students of color without systematically addressing the issues that keep students of color from progressing in the field.

Commitment to Work Toward Social Justice

Bell (1992) argued that working toward the eradication of racism within U.S. society was a futile effort. In response, Ladson-Billings (1995), Solorzano and Yosso (2001), and Brayboy (2013) argued that CRT scholars in education should not be content in just exposing racism within education. As active participants in curriculum and policy development, CRT scholars should make a concerted commitment to resist perpetuating racist stereotypes, norms, and ideologies.

Within committed work toward social justice, CRT researchers are purposefully engaged in political work. Similarly, I have shown how researchers are using CRT to problematize race and racism in the sciences for the purposes of making systemic social change within the discipline. For decades, scientists have portrayed their purpose for doing this work as a public good. With a CRT lens, we ask who benefits the most from the public good? Who defines “good?” Harding (2015) reminded us that science and objectivity are politically and historically contextualized. CRT frames the current scientific context as racist and promotes alternative opportunities to set the course of future scientific research in alignment toward an equitable, just,

and anti-racist society. In the next section, I describe why Critical Race Feminists say that is not enough.

Critical Race Feminism

Further expanding CRT's tenet of intersectionality, Critical Race Feminism (CRF) emerged as a theoretical perspective for researchers exploring the relations between structures of racism, sexism, and classism. Like CRT, CRF has established its own tenets as a guide for researchers. "Critical Race Feminism (CRF): (1) maintains that the experiences of women of color are unique; (2) focuses on the relationship between the intersectional identities of women of color and experiences with heteropatriarchy and racism; (3) challenges monolithic conceptions of women of color; and (4) supports the use of theory and practice that counter gender and racial oppression" (Pabon & Basile, 2019, p. 3-4). Engagement within and against political and systemic structures is a requirement of CRF (Hill Collins & Bilge, 2016).

Before the publishing of Crenshaw's (1991) often cited intersectionality legal framework, queer, immigrant, and working class women of color were exploring intersectionality in their lives through art, poetry, and community organizing. Intersectionality has guided the activist practices of Black feminists and lesbians everywhere from the Combahee River Collective to the Movement for Black Lives (Hill Collins & Bilge, 2016). Anzaldúa (2002) explored intersectionality through a Chicana feminist lens in her descriptions of experiencing the physical, spiritual, linguistic, and theoretical borderlands. In this way, intersectionality serves as a bridge between theory and praxis.

Hill Collins and Bilge (2016) offer insight to intersectionality's use as an analytic tool to explore power. "Power is better conceptualized as a relationship, as in *power relations*, than as a static entity" (p. 28, italics in original). The researchers differentiate the ways power exists in

society. Through structural, disciplinary, cultural, and interpersonal domains of power, racism and sexism inform and reinforce each other and different forms of systemic oppression. Research rooted with an intersectional lens must attend to these power relationships in an effort to liberate and empower research participants (Hill Collins & Bilge, 2016).

Simply being women of color does not mean that we are all on the same page or have similar motivations. Women of color can perpetuate racist and sexist agendas too. White supremacy and heteropatriarchal cultures have impacted women in different ways. Critical Race feminists seek reckonings within communities of color as much they do outside of them: “We are afraid to look at how we have failed each other. We are afraid to see how we have taken the values of our oppressor into our hearts and turned them against ourselves and one another” (Moraga & Anzaldúa, 2015, p. 27). In using this framework, I must be careful to not over-generalize experiences and intentions when analyzing and reporting data. Uncovering the ways women of color have harmed each other is an intentional goal of this type of research. Reflecting on their intentions and actions within an oppressive science culture may prove to be a liberating act of acknowledgement.

While I appreciate the academic characterizations of CRF, I relish the contrasting messiness of it to the stereotypical order of scientific inquiry. Often these research questions born out of the experiences of marginalized communities are not the ones science has historically asked (Harding, 2015). When I think of the history of science and how science has been used to vilify Black and Indigenous communities of color, I wonder how women of color exist within science culture without questioning their worth? How do they come to terms with their philosophies of science? What acts of liberation, if any, do they participate in? Why have women

of color in the sciences chosen this discipline despite its toxic culture? How has it treated them? Who has shown up as their allies and advocates within and outside the science community?

In geometry, we are taught the physics behind “tension.” Look it up and you will find synonyms of being stretched tightly or expressing a mental or emotional strain. In physics, we know of it as an application of force. Imagine women of color in the sciences for one moment holding onto an infinite amount of intersectional repelling forces being stretched so tightly as to cause physical, psychological, and emotional strain every single day. Additionally, these tense experiences have served as training grounds for women to hone special survival tactics, such as Anzaldua’s (1999) *la facultad* or Page-Reeves et al.’s (2019) wayfinding.

With this image in mind, I sought to find a conceptual framework that would help me further explore the process women of color in the sciences use to analyze the risks, responsibility, and reward when choosing to speak up for themselves and against oppression within the science discipline. I found it in Foucault’s analysis of *parrhesia*—speaking truth to power. I examine the ways women of color navigate structures and relationships in their decision to speak truth to power.

Foucault’s Power Analytic

Foucault’s obsession with exposing power systems permeates all of his work. He is well known for using the method of genealogy to examine specific events in history that account for the ways we think about a topic or discourse. In *The History of Sexuality*, Foucault (1990) used this method to trace the concept of sexual repression and deviance to the Victorian bourgeoisie’s desire to maintain power in opposition to a growing call for a democratic government. In *Discipline and Punish*, Foucault (1995) uniquely details the creation of prisons and institutions as a way to keep individuals and groups in order within society. Foucault later explored the

concept of biopolitics—how political systems affect how we see, engage, understand humanity and the ways these political systems strip away our humanity from our bodies (Foucault, 2010).

Foucault had a particular eye for criticizing the use of power within the medical and scientific fields. From his perspective, scientists “are given an authority because their work and our fate are intertwined, not because they have any special claim to represent reason” (Foucault, 2010, p. 23). Like Harding, Foucault critiqued objective science as pure truth. Operating under the guise of truth and knowledge, scientists celebrated a unique freedom to experiment on “deviants” and marginalized populations. “Strategists of life and death,” scientists and medical professionals were given power by society to decide whose life had worth because of their objectivity and value-neutral claims (Foucault, 2010). Foucault adamantly opposed scientists’ and medical professionals’ objectivity claims on the basis that truth, power, and politics were closely intertwined. Speaking to his work’s purpose, Foucault writes, “It seems to me that the real political task in a society such as ours is to criticize the working of institutions which appear to be both neutral and independent; to criticize them in such a manner that the political violence which has always exercised itself obscurely through them will be unmasked so that one can fight them” (Foucault, 2010, p. 6).

Through these analyses and critiques, Foucault established a framework of power. He was very clear that this framework was meant to be an *analytic* of power and not a theory of power. Like Standpoint Theory, CRT, and CRF aim to expose the “weak objectivity,” racial, and gendered undercurrent of society, Foucault unmask power’s nuanced behaviors that often go unseen. For Foucault, power’s ultimate weapon is secrecy, calling it “indispensable to [power’s] operation” (Foucault, 1990, p. 86). As an analytic, Foucault highlights the following propositions of power: (a) power is pervasive; (b) power is invasive; (c) “power comes from below;” (d)

“power relations are both intentional and nonsubjective;” and (e) resistance follows power (p. 95). While I employ Foucault’s work in the area of resistance, specifically, it’s important to note how Foucault describes power and how he sees it applied in society as a baseline.

Power is Pervasive

“Power is everywhere; not because it embraces everything, but because it comes from everywhere” (Foucault, 1990, p. 93). Power exists within every relationship, whether individual, group, or systemic. This is similar to Harding’s argument about “weak objectivity” and “strong objectivity” in the sciences, and intersectionality’s focus on power relations. Since power exists everywhere, scientists should find liberty in naming the power structures that were considered in a research project. I witnessed the regulatory institutions of science attempts at acknowledging power relationships when asking researchers to share conflicts of interest and funding agreements for research projects during the publishing process. While naming power relationships is key, Foucault reminds us that simply naming power exists does not rid us of the power relationship. As Foucault (1990) says, “Power is not acquired, seized, or shared, something that one holds on to or allows to slip away; power is exercised from innumerable points...” (p. 94). While Foucault does not specifically discuss racism and sexism, his work alludes to the impervious and intersectional nature of racism and sexism. In conjunction with standpoint theory, CRT and CRF, I aim to create a comprehensive picture of the overwhelming oppressive nature of racism and sexism, even when exhaustively resisted.

Power is Invasive

While we often think of negative outcomes when power is enforced, Foucault (1990) makes it clear in his analytic that power also provides a “productive network.” “[It] doesn’t only weigh on us as a force that says no, but ... it traverses and produces things, it induces pleasure,

forms knowledge, produces discourse” (p. 61). If power only produced oppression, people would not accept it. Power is seductive and internalized by dominant and subordinated identities. Some individuals or groups are granted power through a structural system, but often masks itself as individualized. When we interact with each other, we are trained not to acknowledge the power system. We attribute any positive or negative interactions to personality or individual misgivings.

CRT names this phenomenon within its discourse differential racialization. Differential racialization is a nuanced tactic of white supremacy and interest convergence (Omi & Winant, 2015). “Whiteness racializes different groups of people in different ways at different times in response to changing needs” (Basile & Lopez, 2015). It pits different minoritized racial groups against each other. The model minority myth describes Asians as “intelligent, gifted in math and science, polite, hardworking, family oriented, law abiding, and successfully entrepreneurial” (Wu, 2002, p. 40). This particular myth has burrowed a home within the ideological framework of the science discipline. Poon et al. (2016) exposed the model minority myth as a sophisticated tactic of using Asian exceptionalism to perpetuate anti-Black sentiments within society. Additionally, Basile & Black (2020) use Delgado’s concept of “the siren song of uniqueness” to examine how institutions lure Black students into science disciplines by making them feel special. Once inside, the system expects these Black students to assimilate to whiteness in order to advance in the discipline. CRT exposes these lies as part of the “productive network” that Foucault describes as crucial to the maintenance of power structures.

Power Comes from Below

Foucault writes often of duality: illicit behavior versus appropriate behavior; freedom versus imprisonment; deviance versus normalcy; powerful versus oppressive. When he describes power as coming from below, he exposes several tactics that those with power use among the

powerless. Foucault (1990) believes that there is always a coercive component of power that exists within relationships. The powerless do not freely give their control away; they are influenced or made to do so through these tactics. One of the tactics that Foucault described in depth was the use of discipline. “The chief function of the disciplinary power is to ‘train’” (p. 188). The powerless are trained to think less of their abilities, to respond positively to attention, to report each other when one is out of line. In CRT and CRF, these are described as microaggressions or microassaults. A more nuanced tactic is normalization. When one deviates from what society deems normal, some corrective action must be employed. In the case of normalization, the deviant is ostracized as an outsider and is often institutionalized in a setting far away from society’s view (i.e., prisons or mental institutions). In the science discipline, “the leaky pipeline” has been used to describe the decline of students of color interested in the science disciplines as if it’s the students’ fault for being leaked out. CRT has been used to problematize the perpetuation of the deficit-mindset model within the leaky pipeline concept (Cannady et al., 2014). Additionally, Foucault’s concepts of normalization can be used to describe the systemic ostracizing of students of color.

Power Relations are Both Intentional and Nonsubjective

“There is no power that is exercised without a series of aims and objectives” (Foucault, 1990, p. 95). Foucault’s main purpose of exploring history is intentionally exposing the tactics and reasons behind historical decisions and events. Foucault would agree with CRT’s tenets of interest convergence, whiteness as property, and racial commodification, because he believes there is always an underlying reason for certain decisions to be made.

In *Discipline and Punish*, Foucault (1995) describes “the great anonymous” to expose the reality that those with power never asked to receive it; power was just given to them (p. 95).

Where CRT and CRF would call this “having privilege,” both Foucault and critical theorists write about the responsibility those with power have to acknowledge their privilege and the effects that privilege has on the oppressed.

Resistance is a By-Product of Power

Returning to Foucault’s love of duality, he has a lot to say about the concept of resistance to power. In fact, power cannot exist without some resistance to it. Since power is pervasive, this resistance ultimately comes from inside of the power structure. Consequently, Foucault (1990) says that one can never fully escape the grasp of power. One will always be resisting power at all times. It is here in this complexity of resistance that I will continue to employ Foucault’s analytic of power as it relates to his description of *parrhesia*.

Foucault's Parrhesia

Up until this point, I have used standpoint theory, CRT, and CRF to identify several dynamics of power that exist within structures examining the intersections of objectivity, race, and gender within the sciences. I now offer the conceptual framework of *parrhesia* as a way to examine how women of color navigate risk when exposing racial and gendered experiences within the sciences.

In one of his last lectures, *Fearless Speech*, Foucault (2001) turned his attention to the resistance of power. Using his genealogy method, Foucault set to explore the historical roots and impact on the experience of *parrhesia*. Within rhetoric analysis, the Greek term *parrhesia* has been translated to the act of “speaking truth to power.” A *parrhesiastes* is “one who uses *parrhesia*” or “the one who speaks the truth” (p. 11). In his analysis, Foucault (2001) offers an interpretation of what *risk*, *responsibility*, and *truth* means in the *parrhesiastic* context. He further outlines rules to identify the existence of *parrhesia*. According to Foucault, the existence

of *parrhasiastes* is critical to a healthy, stabilized democracy. We should all seek to invoke the power of *parrhesia* when context allows for us to speak truth to power.

Parrhesia cannot occur without some risk involved. “There must be a risk of danger in telling the truth” (p. 16). In order for risk to be managed, some type of relationship must be maintained. A *parrhasiastes* must have “courage in the face of danger” to risk losing her life, position, or popularity (p. 16). The threat comes from the other person in the relationship. Courage requires having integrity to her values and choosing to see herself as a “truth-teller.” It requires a choice to choose herself over the Other.

Foucault (2001) speaks of the importance of a sense of duty or responsibility in *parrhesia*. A *parrhasiastes* must have the freedom to choose to speak. Essentially, she is absolutely “free to keep silent,” but it is her sense of responsibility and duty to herself, others, and the relationship that leads her to risk that very freedom that allows her to speak (Foucault, 2001, p. 19). Her liberation is connected to her ability to maintain true to herself in the face of oppressive power. Because of these dynamics, Foucault (2001) makes it clear that anyone who has the power in the relationship cannot use *parrhesia*. In order for *parrhesia* to occur, a complete analysis of power, risk, and responsibility are required.

The next step in analyzing *parrhesia* requires the user to evaluate the frankness and authenticity of her truth. Foucault (2001) warns us of pejorative notions of *parrhesia* that consist of mindless chatter. Foucault (2001) asks, “Does the *parrhasiastes* say what [s]he *thinks* is true, or does [s]he say what *is* really true?” (p. 14). In order to assess *parrhesia*, we are looking for proof of truth. The proof—the objective reality—“can no longer occur in our modern epistemological framework” (p. 14). Foucault says that we have been tainted by the Cartesian understanding of evidence. This is why I found it important to include Harding’s framework of

“strong objectivity” within this study—to assist in evaluating truth. Foucault, Harding, and the Greeks’ believe that “when someone has certain moral qualities, then that is the proof that [s]he has access to truth” (Foucault, 2001, p. 15). “If there is a kind of ‘proof’ of the sincerity of the *parrhesiastes*, it is [her] courage. The fact that a speaker says something dangerous—different from what the majority believes—is a strong indication that [she] is a *parrhesiastes*” (Foucault, 2001, p. 15).

Parrhesia as a conceptual framework is not without its own problems. One of the earlier critiques involves the very nature of democracy. How do we know if a person speaks *the truth* in a democratic system “where everyone is equally entitled to give his own opinion” (Foucault, 2001, p. 73)? Again, Harding’s (2015) “strong objectivity” helps us to understand that *the truth* “should be fair to the evidence, fair to one’s critics, and fair to the most severe criticisms one can imagine even if no one has yet articulated them” (p. 33). When *the truth* is spoken to power, the courage it takes to speak it should be respected by the organization and community it helps to elevate.

Six years before Foucault’s seminar on *parrhesia*, Audre Lorde spoke of the transformation of silence into language and action in a speech to the 1977 Modern Language Association conference (Lorde, 2007). Lorde confessed the power silence seemed to have over her as a Queer, Black woman. “In the cause of silence, each of us draws the face of her own fear – fear of contempt, of censure, or some judgment, or recognition, of challenge, of annihilation” (Lorde, 2007, p. 42). These fears resonate with Foucault’s definitions of danger and risk within *parrhesia*. Lorde resituates these fears as a source of strength: “[T]hat visibility which makes us [women of color] most vulnerable is that which also is the source of our greatest strength. Because the machine will try to grind you into dust anyway, whether or not we speak” (Lorde,

2007, p. 42). Lorde speaks of the responsibility women of color have to themselves and to others to not allow the system to render them silent. She describes breaking silence as a skillset that can be learned, practiced, and honed over time, and she warns that the weight of silence can be just as dangerous as the risks of speaking out. Foucault's *parrhesia* and Lorde's transformation of silence both speak to the transformation of weakness to strength and the unique ways women of color are situated to impact society in immense ways.

CRT and CRF describe the ways that the cards are stacked against women of color invoking *parrhesia*. The risks are overwhelmingly high for women of color in the sciences who aim to speak their truth. Yet women of color in the sciences are "transforming their silence to language and action" (Lorde, 2007, p. 42). Recent activist movements affecting how society engages with science have provided platforms for women of color to publicly evaluate their oppressive experiences in the sciences and to find community among other like-minded *parrhesiastes* with similar concerns.

Conclusion

When choosing to speak up for themselves, women of color in the sciences have had plenty of practice. Among classrooms, research environments, professional spaces, and countless other circumstances, women of color have carved a place for themselves as science professionals. The competitive, isolating, color-evasive, weed-out, patriarchal culture of the sciences serves as a consistent challenge for Black, Indigenous, women of color to overcome throughout their classroom and professional experiences.

My research is an examination of the experiences of outspoken women of color in the sciences as they consider the risks, responsibility, and rewards for speaking truth to power. Rooted in theoretical frameworks that expose and challenge oppressive systems, I use Foucault's

(2001) analysis of *parrhesia* – speaking truth to power—to understand the motivations and visions for the future of science that drive women of color to speak out despite daunting risks. Foucault (2001) describes the act of *parrhesia* as a “game” that requires attentive strategy, manipulation of relationships, and particular skills to be successful. Some women have developed *la facultad*—a survival tactic that only marginalized people in society can access that serves as a sixth sense for them to quickly read a situation and respond in a way that protects them from harm (Anzaldúa, 2012). Using *la facultad* and other techniques, women of color have been able to successfully navigate overwhelmingly white, patriarchal science spaces.

In choosing to speak truth to power, I was interested in understanding the tension women of color hold when navigating their responsibility to themselves, interpersonal relationships, their diverse cultural communities, and the science discipline itself. Each of these responsibilities carries a certain weight with it. Depending on how a participant personally assesses the importance of that responsibility and the possible consequences when doing so, a woman will either choose *parrhesia* or another stereotype management strategy.

In the next section, I provide an outline for the components of this study, which focus on the trajectory of the women’s careers, stereotype management strategies, and their motivations behind their *parrhesiastic* moments. Using *parrhesia* as an analytical framework, I detailed how participants assessed their own risk, responsibility, and rewards when choosing to speak truth to power.

Chapter 3: Methodology

The purpose of this study was to examine the experiences of outspoken women of color in the sciences as they consider the risk, responsibility, and reward for speaking truth to power. Using Foucault's analysis of *parrhesia*, I asked women to share their motivations for speaking truth to power and the benefits they received for doing so. Foucault (2001) describes the act of *parrhesia* as a "game"—one that requires strategy, negotiation, and skill to be successful. Women of color sharpen these skills in the midst of science's competitive, isolating, color-evasive, and weed-out culture (Johnson et al., 2011). I chose to study women of color in the sciences and their ability to invoke *parrhesia* precisely for this reason. Science is one of the most oppressive academic cultures in which women of color attempt to professionally thrive (Johnson et al., 2011; McGee, 2020). Many women of color have found success despite the stifling culture and are working toward solutions to allow younger women of color a freedom in the sciences that they have not previously been afforded. I explored the ways women of color used their unique skill sets grounded in the cultural intuition of wayfinding (Page-Reeves et al., 2019) and *la facultad* (Anzaldúa, 2012) toward the promotion of a more just, inclusive, and equitable science.

The research questions guiding this study were:

1. What motivating factors guide women of color in the sciences to choose to speak truth to power?
2. How do women of color in the sciences envision the future of science culture?

In order to answer these research questions, I situated this study within a Critical Race and Critical Race Feminist epistemology. As a critical qualitative researcher, I used a form of narrative inquiry, the *counternarrative*, to privilege the marginalized experiences of participants.

I aspired to empower women of color in the sciences to confidently challenge the structures that maintain the oppressive status quo in both science and society.

Methodological Stance

I am a critical qualitative researcher. As such, my inquiry was rooted in understanding the ways the participants of this study made meaning of their experiences, while also choosing frameworks and methods that purposefully interrogated oppressive systems (Bhattacharya, 2017). “[T]he term ‘critical’ means criticizing, rejecting, and/or trying to fix the social problems that emerge in situations of social injustice” (Hill Collins & Bilge, 2016). I was drawn to critical research’s call to praxis and reflexivity (Crotty, 1998). As a critical researcher, I aspired to actively work toward social justice by asking relevant questions that critique inhumane systems and in so doing promote social change. The target of my attention was understanding the ways the oppressive science culture has plagued women of color’s existence in the science field.

In the literature review, I wove together well-documented instances of oppressive acts that situate women of color at a significant disadvantage with expectations to perform academically and professionally among precariously oppressive circumstances. I approached this interrogation with a critical lens—one that was meant to critique the current science culture, reject the notion that this oppressive culture should continue to be normalized, and collaborate with the participants of this study to envision a more just, inclusive, and equitable science environment. With this research, I made no attempts to justify generalities or cause and effect (Glesne, 2015). In form with CRT, CRF, and Foucault, I aimed to problematize the relationship between truth and power, and “to question truth as truth operates through power and to question power as it operates through truth” (Madison, 2020, p. 5). I privileged the participants’ stories as their gift of truth to this matter. As mentioned previously, I also examined their narratives

through the theoretical frameworks of Critical Race Theory (CRT), Critical Race Feminism (CRF), strong objectivity, and *parrhesia*. In the next section, I detail how these theoretical frameworks impacted the design of the study.

Theoretical Considerations on the Design of the Study

Critical Race Theory, Critical Race Feminism, strong objectivity, and *parrhesia* call for a thorough examination of power by privileging the voices, experiences, and considerations of the most marginalized in society. They each call for the researcher to blur the lines of what is considered empirical data in research (Cook, 2013; Glesne, 2015). As a researcher, I was afforded freedom in choosing methods that acknowledge power dynamics and offer suggestions for co-producing data. While CRT, CRF, and strong objectivity do not offer much directive on prescribed methods, they do provide extensive lenses with which to analyze the qualitative data I collected. When choosing a method to disseminate my findings, CRT, CRF, and strong objectivity called for the approach to be “in accessible ways” (Cook, 2013). With these considerations in mind, I used data production strategies from narrative inquiry, emphasizing *counternarrative*, with an aim to pay particular attention to CRT, CRF, and strong objectivity themes during data analysis. These theoretical frameworks aim for the empowerment of marginalized communities and liberatory praxis toward a socially just society. In the literature review, I shared the vast amount of research that has detailed the oppressive effects of science culture on girls and women of color. In this study, I intentionally focused on the ways women of color chose actions that were congruent with liberation and empowerment from the current science culture. Additionally, the frameworks called for the researcher to examine her values and positionality, as well as offer research participants an opportunity to negotiate for themselves what data is shared and for what purposes. For these reasons, I kept a field journal of my

personal reflections as another source of data and have injected my own thoughts and perceptions in to the analysis. With these theoretical framework considerations, I used the narrative inquiry methodology to explore the experiences of women of color in the sciences.

Narrative Inquiry

Narrative inquiry is the study of how humans experience and make sense of their world (Alleyne, 2015; Connelly & Clandinin, 1990; Glesne, 2015; Wertz et al., 2011). Narrative inquiry applies to anything where a narrative could exist—written, oral, self-authored or authored by someone else. It can also include a variety of field texts, from participant observations to photographs (Alleyne, 2015; Clandinin, 2006). Narratives are often co-constructed between participant and researcher and require an aspect of collaboration and negotiation to be produced (Connelly & Clandinin, 1990). Narrative inquiry “respects the relativity and multiplicity of truth” (Wertz et al., 2011, p. 224). Narrative’s main method of data production is the interview where the researcher aims to elicit “a constructed account of experience” from the study’s participants (Wertz et al., 2011, p. 225). There are several kinds of narrative categories within qualitative research. In the next section, I discuss the reasoning behind my choice of personal narrative—the *counternarrative* or *counterstory*.

Counternarrative

This study examined the empowered moment when women of color speak their truth to those who uphold oppressive power structures within science culture. I use the term “speaking truth to power” to depict this unique power dynamic. To respect the inner strength and liberation of that moment, I chose to use *counternarrative* as a methodology rooted in challenging whiteness and the majoritarian perspective. Through the use of *counternarrative*, I joined other critical race scholars in intentionally centering the experiential knowledge of women of color as

a corrective course of action rejecting research that has prioritized white narratives as the conventional norm in the standard population in the sciences (Bernal & Villalpando, 2002; Holstein & Gubrium, 2003). Proponents of CRT have used *counternarratives*, or *counterstories* (Delgado, 1989), because:

(1) they can build community among those at the margins of society; (2) they can challenge the perceived wisdom of those at society's center; (3) they can open new windows into the reality of those at the margins of society by showing the possibilities beyond the ones they live and showing that they are not alone in their position; (4) they can teach others that by combining elements from the story and the current reality, one can construct another world that is richer than either the story or the reality alone; and 5) they can provide a context to understand and transform established belief systems.

(Solorzano & Yosso, 2002, p. 156)

There are several forms of *counternarrative* that have been employed by critical scholars, such as personal narratives, other people's narratives, and composite stories (Solorzano & Yosso, 2002). The *counternarrative* requires researchers to examine the ways we share and represent the data to ensure it is accessible beyond the ivory tower (Ladson-Billings & Donnor, 2008). In order for marginalized people and communities to have access to information that could be beneficial and empowering to their lives, critical scholars have represented their research as autoethnographies, autobiographies, *testimonios*, ethnographies, narratives, composite characters and chronicles, just to name a few. I followed the tradition of developing *counterstories* through the thematic analysis of qualitative interviews and a focus group, my review of literature on the intersecting topics of race, science, and social justice, my professional experiences of working with undergraduate science students for over a decade, and my own personal experiences of

having been a Puerto Rican woman in an undergraduate science major (Solorzano & Yosso, 2002).

Positionality

As a new academic advisor for a science major, I sat across from my supervisor, a tenured faculty member with more than thirty years of experience in the department. She was training me on the curriculum flow and helping me answer students' frequently asked questions. After shadowing one of my advising appointments with a young Latina woman who was struggling with a notoriously difficult chemistry course, my supervisor exclaimed, "Well, she's gotta go!" That day, I learned my supervisor followed the "weed-out" strategy. As a former science major, I knew what this student was going through. I rarely saw people like me in my classes. I struggled to balance the onslaught of multiple science courses vying for my undivided attention. While I knew how classes "weeded-out" students, it was the first time in my career that I was personally expected to talk this student into leaving this major. Under the guise of "for their benefit," I met with many struggling students. With few helpful academic resources to provide, I helped students find a "better academic fit" that was almost always *out* of the sciences.

Early in my career, I oversaw a residential community of all science majors. I got to see these students outside of the classroom experience. I helped navigate roommate conflicts on the all-male computer science floor where an ever-present aroma of body odor sank into the carpets. The resident assistants planned social programs for socially awkward and isolated science students. I had the opportunity to see these students at their best and their absolute worst. As a building, we had one of the highest numbers of suicide attempts. When the science community moved out of the building into a new residential hall, the numbers followed.

For several years, I have taught an undergraduate research methods course for second-year students of color. Two out of the three past years, the class has been full of only women of color in science majors. At the beginning of the year, they share how different their classroom experience is from their other science courses. For example, they actually take time to know the names of the other students in the class! One student wrote in a class feedback survey that this class was one of the first times everyone got the pronunciation of her name correct.

I have been interested in the connections between science, race, and activism for a while. During a conversation with a friend who was a science major and works in the environmental health realm, I asked if she considered herself an activist. I wholeheartedly considered her to be one, and I was surprised when she said no. She said, “I’m not an activist, I’m just outspoken.” That characteristic stuck out to me. As I started to use my own *la facultad*, I found my way to seeing the outspoken nature of the many women of color in my life who graduated with a science degree. I witnessed the consequences they faced when speaking truth to power. But I also saw their pride, especially when they were able to open doors for other women of color.

I came to this study with my heart in my hands. I offered that heart to all of the participants. I have been a part of the system that has perpetuated a competitive, isolating, weed-out, color-evasive, and heteropatriarchal culture of science. Also, I have tried to be part of a solution toward a more inclusive and affirming science culture. As a critical researcher, I offer this study as a map for young women of color in science to learn how to navigate their professional environments from others who came before them.

Methods

Congruent with the *counternarrative* methodology, I conducted 13 individual semi-structured interviews followed by one focus group with women of color who fit the participant

selection criteria. Glesne (2015) points out that “qualitative researchers play an active role in *producing* the data they record through the questions they ask and with the social interactions in which they take part” (p. 44, italics in original). As a critical researcher who aims to name power dynamics in this and other research studies, I adopted this language of data *production* or *generation* over data *collection* in this study. With sensitivity to the theoretical frameworks of CRT, CRF, strong objectivity, and *parrhesia* (Strauss & Corbin, 1990), I used participants’ narratives to understand insights into risk, responsibility, and reward when choosing to speak truth to power.

Data Production Methods

The study’s main methods of data production were semi-structured interviews, a focus group, and personal journal reflections from the researcher. Building rapport with potential participants was an important component throughout the data production process. I knew I was successful when several of the focus group participants shared that they felt certain that I could provide a safe space to have this important conversation. To create interview questions, I not only looked to the literature but also incorporated questions from my personal reflections of conversations I had with women in the sciences over several years. Additionally, I used social media comments from women of color in the sciences as a form of triangulation to affirm that this topic was of value to this community. To maintain trustworthiness of the data, I followed up with several participants of the study and shared the relevant themes that emerged. By member checking (Glesne, 2015), I confirmed that the themes were accurately expressing the participants’ experiences. One participant shared that she felt “read.” By member checking, attending to my literature review, and personal experience, the data produced through interviews,

focus group, and personal reflection was filtered through several informed lenses for a thorough and trustworthy analysis.

Semi-Structured Interviews

In virtual one-on-one interview settings, I asked participants to describe their science trajectory, risk management strategies, sense of responsibility, and motivations for choosing to speak truth to power (see Appendix B). Foucault's (2001) *parrhesia* was helpful in crafting questions that attempted to get a better understanding of the motivations behind choosing to speak out. These interviews were approximately 60-75 minutes in length and audio recorded for transcription purposes.

Focus Groups

After I completed seven interviews, I invited interview participants to participate in a small focus group. Four of those participants were able to attend that day. The focus group questions centered on the second research question: how do women of color in the sciences envision the future of science culture (see Appendix C)? Participants were led through a visioning activity, which uncovered some personal definitions of success and social change in the sciences. Critical methodologies aim to create community among like-situated individuals (Cook, 2013). Since education and workspaces can be isolating for women of color (Johnson et al, 2011), I found it important for the participants to have an opportunity to engage with each other throughout the research process. The focus group lasted almost two hours and was audio recorded for transcription purposes.

Research Journal

My theoretical frameworks required an internal level of reflexivity throughout the research study. The research journal was stored with password encryption using the Scrivener

application. Throughout the data production and analysis process, I reflected on statements participants said that viscerally hit me or gave me pause. In the earlier stages of interviewing, I wrote down questions that I wanted to bring up later in the focus group. My earlier attempts at thematic analysis were also captured in the journal.

Data Analysis

After I completed the first seven semi-structured interviews, I used InqScribe to transcribe participant audio recordings into transcripts. In the initial process of transcribing, I took notes on attention-grabbing quotes that piqued my curiosity. I used my initial analysis of the first seven interviews to construct questions for the focus group. In doing so, I discovered that I needed to ask more questions about the rewards and benefits participants envisioned when speaking truth to power. In my initial instructions to focus group participants, I asked them to complete reflection pre-work that had participants envisioning a newspaper headline that would appear the next day if science was not rooted in an isolating, competitive, oppressive, and generally unwelcoming culture for women of color. After the focus group interview, I continued to complete semi-structured interviews until I exhausted the list of women of color who responded to my initial outreach.

Common with narrative inquiry, I used a thematic analysis approach to analyze the data. After uploading each transcript, I used the MAXQDA coding software for analysis. I did an initial review of each transcript, highlighting any intriguing insights. Using concepts from my literature review, I created a proposed analytical framework that was helpful during the initial coding period. Figure 3.1 shows my proposed analytical framework. After initially coding for concepts related to science identity, stereotype management strategies, and *wayfinding* (navigation and negotiation), I broke those concepts down further into more descriptive

components. Figure 3.2 shows a glimpse of a further nuanced coding structure and its components. Using Foucault’s analysis of *parrhesia*, I searched for participants’ descriptions of the concepts of risk, responsibility, and reward.

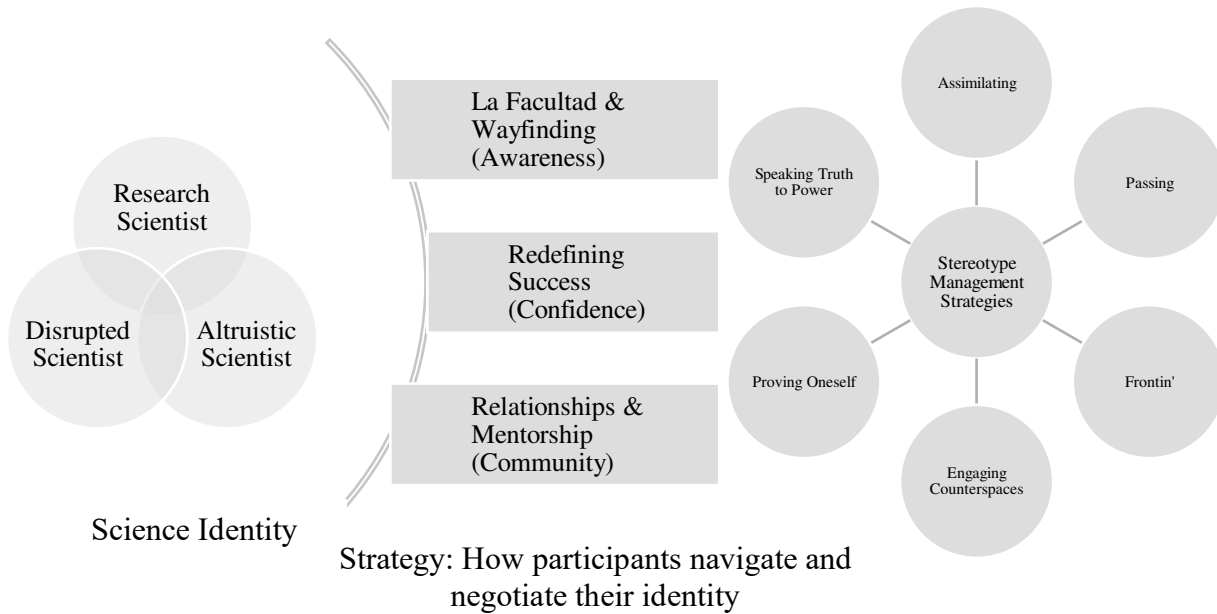


Figure 3.1 *Proposed Analytical Framework*

Science Identity	Stereotype Management Strategy	Wayfinding
• Inspiration • Encouragement • Discouragement • External Advice • Empowering Moment • Mentorship • Faculty Impact • Parental Influence	• Stereotype Threat • Fragmented Management Strategy • Sense of Belonging • Parrhesia	• Lack of Confidence • Gaining Confidence • Gaining Competence • Recognition • Impact of Social Identity

Figure 3.2 *Example of Initial Coding Structure*

Next, I used those coding structures to identify sentiments that motivated participants to speak truth to power. I was drawn to the emotional aspects of participants' experiences. Those motivations were identified into five related themes, such as courage and responsibility, pride and humility, regret and guilt, connection and visibility, and strategies. These themes were then used in the descriptions of the rules and strategies I shared in chapter 4.

Participant Recruitment and Selection

The criteria for participant selection in this study included:

1. Either self-described or has been described as outspoken, opinionated, or similar descriptions (in a professional context);
2. Self-identified cis- and Trans-women;
3. Racially and/or ethnically self-identify as a woman of color, ex. Native American, Indigenous, Black, Latina, Asian, Pacific Islander, Desi, Multiracial, Biracial, etc.;
4. Completed middle and high school education in the United States and territories;
5. Graduated with a Bachelors, Masters, and/or a terminal degree (i.e., Ph.D., J.D., M.D.) in a science field from a higher education institution in the United States.

Through snowball and network sampling (Alleyne, 2015; Glesne, 2015), I was able to interview 13 participants and conduct a follow-up focus group with four of those participants. While I did have previous relationships with some of them, I was struck by the number of participants who participated willingly without any prior personal connection. Utilizing self-disclosure tactics, as in sharing information about myself, we were able to establish lively discussions on the research topics (Holstein & Gubrium, 2011).

By participating in Critical Race and Critical Race Feminist research, participants can “become empowered participants, hearing their own stories and the stories of others, listening to

how the arguments against them are framed, and learning to make the arguments to defend themselves” against intersectional oppression (Solorzano & Yosso, 2002). In the focus group, I was struck at the candid responses and ease of connection participants seemed to make with each other. Two of the participants expressed the empowerment they felt from participating in this research study. Lauren explained the “power of actually embracing our stories and how we’ve leveraged them” has been a liberating experience for her as a young Black woman changing fields from engineering to public health. By participating in the focus group, she felt validated by the other participants sharing their different paths and life goals. Mirroring the reasons why I felt drawn to critical feminist research, Gloria shared, “When we come forward, we don’t come forward as an individual, we come with our whole community in mind. That’s our responsibility, that’s our joy, that’s our hopes for what we’re wanting to do also.” While their specific stories and experiences were unique to each participant, their understanding of the oppressive science culture seemed universal. In the next section, I share more about each participant. Table 3.2 provides an overview of participant demographics.

Table 3.2 *Participant Demographics*

Pseudonym	Profession Category	Age	Race/Ethnicity
Nikki	Research Scientist	30s	Black
Katherine	Research Scientist	30s	Indian/ white
Grace	Research Scientist	30s	Chinese/ white
Nidia	Medicine	70s	Puerto Rican
Skynet	Medicine	40s	Black
Isabela	Medicine	40s	Puerto Rican
Ava	Public Health	30s	Puerto Rican
Lauren	Public Health	20s	Black
Eva Anne	Public Health	30s	Black/ Latina/ Indian
Gloria	Natural Resources/ Conservation	20s	Chicana/ Indigenous
Margarita	Natural Resources/ Conservation	20s	Chicana/ Indigenous/ white
Walter	Business	20s	Black/ white
Selena	Education	30s	Mexican American

Participants

To understand the experiences of women of color in science speaking truth to power, I completed 13 semi-structured qualitative interviews. In this section, I introduce you to each participant within their professional categories. While interviewing each participant, I discovered similarities in stories and experiences that guided participants to certain professions. My findings contribute to the usefulness of Carlone and Johnson's (2007) science identity framework to understand the entry points to certain types of scientific disciplines and professions.

Research Scientists

Nikki, Katherine, and Grace studied or worked in more traditional research science settings within higher education or research industries. All three of them lived in predominantly white locations at the time of our interviews. Nikki, a Black bio-scientist, worked for a private research company; Katherine, a multiracial (Indian and white) virologist, was an assistant professor at a university; and Grace, a multiracial (Chinese and white) graduate student, was job searching amid graduating from her Ph.D. in biology. Nikki, Katherine, and Grace shared many similar experiences within the research science realm. Of all the participants in my study, they shared how consequential their parents' science knowledge was in supporting their science interests. Katherine's and Grace's parents were research faculty at higher education institutions. While Nikki's parents were not scientists or faculty members, they did support her interests in science by sending her to various science camps and watching science television shows with her from a young age.

Ascribing to the science identity framework, Nikki, Katherine, and Grace had tangible experiences with science that were recognized and celebrated early and often. All three women

participated in undergraduate research experiences, forming solid relationships with principal investigators (PIs), post-docs, and graduate students who provided an outline for what to expect in the future. At the time of our interviews, all three were either job searching or contemplating transitioning to another position. Nikki was the most vocal about her strategic moves regarding the trajectory of her career. She expressed a difficult transition to the predominantly white staff at her company from a more diverse lab in a larger city:

Coming here, I'm the only Black person in the entire building, like *entire* building! On all their Zoom calls, all of our meetings, I'm the *only* Black person. It's just a hard pill to swallow because for one I still feel like I have to work twice as hard to get to be acknowledged.

While Nikki was unhappy with the climate at her current position, she was still very invested in the work that she was doing. Her current position was a purposeful move to gain specific experience and reestablish her professional reputation after an awfully abusive work dispute in a previous position.

Continuing with professional transitions, Katherine and Grace, both married to other research scientists, described the ways they navigated dual job searches. In their first faculty search together, Katherine and her husband—a white man—discussed which one of them should serve as the "main" hire, while the other would plan to be employed as a spousal hire:

I'm currently applying for additional jobs elsewhere and we were kind of deciding, since we have the same job—"Do you apply? Or do I apply? Who's the better candidate?" So we've been having a lot of conversations recently. I would be a better candidate, maybe. Institutions are looking for women in faculty because they are at a lower number at this level.

In this statement, I see both a developing strategy and a lack of confidence. Katherine and her husband are trying to reach the best outcome for their relationship by putting the “better” candidate forward. Knowing the harsh environment science can be for women of color, a little seed of doubt can be seen in Katherine’s “I would be a better candidate, *maybe*.”

On the other hand, Grace and her partner have opted for the vice versa. Consequently, Grace felt like she has received a lot of judgment from others, especially her graduate advisor, who is another woman of color, about this decision. Despite the questionable feedback, Grace described how she and her partner created boundaries between their professions and their personal lives with each other:

Because of what I study, I can do a lot of different things, whereas [my partner] is a little more specialized. I was explaining to [an undergraduate student I mentor], part of the reason why I have done [as] many things as I’ve done in graduate school is to help make myself really marketable. Basically because [my partner] can only do what he can do in so many places. [The undergraduate student] asked me, “well do you feel like you’re basically under-prioritizing yourself for him?” I don’t see it as under-prioritizing myself. I see it as prioritizing my family.

Grace depicted her ability to redefine success and create a strategy to reach that definition. In her answer, she spoke of “prioritizing [her] family” as a personal goal of hers. Success for Grace was ensuring her partner and family are cared for, which is vastly different from what society and her undergraduate mentee’s definition of success was. With the prioritization of her partner’s job search process, Grace developed a strategy to ensure her ability to find something congruent with her varied skill sets.

Katherine and Grace were the only participants to bring the subject of dual job searches and talk about the strategies they planned to navigate the search process. The research faculty dual job search is unique to the culture of higher education and was rarely experienced by the other participants in other professional sectors or industries.

All participants addressed the relationship between race and science. As Asian women, Katherine and Grace were uniquely qualified to address the model minority myth and its effect on their racial identities. Grace shared how people's perceptions of her educational and professional successes were clouded by the model minority myth:

I think as an Asian American, there's the whole model minority thing that is a little bit interesting because a lot of times... I don't know... Sometimes I feel weird talking about successes. I feel like I've been a pretty successful graduate student. I feel like I was pretty successful in my undergraduate degree. I feel like over the course of my lifetime I've got a lot of "well, you're successful because you're Asian" or that "you're successful because your parents were scientists." I grew up with a lot of privilege. My parents were chemists. We were fine. But I also put a lot of work into it.

Grace felt like people expected her to be "naturally" good at science simply because she identifies as Asian. Some participants brought up the notion of a "science personality." When pressed further, they described aspects of introversion and analysis, as well as skill-based characteristics, such as problem-solving and experimenting. Carlone and Johnson (2007) and Jackson and Seiler (2013) noted there is no such thing as a "science personality." There are people who get nudged in and out of a science identity or trajectory for various reasons. Having had several negative experiences with a biology teacher in high school, Grace decided never to take another biology class again. In high school, she chose to focus on any other type of science

classes, such as physics or chemistry. In college, Grace chose not to major in a science discipline. It was a chance encounter with her roommate's sibling who suggested Grace change her major to biology after noticing Grace's interest in the subject. Grace's story showed how one could be nudged in and out of the science discipline with simple words of discouragement or encouragement.

Poon et al. (2016) reminded us that the model minority myth is rooted in anti-Blackness. The model minority myth is a trope that hurts all marginalized racial groups. Because Grace was exposed and rewarded for her work in promoting diversity, equity, and inclusion in the sciences, Grace understood the systemic nature of the model minority myth. Her understanding of it did not make her any less impacted by the perceptions of others though.

For Katherine, the model minority myth made her question whether she should even answer my initial outreach for participants. As an Indian and white multiracial virologist, Katherine described her hesitation:

Yeah, you know it's funny, some people define me as a woman of color and NIH [National Institutes of Health] does not. So sometimes I feel uncomfortable with that label because it's unclear to me whether I can be a woman of color. There's like that little uncertainty.

Katherine's uncertainty of whether she was allowed to create connections and belonging with other non-Asian women of color in the sciences was an example of a purposeful by-product of the model minority myth. It was meant as a white supremacist strategy to divide and conquer communities of color. It further widened the chasm of Katherine's isolation as one of few women in her department.

As research scientists, Nikki's, Katherine's, and Grace's work were the closest to the positivist paradigm of scientific inquiry. I found that they collectively chose not to talk in absolutes without concrete evidence. They often used a specific set of qualifiers, such as "I'm not sure" or "I guess," to address what they deemed to be racist and/or sexist microaggressions and experiences. I attributed this desire to have more evidence as a method of seeking an objective understanding to prove *to other people* what their body and intuition were telling them. Nikki, Katherine, and Grace may have the most to lose if they were not able to back up or "provide receipts" for their *parrhesiastic* claims.

Medical Professionals

Skynet, Nidia, and Isabela described their entry into the medical profession as a desire to simply help others. Their sense of responsibility to others was heightened by the immediate life or death consequences they routinely experienced in their field. The past few years of the COVID-19 pandemic has only reinforced this notion for the women. I interviewed Skynet, a Black chief nurse in her mid-forties with seventeen years of experience (and an avid *Terminator* fan), toward the height of the second wave of the COVID-19 pandemic just after the COVID-19 vaccine was released. The timing of our interview brought up a lot of Skynet's thoughts on the politics of providing medical care to communities of color, especially an older Black generation. Her description of the first time she had to give the vaccine to a patient was telling of the ways Skynet navigated politics and her personal value system:

For me personally, giving that first injection of [one of the COVID-19 vaccines] was actually [pause]. I stepped away. It was a challenge for me. I mean, I had read and read and read. That first injection, I couldn't give it to that person. Somebody else had to. And the reason was, they ask you "have you had it?" I hadn't been injected yet... I thought if I

say this to them, they're going to be like "oh, wait. You're going to give me something you haven't taken." ... You know what, do you or do you not stand behind the science that we know? Do you or do you not believe that out of all the health outcomes possible given the same circumstance, would you not take this vaccine, or would you not recommend it? I just reminded myself, "given what we know, given what we know."

That's how I got past it and was able to go ahead on and be able to administer the vaccine and get it myself.

We will continue to see Skynet's reflections of the risk versus benefit relationship and how it plays into her strategies for speaking truth to power.

Nidia was also trained as a nurse, although retired at the time of our interview. As the eldest participant, I found Nidia to be the most reflective and hesitant regarding the consequences of speaking truth to power within her career. She attributed her hesitancy to the gender norms of the time, even though those gender norms are likely similar today. From an early age, she "was taught to be submissive, don't get into trouble, don't take risks." Nidia was born in Puerto Rico, raised in New York, and returned to the island for the majority of her professional career as a nurse administrator. She professed that she was more interested in becoming a doctor, but her high school counselor swayed her toward nursing instead. Again, she was impacted by the gender roles of the time when men were doctors and women nurses. With her counselor's lack of support, Nidia's self-esteem was negatively impacted. While she appreciated and took pride in her nursing career, she regretted listening to the counselor who did not think she was smart enough to become a doctor. These days Nidia reflected on the importance of mentoring the younger Latinx community on how to build self-esteem and "take risks in order to accomplish big things."

Nidia transitioned professionally from a nurse to a nursing instructor to a hospital administrator in her later career. One of the highlights of her career included writing and winning a major federal contract to bring federal support to Puerto Rico's poorer population. She described the rollercoaster of emotions she felt during the project:

I felt like I won a competition, because there were a lot of other people who had a lot more experience than I did and a lot more education. A negative part about that experience was when we finally get the contract, then my hospital administrator wants to hire an administrator to run the program. I got very annoyed, and one day I went to his office and I said, you know, I write up the proposal and you want to hire someone else to administer it. I told him there's no one who knows exactly more on how to implement the model than I do.

This was Nidia's self-professed truth to power moment. She knew in her gut that she was the right person for the position, and she decided to fight for it. After years of "being told what to do," she mustered the courage to argue for what she felt was right and won.

Another Puerto Rican medical professional, Isabela is an internal medicine physician. Having served as an officer in the military, Isabela was working as an executive-level administrator for a medical company at the time of our interview. Because of her military experience, she learned to adapt to a cut-throat, competitive, and political culture of career attainment that served her well in the private sector. While Isabela cited her mother's nursing career as a catalyst for her interest in medicine, she stated that her pursuit to become a physician was not solidified until she was in college:

I started working as a medical interpreter at the university hospital as a volunteer job my freshman year. I did that every week for the entirety of my college years. That first year,

it became apparent to me that there really was a need for Spanish speaking providers and physicians in the mainland. Just going through that experience and kind of being that middleman between the patient and physician. But in a setting where the patient really listened to *you* more than the physician and any other provider. And really kind of empathize and commiserate, like being that middleman is kind of like you become that person, you become that provider.

Even though Isabela's interest in medicine was heightened by this experience, she shared that her understanding of science and math did not come easy for her. She had to study for long hours and worked to get the grades she needed to go to medical school. It was her ultimate desire to do something to help others, to "be that middleman" that drove her to the medical field.

In accordance with the science identity framework, Skynet, Nidia, and Isabela would be classified as altruistic scientists. Collectively, they spoke of their integrity and the connection to their values. Their moral arc was strong and heavily directed toward helping others, often to the detriment of themselves. While I would not go so far as to call them selfless, their statements regarding speaking truth to power showed they were more willing to bear the brunt of any consequences they may receive. Even so, Skynet and Isabela, specifically, provided *parrhesiastic* examples where those with power and a grudge sought out friends and colleagues that were adjacent to them instead of Skynet and Isabela personally. Skynet shared the following:

I believe consequently another one of my direct employees was impacted. In other words, [my supervisors] anger with me was redirected towards my staff... Like I can't directly get to you because that would be too obvious. Because I know I've already gone on record saying that you're a great worker. The patients love you. I don't like what you're saying to me. I don't like how you have answers when I hope you don't have the answers.

So let me go laterally. And let me pull one of the ones that is just as smart as you, and does things that make me uncomfortable. Let me pick on [that other staff member of color].

Both Skynet and Isabela shared the need to be flawless in their work. To earn the ability to speak freely, they felt like they could not give anyone a reason to speak ill of their work. This does not mean their supervisors did not try. As Isabela explains, “Even though up to then, if you had read all of my reports [my superior] had written, he would say [I was] the top physician he’s ever worked with in [his] 25 years of the [military].” Isabela went on to explain how her superior still tried to speak negatively of her promotion at the time.

Values-driven decisions are a hallmark for Skynet, Nidia, and Isabela. “People tell me that I’m too righteous sometimes. And that I should learn how to lie a little bit. Or that I should learn to be okay with the status quo,” Isabela shared. Additionally, serving as a mentor was seen as a responsibility to ensure more inclusivity and visibility of other women of color in their respective fields. In her retirement, Nidia described a longing to start mentoring Latinx youth as young as elementary school age, while Skynet and Isabela described mentorship as opening doors within their current work settings. At the end of the day, it was important for Skynet, Nidia, and Isabela to know that they were contributing to something greater than themselves. For Skynet, she wanted to ensure healthy outcomes for communities of color. For Nidia, she wanted to help build self-confidence in the younger Latinx community. For Isabela, she tried to open doors for Latinas in the medical industry. Their voices will continue to contribute to the themes I explore in the discussion section.

Public Health

Entry points into the public health sector can be wide and varied. Eva Anne, Lauren, and Ava demonstrated this perfectly. Eva Anne, a Black, Latina, Indigenous, and Indian multiracial queer woman, has a background in environmental health and worked as a safety professional supervisor for a large corporation. With an educational background in biomedical engineering, Lauren, a Black queer woman, was inspired to switch into the public health field during the COVID-19 pandemic and was job searching in the field at the time of our interview. Ava, a queer Puerto Rican woman, described herself as an exposure scientist—investigating radiological exposures that impact human, animal, or environmental health—and works for a government agency.

While their positions were varied, the ways these women described navigating their profession and *parrhesiastic* moments were compellingly similar. Eva Anne, Lauren, and Ava sought out their professions to also help people. Unlike other participants of the study, it is a specific requirement of their respective positions to speak up and advocate for workers and communities against other competing, often capitalistic interests. As Eva Anne shared, “Because at the end of the day, that is my job. Protecting humans in a way that no one else on their worksite does because they have different incentives.” Most of Eva Anne’s and Ava’s *parrhesiastic* moments were rooted in the tension between protecting humans and capitalistic interests. In the process of competing with other interests, Eva Anne, Lauren, and Ava described similar strategies in collecting as much evidence to prove their claims and ensure a change in behavior. Ava explained that she needed this information because she saw these moments as literal “fights to win.” Similarly, Lauren shared her propensity to collect evidence:

I like to have evidence behind what I'm saying, especially if I'm accusing someone of something, especially like an institution. So my mind immediately goes to what tangible evidence can I present regardless of how I'm going to use it. I want to have it.

This strategy of "getting receipts" is something that was shared by other participants in other fields. I discuss its importance later in the findings section.

Considering the science identity framework, these women would also fall into the altruistic scientist category. They had previous experience in research labs as undergraduate and/or graduate students, but the recognition they received within various internships or early professional experiences swayed them toward using science for the benefits of public health. Internships and early professional experiences were able to provide hands-on skill building, access to certifications, networking opportunities, and mentoring relationships that set them up to jump straight into the workforce with little hesitation or need for further education (although all three women sought out further education for the sheer appreciation of learning and continued desire to challenge themselves).

Eva Anne, Lauren, and Ava addressed the concept of following one's gut and how they used their body as a moral compass. While I may attribute emotionality to this process, they each described their ability to set emotion aside. To meet their respective goals, Eva Anne, Lauren, and Ava spoke of how their decisions affected not only them but those that trust them. While every participant addressed the sense of responsibility they felt, this group of participants in the public health sector spoke to it with a candor unlike others. I could physically feel the weight of their decisions as they described them to me. As Ava stated:

It doesn't matter what you want. You don't necessarily matter, I mean, you matter, but your wants and desires don't matter if they impact someone else negatively or if we cater

to your wants and neglect the greater good. I think making sure the decisions I make are for the greater good. And they don't just appease. Especially, a dominant identity. That it actually appeases or seeks to learn more to protect the collective or everyone that we're in charge of.

Here Ava described a tension between needing to compartmentalize herself, while still working to allow others to bring their whole selves to work. This tension reflected the most nuanced experience of women of color walking a tight rope in their work environments.

As a collective group, Eva Anne, Lauren, and Ava may have the most experience speaking truth to power in both professional and personal settings. Consequently, they also described the most diverse strategies they used to get people to do what they needed them to do, such as follow certain standards and protocols. This group of participants was instrumental in providing a unique understanding of the *parrhesiastic* experience while navigating competing interests.

Natural Resources/ Conservation Scientists

As natural resource and conservation scientists, Margarita and Gloria spoke of the genuine connection between science, people, culture, and "the land." They searched for a "science deeper than data" (Kimmerer, p. 221). Both women were inspired by animal conservationists early in their childhood that ultimately led to majors in natural resources and conservation biology. With a desire to honor the complex relationships of their ancestors and their current lived experiences, the question around ethnic identity served to be complex for both women. Margarita, a Chicana and white woman, and Gloria, also Chicana, reflected on their Indigenous roots and whether they could call themselves Indigenous. Gloria expressed her internal struggle:

I don't feel like I can walk into a room and say I'm Indigenous. But in a sense, I know that I am. I know that those are the people I come from. I don't know where in what's now called Mexico the Indigenous peoples I come from. I also recognize that it isn't anything to be hard on ourselves for because that's literally colonization having worked to cut those ties and connections and forced migrations of our generations.

Margarita and Gloria were the only participants to bring up Western science as a form of colonizing Indigenous thought and practice.

They shared intense stories of navigating academic and professional bullying and abusive work settings. They expressed an underdog spirit, constantly having to prove their existence as vital to the mission, cause, or goal of the moment. Margarita's and Gloria's emphasis on bringing Indigenous knowledge with them to their science education and professional positions was met with animosity by trusted science figures. These daily battles heavily affected their science identity. Within the framework, I would identify them as disrupted scientists, developing a science identity out of spite. Both had returned to pursue further education in their disciplines despite the negative experiences they had prior. Margarita shared her education experiences:

It's just been a constant amount of me trying to convince people of my worth, that my ideas matter. Because I think Western science... [is] epistemological violence. ... Here's one way of doing things. It's very positivist, it's very quantitative, it's very male. All of the roots of Western science are very anti-woman, anti-Indigenous, and also anti-any other world view that isn't a white, male, Christian view is where Western science comes from and is what is taught in research institutions. So because I questioned that - I was like this isn't the only way to do this. People said, "well, you're not good enough for science, science is not for you."

Both women wore their hearts on their sleeve. Whereas Gloria teared up as she recalled memories of injustice she incurred in the profession, Margarita was plainly pissed off and angry. They spoke of the trauma that sits within their bodies and manifested in illness and anxiety. They described the beauty and belonging they felt when they each found a group of other women of color that they could trust and commune with. Collectively, Gloria and Margarita are fighters willing to go to battle not just for themselves but also other humans, animals, plants, and the earth.

Science Adjacent

The participants of this study did not have to be currently working in a science field. Walter and Selena successfully graduated with a science degree but switched into different disciplines later. Walter, a multiracial (Black and white) queer woman, graduated with an undergraduate degree in biology, and Selena, a Mexican American woman, finished her undergraduate degree in agricultural sciences. Even though they studied within different disciplines and currently do significantly different things, Walter and Selena still have a few things in common.

First, they reluctantly identified as outspoken. They both described themselves as introverted with a soft-spoken nature, but they also felt like they had to live up to the stereotypes of the “spicy Latina” or “bossy one” to be heard. Walter shared:

My whole life I needed to be loud or I needed to be better. Because I had to do that to survive in those spaces, that’s one of the number one things that I got put into the box of.

You’re outspoken. You’re articulate. You’re so loud. You’re so bossy. All the things.

Their outspoken nature was pulled out of them. For those reasons, Walter and Selena were often invited to serve as student representatives in their respective academic departments. Their initial

quiet nature was perceived by administrators as manageable. Walter and Selena used this perception as a strategy to publicly question those in power. They still embodied the analytical, problem-solving skill set that stereotypically separates scientists from other disciplines. Walter and Selena employed these skills to slice and dice arguments that did not make sense to them.

Walter and Selena fit the description of the disrupted scientist from the science identity framework. While they were ultimately successful in graduating with a science degree, their experiences within the degree were less than supportive. They both described distrust with advice they received as students. Walter questioned the reasons why her academic advisor would suggest she take three of the most difficult science and math courses together in one semester. She trusted her advisor to have her best interests at heart, but looking back, that decision was something that she regretted doing at that time in her collegiate experience. Selena described her frustration in not knowing why physics was a required course for a food systems major. While she had been successful in most of her undergraduate science courses, she struggled with a genetics course that led her to question her science goals. When she decided not to double major after telling her undergraduate research lab PI and academic advisor that she would, she was surprised by her mentor's and academic advisor's lack of questioning of this decision. As a current student affairs professional, Selena exclaimed, "I know when I work with my students and they tell me they're not going to do something that they wanted to do, I at least ask how come? But I didn't even get that!"

Walter and Selena addressed the fact that they were completely happy with their decision not to continue in the sciences. They realized that they were able to redefine what success meant for them outside of a science identity framework. They both expressed their appreciation for their disciplines and the lessons learned, but there are other ways to use that knowledge and represent

science in other places. As an example, Walter realized that “talking to people and learning about people in connection with science was where I thrived.” Both women still use the skills they learned today, which is why I have aptly categorized their professions as “science adjacent.”

Summary

In this section, I shared the reasons behind my methodological approach for the study. As a critical qualitative researcher, I used the narrative inquiry process to establish counternarratives for women of color in science. I shared my analytical approach and provided a summary of the study’s participants. In the next section, I discuss the themes that arose from the counternarratives of the 13 semi-structured interviews and focus group.

Chapter 4: Findings

The purpose of this study was to understand the experiences of women of color in science who are outspoken, speak truth to power, and attempt to create more equitable science spaces. I interviewed 13 women who vulnerably shared their inspiration for science and what they hope science could be. Participants also shared moments when they were discouraged, humiliated, berated, and bullied for attempting to bring their whole selves to their educational and professional experiences. Every single participant faced challenges and encountered moments when they had to choose whether or not to speak truth to power. In this section, I provide examples and compile a larger framework for understanding outspoken women of color in science. Throughout this section, I aim to answer the following research questions:

1. What motivating factors guide women of color in the sciences to choose to speak truth to power?
2. How do women of color in the sciences envision the future of science culture?

The *Parrhesiastic* Game

Foucault (1991) described the act of speaking truth to power (*parrhesia*) as a game. He identified two types of *parrhesiastic* games—one that required a relationship between truth teller and power figure, and one that required the truth teller to serve as a removed, “seemingly” neutral observer. Foucault questions a person’s ability to be neutral. Each type of *parrhesiastic* game comes with its own rules for engagement. For the purposes of this study, I used the former *parrhesiastic* game to explore the ways women of color in science negotiate relationships within scientific and professional power structures to navigate risk, responsibility, and reward when speaking truth to power.

All games follow a particular structure in form. In general, games require a goal or reason for playing and rules that all participants agree upon. Beyond this simple framework, games fall into specific categories, such as luck games, role playing games, etc. Foucault's description of the *parrhesiastic* game compares to a strategy game. In strategy games,

Players succeed (or lose) based on strategic decisions, not luck. Players have equal knowledge to play; no trivia. Play is based on multiple decisions a person could make on each turn with possible advantages and disadvantages each time. Players can plan strategies that will take multiple turns to complete fully. Players can replay the game many times and have different experiences each time. Winning (and losing) is specific and achievable. (Mercury, n.d.)

Similarly, *parrhesia* requires the *parrhesiastes* to strategize ways to mitigate risks while speaking especially weighty truth to those in power. In theory, both parties in the *parrhesiastic* relationship are entangled in the situation, environment, or culture together. *Parrhesia* involves specific, or multiple, decisive moments (called a *kairos*) where the *parrhesiastes* assesses the landscape and chooses to speak truth to power in that instance. Many of the participants described moments when they chose to speak up and moments when they chose not to. The participants' understanding of the moment's risk and reward impacted what decisive action they took at that time. Like strategy games, each decision has consequences that require another decisive action. As you will see, aspects of responsibility, guilt, regret, humiliation, humility, pride, and desire for connection played a role in dictating each participant's *kairos*. Additionally, Foucault's *parrhesia* required a test of ethic—the embodiment of walking one's talk. In this case, it is an intentional examination for how one is enacting their values. Foucault's test of ethic begs the question: what kind of player will you be?

Based upon these structures, players determined the best strategy to use in that moment that balanced the weight of risk, responsibility, and reward. In some strategy games, players can focus on getting as many resources as possible, taking from a pile or negotiating resources away from other players. In cooperative strategy games, players are usually given an individualized power and goal to achieve in addition to a group objective to manage simultaneously.

Participants of this study embodied this cooperative nature of strategy games. They gave voice to the ways they determined individualized goals, shared goals, and possible successful strategies in navigating their real-life examples of the *parrhesiastic* game.

Most people say that the goal of any game is to win. Foucault's analysis of *parrhesia* describes the goals of the *parrhesiastic* game as exposing the power figure to reality *and* remaining alive while doing so. Foucault used the court jester as an example of a *parrhesiastes* who was able to cultivate a meaningful and trustworthy relationship with the king. Using strategies like visibility and satirical humor, a successful court jester could provide the court entertainment mixed with biting, critical feedback. The point of this strategy was to bring up a mirror to those in power in hopes they would make informed decisions in those powerful roles. For this study, I proved that each participant served as a *parrhesiastes*. They entered confrontational relationships with those in power and aimed to share truths about their oppressive experiences. Here, the win served as an active resistance to fear, to whiteness, to status quo, to being silenced and cast into the shadows of their respective professions. The participants developed a vision for what the future could look like and continue to choose the path of resistance to fight for that future. Next, I share rules that participants described as a guidance system in playing their *parrhesiastic* game.

Rules of the Game

Critical Race Feminism reminds us that women of color are often expected to play by different rules than everyone else. In earlier sections, I made the argument that the culture of science education and professions can be especially isolating, competitive, oppressive, and generally unwelcoming for women of color. To be successful in the sciences, I anticipated participants to share heartbreaking stories. They did not disappoint. Participants shared how they risked their physical bodies and mental health to fulfill their interests and passion for science. As I analyzed participant transcripts, I was intrigued by an emerging list of agreed upon yet unspoken rules the participants of this study described as they navigated the treacherous terrain of science culture. If the goal of speaking truth to power was to provide feedback to those with power while protecting oneself, the following rules were meant to be a test of ethic for defining their true intentions to the community of women of color in the sciences. Additionally, the rules served as a social contract outlining ways women of color were meant to interact with each other. The emerging rules of engagement for speaking truth to power include:

1. Stay true to oneself;
2. Avoid ruining it for other women of color;
3. Live to die another day;
4. If you must leave, go out on your own terms;
5. Share the map with others.

In the following section, I share more in-depth descriptions of the rules and examples for how participants enacted them in their personal and professional lives.

Rule 1: Stay True to Oneself

First and foremost, it was important for the women to be able to say they lived and operated in congruence with their values. They desired to live with integrity and not be perceived

as hypocrites. Overwhelmingly, participants witnessing bullying or disrespectful behavior tended to motivate most of them to act. Some participants described moments when they were personally bullied or disrespected, while others described moments when they witnessed other people being denigrated. Ava and Katherine described how they could overlook someone who said or did something disrespectful to them personally by shrugging it off or making excuses for the offender. On the other hand, they would not stay silent when they witnessed someone else receiving similar treatment. Eva Anne and Nikki described instances that were so egregious that they triggered human resource processes. They both talked about their family serving as support systems in providing strength to engage these procedures when abused on the job. Nikki shared the two reasons why she chose to report her supervisor for abusive behavior in the workplace. She credited “the resiliency of knowing who I am throughout everything and also knowing my support system is unshakeable.” Nikki’s family and personal value system provided the comfort she needed to overcome any further retaliation she might receive. She expressed that the salary of the position did not outweigh the negative impact of the physically abusive behavior. She could escape to her family for financial, physical, and emotional support. Several participants shared this sentiment. While their time at work might be isolating, they had supportive communities and families to turn to when situations got rough.

Skynet, Lauren, Walter, and Isabela described being in the room where decisions were made. They expressed the responsibility they felt to balance their personal values with the weight of representation. For these women, the act of speaking truth to power was a leadership quality they were willing to employ when necessary. As one of few women of color in these spaces, they often felt like they not only spoke for themselves, but for all other women of color in their respective organizations. All participants described characteristics of imposter syndrome that

created moments of critical self-analysis. The women balanced a sense of integrity, responsibility, and duty to their respective professions or positions. Isabela noted that employers should see her desire to speak truth to power as an asset—"To have someone that is outspoken and willing to take risks, but the good kind of risks." Leadership is about the willingness "to do bigger and better things than yourself." Skynet also shared beliefs in the relationship between leadership and *parrhesia*. Leaders should "be bold enough to put [themselves] out there, because leaders have to do very uncomfortable things and make very uncomfortable decisions."

Unfortunately, speaking truth to power is not always appreciated by employers or organizations. Walter provided an example of what is most often expected from women of color who are provided a seat at the decision-making table. After a racist incident occurred at her high school, Walter, serving as the president for the Black student union, was invited to a meeting with the school's administration to mitigate any reputation-damaging student protests. Previous to this situation, Walter had become a well-known student leader at the school. She had a reputation for helping teachers in the classroom and assisted with school spirit programming. When this situation put her front and center as a representative for all the other Black students at the predominantly white school, she entered the administrative meeting with an aim to speak truth to power. The following provided insight into Walter's mindset as she matured into a *parrhesiastes* as a high school senior:

I was the articulate one. They were so happy they were talking to me. I am so understanding. I understand how this works. You are not going to make me a coon in here. ... Being the lightest Black woman [of the group], being the most outspoken Black woman. They wanted me to perform with the situation in a way that I refused to, and it

tainted a lot of the relationships that I had cherished when it came to my dean and my admin and stuff.

As she noted, Walter risked her good standing as a well-like student at the school. While she mourned the loss of her social capital, she never regretted staying true to herself.

Touchstones

How participants came to know that their actions were congruent with their values varied, but most of them described a gut feeling—an emotional-physical connection that often sat between the stomach and the throat. For others, a pause in the “hamster wheel” of their thought process provided a sense of ease that served as a compass for their actions. Foucault defines this connection as a *touchstone*—“a black stone which is used to test the genuineness of gold by examining the streak left on the stone when ‘touched’ by the gold in question” (p. 97). A *parrhesiastes* requires a similar touchstone to help define her truth and muster the courage to speak it.

Similarly, these women employed their own tests to ensure their actions were genuine and that they were following their own values. As long as Isabela “can look at [herself] in the proverbial mirror at the end of the day,” she knew she was good. She continued, “I have never been a hypocrite. I have never lied. I have never felt like I have ever done everything that I can do to make the workplace better when I leave it than when I got there.” Ava’s touchstone was her daily answer to the following question: “If I go home tonight, will I respect myself?” Beyond the proverbial questions, Eva Anne and Skynet brought up the physicality of knowing right from wrong. Eva Anne shared her touchstone:

My body talks to me. That’s how I experience the world. When my stomach drops and I get that, like, “something is wrong here.” Speaking truth to power is the bravery or the

courage or the resiliency I have to say, “All right, stomach, I see you” and I also know that it’s worth engaging here, or saying “Okay, stomach, I see you or I hear you, here are the risks that I have to consider, so for example my job, my family’s livelihood, my career progression.”

In this quote, Eva Anne shared a glimpse of what happens during *kairos* moments, when she analyzes the risks in that moment and decides whether speaking truth to power is the best option at that time. Whereas Eva Anne’s body is tell-tale of something wrong, Skynet’s lump in her throat served as a physical stopgap to assess the situation before an instinctual outburst occurs. Skynet shared how she uses those moments to pray for the courage to live with the consequences. That lump in her throat is a physical manifestation of her truth, her touchstone.

Stitching Themselves Together

Selena, Gloria, and Skynet brought up the distinctive separation they experienced between their ethnic cultures and science disciplines. They purposefully sought opportunities to meld the two when they could. Gloria described getting caught up in what society was telling her to do in her professional career, but not feeling fulfilled when she worked toward those goals. She graduated from college, got a job, made some money, but something was missing. It wasn’t until Gloria took ethnic studies courses in her graduate program that she started to reflect on the reasons why she was feeling unfulfilled:

[We’re told that] education is most important, getting to the top of a career is important, but then it’s like, okay, but what about the people we come from? Our Indigenous values are actually totally opposite about that. Our Indigenous values are actually wholly around family, wholly around community, wholly around committing to our family, to our

community, and also to the land. Because we are in community with all relatives of the land.

Gloria was missing that connection to the land that was lost when success was only defined as a good job that paid well. Likewise, Selena highlighted the dissonance she felt in her agricultural science courses with how she grew up on her family farm where they focused on the “caring” for the animals versus the “management” of them. In order to find comfort, many of the participants chose to engage within science-affiliated organizations that intentionally focused on communities of color.

As a Black nurse during the height of the COVID-19 pandemic, Skynet addressed the complicated relationship between scientific medical discoveries and Black communities in the South, especially among an older generation. As a nurse, she noticed how her older Black patients put their trust in her. She did not take that responsibility lightly. This is one of the reasons why she continued her education toward a Ph.D. in nursing to better understand the science behind the medicine. More importantly, she wanted to be able to translate this information to her patients. In the following quote, Skynet described how her patients perceived her as a “smart, young Black woman.” While her patients were not wrong, Skynet continued to describe how she used their perceptions to her advantage in taking care of them:

I have to use my Blackness. I *have* to. It is my gift. Sometimes it—I don’t even want to call it my “curse”—sometimes it is my challenge. But I use it. I use it intentionally to penetrate the thoughts that overwhelm people because those thoughts come in when they are afraid. Those thoughts come in when they’re like “I’m not familiar with any of this.” So *I’m* the familiar.

Despite the separation Gloria, Selena, and Skynet described between their ethnic cultures and science disciplines, the women were able to establish useful stereotype management strategies, such as redefining success, engaging in *counterspaces*, and becoming “the familiar.”

Parrhesia as Skill and Character Trait

When I initially asked why the participants described themselves as outspoken, some of them shrugged and said “It’s just the way I am.” For these participants, *parrhesia* was described as both a skillset to be honed *and* a character trait to be refined. Some participants, like Walter, saw it as a skill: “Having the ability to articulate myself and say it and be confident in that is pretty rare to come by and people recognize that in rooms.” Contrastingly, Skynet and Margarita noted that not everyone appreciated the art of being outspoken as a trait to be respected and valued. They both described moments when they have received negative feedback about their approach. Skynet shared, “I speak with what I would call conviction because I’m passionate about what I’m saying. I don’t at all view it as disrespectful or curt, but it’s perceived that way for some reason.” As for Margarita, she said, “I don’t take any bullshit. I have always been very vocal. You could say confrontational, or you could just say straightforward.”

Skill, ability, personality, trait, convicted, passionate, confrontational, straightforward—whatever one may call it, all the women described the relief they felt when they were able to act in congruence with their values and what they stood for. While significant consequences might follow their decisions to speak truth to power, each participant noted the importance of staying true to themselves. Like other participants, Lauren reflected on the first rule of the *parrhesiastic* game: “I would say my success is directly related to my ability to actually show up as my full self to a space or else something is being left out of a conversation.”

Rule 2: Avoid Ruining It for Other Women of Color (The Four Deadly Sins of Betrayal)

The pressure to positively represent an entire ethnic group, gender, and/or other identity group was reported by all participants. Participants continued to reflect on the nuances regarding representation. Portraying stereotypical behavior, not meeting others' expectations, disregarding other women of color, and making a spectacle about oppression without adequate evidence were described as the four deadly sins of betrayal for the participants. If committed, the consequences could be substantial and enduring across the limited population of women of color in science disciplines.

Avoid Being Stereotypical

Nikki, Lauren, and Skynet—all Black women—described the necessity of not giving into the “angry Black woman” stereotype despite their right to be angry. Latina participants Selena, Margarita, Ava, and Isabela, shared how the “spicy Latina” trope affected how they chose to represent their truth. As noted earlier, Grace and Katherine spoke candidly of how Asians being perceived as a model minority affected the ways they celebrated and shared their accomplishments in science with others. Whereas the other participants held their tongue, Grace and Katherine battled with stereotypical expectations of being quiet and demure. Knowing their silence impacted their Black, Brown, and Indigenous colleagues required them to use their voice in ways other participants could not. Nikki reported a time when she was embroiled in a disagreement with her supervisor. While Nikki wanted to express herself more outwardly, she stopped herself by thinking of the consequences. She explained:

If I get Black, then it's like, “Oh, we saw this coming...” I have to stop and think. I have to be cognizant of that because if I want other women of color to have an opportunity to come in, I have to set a standard. Okay, we're not harmful. We're not all going to be snapping our necks, rolling our heads, or snapping our fingers and things.

Other women also mentioned the “stop and think” strategy. Participants were rarely offered an opportunity to “clap back” instinctually. They reported having to pause and strategically choose a response that met “a standard” of professionalism, often described as a performance of whiteness.

Raise the Bar (Meet High Expectations)

Unable to, and often unwilling to, disassociate fully from being grouped with other women of color, the participants set out to create a positive image for themselves and their respective racial/ethnic groups. One of the methods several participants shared was to exceed expectations of those with power. Ava explained her motivation for setting and attempting to reach a “high bar, an unachievable bar.” Other participants shared Ava’s advice about having to work “twice as hard” than everyone else. Ava further explained that individuality gets erased for women of color:

Because we gotta outperform. You have to do better. Not only earn your place because that’s where the low bar is. It’s not equal. You have to be better... It doesn’t matter what you want... Your wants and desires don’t matter if they impact someone else negatively. Or if we cater to your wants and neglect the greater good.

Unlike their white counterparts, these women’s actions were not their own. Because of their limited numbers in their professions, the visibility for women of color is heightened. There was no place for Ava or other participants to hide. When one received recognition or a hefty position title, participants described the responsibility they felt to live up to those expectations.

As a graduate student, Grace received a prestigious award for her work in equity, diversity, and inclusion in STEM and an opportunity to sit on a committee to further her leadership in that area. Grace recalled sitting with the weight of the expectations of other

students of color as the committee made questionable decisions regarding how to show support for the topic. “We have students of color who are expecting us to come through for them,” Grace stated.

Selena and Lauren also shared in Grace’s experience of serving as a representative for other students on important issues. Selena recalled being one of the only women of color in her agricultural science major. When she was recruited into the major, she connected with a former high school alumna who advocated for Selena to work in the agriculture science department office. Out of convenience, departmental leadership often chose Selena to represent the major at various high-priority events. Selena shared, “I knew it was important that I made it. Because I was the only *one*. They needed the poster kid. I think there were ways that I got more attention.” With more attention, Selena reflected on her ability to leverage her visibility within the department to bring more Latinas to student leadership positions and to combat prevailing tokenism. This was her opportunity to show other Latina students in the major that they were valuable and important, an opportunity she took on willingly and proudly.

Don’t Fuck with Other Women of Color (Unless They Fuck with You First)

Despite having a deep regard for other women of color in science, only a few participants described having experience working with and around other women of color. When a woman of color was hired as the chair of Katherine’s department, she expressed appreciation for the added visibility. When the department chair told Katherine that she was being too emotional during a meeting, Katherine shared that she was too afraid to confront her although Katherine expressed her disagreement with the feedback. Katherine worried that her silence “set a precedent” that made it more difficult for her and others to give the chair feedback when oppressive statements escalated. When another woman of color in the department left her position citing frequent

microaggressions, Katherine expressed regret at having let that initial “you’re too emotional” moment slide.

Multiple women described ways other women of color impinged on their careers or wellbeing in the workplace. Skynet mentioned backhanded comments from other women of color: “There she goes, thinking she knows everything.” Isabela described the competitive nature that came from women of color in authority positions. She said, “There’s always a degree of don’t be too good, because you’re going to take over my role. You can’t be too good.” Selena summarized the conflicting relationship between women of color:

I think every woman of color has a story about being done wrong by another woman of color and it’s so painful. It’s about how often can we recognize that moment when we’re that person for another woman of color. Because it happens, and we’re not perfect.

The most reflective moments of the interviews I had with participants came from times they shared how they may have wronged another woman of color. These moments were visibly met with regret and guilt. Lessons were learned while participants vowed to do their best to rectify past wrongs.

Collect Those Receipts

Participants were shy to describe an experience or incident as oppressive unless the offensive behavior was particularly appalling, or participants had evidence to confirm. Lauren recalled her practice of “taking a step back from the situation,” “gathering receipts,” and collecting other perspectives on an incident before she felt comfortable addressing the incident publicly. Eva Anne brought up running her thoughts through a “fact filter... to substantiate whatever claim [she is] about to make.” This notion of questioning one’s confidence and

collecting evidence was shared widely throughout the group of participants but was expressed more strongly within the participants in science research and medical professions.

Four Deadly Sins of Betrayal

Betrayal is a strong and lasting emotion. I use it purposefully because of the participants' overwhelming regret and guilt when they reflected on past actions that left other women of color out to dry. Portraying stereotypical behavior, not meeting others' expectations, disregarding other women of color, and accusing others of oppression without receipts were very harmful actions for the women to take. The four deadly sins of betrayal not only impacted an individual, but the consequences had lasting effects for the ways other individuals or organizations interacted with other women of color. Since many of the participants shared an interest in creating more opportunities for women of color in their respective professional disciplines, the mental energy it took to form and assess collaborative relationships with other women of color was exhausting. Consequently, it is necessary for a woman of color in science to quickly assess her ability to create the biggest impact for speaking truth to power without negative impacts to herself.

Rule 3: Live to Die Another Day

"I can't let go of the damn shoes." I could see the anguish on Eva Anne's face as she was catapulted back in time to the moment a colleague verbally berated her over her request to supply special footwear to electrical workers in the field. As a safety professional, Eva Anne vowed to keep workers safe while doing their jobs. When a project manager who held the purse strings berated her for allegedly overstepping her bounds and swore to make her life miserable if she continued to bring it up, it created a *kairos*—decisive moment—for Eva Anne:

I went into tuck my tail, cover your ass mode... I started documenting the crap out of every single day to protect me and my family because I am the primary earner. If we lost my income for whatever flippant reason this guy wanted to claim, my family is at risk. Eva Anne's strategic decision to "cover [her] ass" allowed her to protect herself from danger in that moment. She collected receipts and prepared to make her case whenever the moment came up. Eva Anne knew in that one moment, she would not win. She chose to live to die another day.

All participants described the dangers of being outspoken *too often*. As with any skill, participants described speaking truth to power as an art that is learned through trial and error. Twelve out of the 13 participants reflected on a cognitive appraisal process where they evaluated if speaking truth to power was worth it or not. Nikki acknowledged the unfairness of the system. Because of her former experience as a *parrhesiastes*, she was more apt to envision a lose-lose scenario. Describing an instance when she assessed speaking truth to power was not worth it, she said, "I recognize that if I'm going to be vocalizing or if I'm going to be expressing myself all the time, I'm just not going to win. [The situation is] not set up for me to win. The system is not set up for [me] to win." Reflection on and justifying her silence in an earlier example I shared involving her supervisor, Katherine also shared, "I let it go because I don't know, I felt like it didn't... maybe there was some truth to [her telling me I was being too emotional]. I didn't see that me having a conversation with her was going to get anywhere. So there are things that I have let go that I felt were inappropriate." In these instances, Nikki and Katherine decided not to invoke *parrhesia*. They assessed the situation, weighed the possible consequences with the intended benefits, and ultimately decided that the psychological and physical consequences were not worth the risk. As I mentioned earlier, sometimes these moments of silence were remembered with a considerable amount of guilt and regret.

After reporting her PI to HR for yelling and throwing lab equipment at her during a heated disagreement, Nikki looked back at the arduous legal process with remorse. While she did not regret reporting the situation, she was not eager to repeat the unwelcome drama in her life when she realized her new work environment was also not what she expected. The consequences from the former action led her to question what might come if she were to invoke *parrhesia*. Nikki shared, “I feel almost like, not afraid, but just a lot more apprehensive to not, say, stir up dust, but be heard so much here. It’s because when I kicked up dust at [the other lab] it took months before that settled.” A woman who was often confident in her ability to speak truth to power, Nikki’s threshold for withstanding certain behaviors from colleagues had grown out of a desire to focus on her work and other professional goals.

Other women shared lessons learned from getting “too close to the fire.” Five women extensively described the traumatic impacts to their physical body. These women sacrificed so much to stay true to themselves and serve as a positive representative for women of color in their disciplines. In the following quotes, Gloria, Walter, Lauren, Isabela, and Nikki expressed sacrificing their physical body, their parents’ dreams for their future, their personal relationships, and their self-esteem.

Gloria: I’ve finally been out of those harmful spaces. Now all of the emotions, all of the trauma, that through those seven years that I literally pushed down and was just trying to get through it all. Well, now it’s all coming out. It feels like it’s all at the surface of my body. Like I literally feel it here in my chest and in my throat all the time. All the emotions.

Walter: It was just like a massive recognizing what I have risked in all the things that I’ve done this future that I thought I was building for myself, that my mom had built for me,

and that type of responsibility was really tough to live with [when I decided to speak truth to power].

Lauren: Regardless of how many times people were checking on me, ... I was just kind of like, “Okay, cool, thanks,” and pushed ahead anyways. That continues to be my biggest takeaway of the consequences because it’s something that had a residual effect, positive and negative. Continues to [impact me], honestly. At the time I was just in full-fledged denial of it.

Isabela: I’ve been called things such as man-eater. I’ve been called out for burning bridges, although I don’t think anything I’ve done has burned bridges in a bad way. It’s burnt bridges with people who you want to burn bridges with.

Nikki: “You asked for this, deal with it.” ... That’s the kind of mindset I try to have about these kinds of things. You have to be strong. And it is what it is. I also don’t want it to make me bitter if I try to be strong.

Forced Play

Regardless of whether they wanted to play the *parrhesiastic* game or not, all the participants were eventually *required* to play. As with chess, when one is in “check,” the player is forced to move her king in defense before she can make any other move. To be a woman of color is to constantly be in “check” and resist the checkmate as often as possible until she leaves or is forced out. She is desperate to evade the seemingly inevitable checkmate. The idea of living to die another day was reflected in how the participants played the game. Some participants took calculated risks, like Lauren, who recognized “sometimes you just have to say the shit—just say it and figure out what happens.” Other participants expressed guilt over not saying something in the moment. Regardless, participants learned lessons about their physical, emotional, and

psychological limits, which would then reflect in the strategies they employed to play the game. Contributing a unique perspective that was welcomed by other participants in the focus group, Gloria reminded us of a lesson she learned when she regretted not speaking truth to power earlier in her career, “There’s no time limit that we have for when to speak up and say that was wrong or that it’s not okay.”

Rule 4: If You Must Leave, Go Out on Your Own Terms

As a person who highly values job and financial security, I was expecting participants to share more anxiety over the possibility of losing a job. Eva Anne was the only participant to fuel my assumptions. Some participants simply scoffed at the concept—expressing no fear of risking their jobs for exposing the truth. Eleven of the 13 participants said they were either actively job searching or had just transitioned into a new position, so the job-search process was on many of their minds. Regardless of where they stood in fearing job loss, every single participant noted the importance of going out on their own terms. Grace shared:

I think having the power to say I’m leaving this space because it’s not good for me is an incredibly powerful option and takes a lot of personal agency and a lot of self-reflection. And I don’t think that that should be overlooked. I think a lot of times we think people should just be resilient. Sometimes I think people should transform, and they should leave these really negative spaces. Coming back to the “Is it worth it?”, sometimes it is and sometimes it’s not. I think that those people should be praised just as much for choosing to leave as much as those who stay and push it out.

Grace gave voice to the choice women have in these difficult situations: to stay and be perceived as resilient or to leave and be perceived as a quitter. There were several considerations to this decision. First and foremost, were they the right ones for the job? Have they been recognized for

their work? What control do they have over the decision? I discovered the answers to these questions impacted participants' decisions to choose to speak truth to power.

Be Humble Enough to Know When to Step Down

Whereas many of the women brought up the concept of humility, Lauren and Isabela highlighted this consideration the most. Isabela admitted it was important for her to know her strengths and limits in her skillset. When Isabela was originally hired in her position, her company required her unique abilities in the medical field. After a company merger, the requirements of her job changed considerably to the point where Isabela vocalized whether her expertise fit her current position. Not only was she able to speak her truth to others, but she was also able to turn that practice onto herself in a rather humbling way. Because she knew what her capacity was for being helpful and she believed in the value of quality medical practice, Isabela was able to have an honest conversation with those in power to admit that they should find someone better for that particular position. She set herself up to go out on her own terms.

Sometimes the writing is on the wall, and the participants had the awareness to recognize it. Lauren admitted that gaining awareness was a skill that she learned the hard way. When she took on a leadership role in a student protest her junior year of college, she knew that her grades might suffer. She did not know that she would end up sacrificing her physical body and mental fortitude. Lauren prided herself on being very self-aware, but it wasn't until she was deeply depressed that she understood she needed to admit defeat and try to move on with her life. During the time of the student protest, she found it very difficult to muster motivation to do any kind of academic homework. Lauren described her attempt at creating a boundary for herself, but unfortunately, the boundary ended up creating a wall that "fed into a pretty negative mindset"

about her identity as an engineering student. She decided on her own to step down from the leadership role and focus on graduating.

Be Proud Enough to Ask for What You Deserve

A common theme among the participants was the lack of recognition they received for *all* their work. The women brought up a lack of recognition (and fair compensation) for their work and an absence of other women of color in their organization as additional considerations that affected the women's pride and desire to stay in the job. In the focus group, Grace shared that she wished others would know how much *additional* work it took for her to get to where she was personally and professionally. Her sentiment was shared emphatically by all the participants present that day.

Grace: One of the things that I was thinking about the day that I defended my Ph.D. and gave my exit seminar. I wish that everybody in the room knew how much extra work I had done to get there.

Gloria: I think when you say wishing everyone knew how much it took and that extra work it took, it's like the extra work is not only literally the extra time and labor and hours, but it's the extra pain, sometimes. It's the extra emotion. The way that it also ends up having us unpack many years of a lot of stuff we hadn't unpacked before. That's definitely what happened for me.

Again, several of the participants shared receiving messages from family and mentors of having to work twice as hard to get just as far as their white and/or male colleagues. While the extra work was a problem, the extreme lack of recognition for completing the extra work was a nagging concern, especially if recognition was in the form of salary compensation. Some of the

participants linked pay disparity to their lack of ability to make strategic decisions based on economic freedom.

Redefine Success for Yourself

The participants' visibility as women of color in predominantly white spaces also impacted their decision. They took a lot of pride in being a visible representation for their respective ethnic communities. When working with a slew of white colleagues, several of the women described feeling invisible in their workplaces. For Nikki and Gloria, they both shared how they did not recognize how isolated they felt until they found themselves in spaces with supportive women of color in similar disciplines. Despite feelings of isolation and lack of recognition, these outspoken women were called to challenge these environments because they learned how to value themselves independently from these spaces. Gloria acknowledged the importance of knowing your worth and of validating your experiences:

I think speaking truth to power means knowing your worth. It means knowing your value. It means knowing the strong badass women you come from and that is you. And that how you feel, what you've experienced, what you're thinking is or isn't right, is valid. And to speak up about it. To not believe the gaslighting that we face—that tells us that when we are trying to or are speaking truth to power that it's wrong or what we're saying is not true or it doesn't happen or that we're making a big deal out of it. I would say speaking truth to power is knowing that what you're feeling, what you're thinking, what you have experienced is valid.

When the women were not experiencing professional “success,” it became critical for them to redefine what success meant in ways that seemed achievable. All the participants brought up the significance of protecting one's reputation within hostile work environments. Having left her

former position earlier than she originally planned, Nikki started her current position knowing that she had to complete her multi-year contract regardless of the constant microaggressions she experienced in her predominantly white research laboratory. For Isabela, she could take the “crap” that the military threw at her because “you can always think about the bigger impact that your role is doing for the bigger good of the country and our citizens.” For her current role in the civilian sector, she found, “It’s all about individual gain, it’s all money, it’s all money for the rich. The bad jobs, the bad days, I don’t feel the pride because it’s not going to something bigger than myself.”

Similarly, six more participants discussed not being able to see progress or benefits in the moment. The delayed possibility for success was enough to make them feel like their work was meaningful. As an example, Margarita expressed how she redefined success when it was hard to imagine what success could look like when focusing on climate change:

Studying climate change, it’s like, we’re in the apocalypse. That’s what it feels like. And so pretty much I just think you have to be able to do work that you may not see the benefits of for a long time. You have to be in it for the long haul. And I feel like I just got over that hump feeling like nothing that I’ve done has done anything. It’s just made it worse. And then I’m finally like, no, it hasn’t been for nothing. I feel like I’ve probably helped improve one animal’s life, planted trees that survived, and maybe there were people that are inspired by my work. Even though these problems are so huge, I think real change happens in very tiny minuscule ways that we may not always be able to see.

Participants understood that change came slow. As long as they perceived themselves to be problem solvers versus parts of the problem, the women were often able to find small moments of success that kept them in the game.

Control the Narrative

When the women were unable to redefine what success meant for them, when they felt unappreciated and were going unrecognized (in praise and in salary), when their visibility became a liability, it was time to cut ties. In the focus group, Gloria redefined her narrative by saying, “We can leave whenever we want to. We’re not tied to it. We don’t owe them anything. We don’t have to think if we leave then we’re letting down our communities. We’re free to do what’s best for *us*.” What was best for many participants was to control the narrative around their exit and leave on their own terms. Controlling the narrative meant preserving relationships that would benefit the women later in their career. Some women admitted to being so fed up that they were ready to “burn the whole place down” on the way out and not look back.

Reflect and Do Better Next Time

Scientists must deal with failed experiments frequently. Each experiment gone wrong provides an opportunity to assess and learn. Isabela noted, “a student of science is a perpetual student... [Science] is not stagnant. Whoever goes into science needs to be willing to always be studying.” Similarly, the women who were still in the science fields in this study shared the same sentiment. As true *parrhesiastes*, they took those same skills to reevaluate their own behaviors and strategies—what hurt, what helped, and what needed to be changed. The lack of critical soul searching in the sciences led the women to complete their own self-reflections. Eva Anne shared questions she now asks at interviews, “I try right up front from an interview to get an understanding of the company’s approach. I have the fortune of being able to say I will no longer work for any company that does not have, not only safety as a value, and something that they talk about, but data to substantiate it.” Similarly, Isabela addressed her vision for the next move in her career:

It really is helping me define what that successful career is going to be. I think it might have to be something that has a public sector interface. I just don't feel like making the wealthy wealthier is going to do it for me. Maybe it's a not-for-profit organization. Again, it's got to be something that's so much bigger than the role. I'm learning that. Coming out of the military, you see the money signs, you're like, "Oh my god, the military never paid me this much." But when you start doing it, you're like ugh, this is ugly, right?

If those next opportunities ended up not working out, rest assured, these women would continue to leave on their own terms.

Rule 5: Share the map with others

Mentoring plays a major role in the scientific enterprise. All participants were able to name mentors and other influential figures that helped shape their science identities. From teachers to PIs, post-docs to advisors, parents to peers, the women had to filter years of advice regarding how to act, how to interview, how to do experiments, how to talk to patients, and so on. Looking back, participants were able to discern the people they crossed paths with that helped instill confidence or tempered what confidence each woman had. Many of the women discussed developing strategic foresight—a sixth sense—regarding who they might be able to trust in certain situations.

Participants shared examples of people they once trusted turning against them unexpectedly for a variety of reasons. Grace was excited to have a PhD advisor who was also a woman of color and was recognized for her emphasis on diversity and inclusion in STEM. Little did Grace know that her advisor would end up bullying her for being outspoken throughout their time together:

She's actually told me that I don't know when to keep my mouth shut multiple times throughout my Ph.D. ... Every time she tells me, she tells me like she's telling me for the first time. She tells me like she's never told me before, so she can protect me from other people's perceptions of me. Apparently, there are a lot of other people who tell her they have problems with the way that I speak. Maybe that's true. Nobody else has ever told me that.

Margarita was so excited to continue her education in ornithology and conservation at her Master's program. When she shared the type of research she wanted to do, her advisor, a white woman with decades of experience, berated and publicly humiliated Margarita. Margarita shared:

I just used that negative toxic violent bullshit [she gave me], and I turned it into a really amazing Master's project. I did every single thing I wanted to do. I raised fifty thousand dollars to do it. I was twenty-three years old, and I raised fifty thousand fucking dollars for my research project because I knew that it was the right thing to do. It engaged people, it had an educational component, and I won money. As soon as I did that, guess who started being nice to me all of a sudden—my advisor. And I was like you can literally kiss my ass because I don't need you.

Isabela received a promotion that made her one of the youngest persons, let alone a woman of color, to achieve a prestigious position in the military. Once a kind-hearted white man, who went out of his way to welcome her, her mentor turned standoffish. She interpreted his demeanor as competitive and jealous:

It was his last day, where he came into the office. This is kind of silly. He had to hand over his parking placard. There's a very special parking placard for you to be able to park [close to the building]. It's the most coveted. It's the freaking golden ticket for the

chocolate factory. He had to hand it over to me. He's like, "You're very lucky to have this. You treasure it." It wasn't in a joking way. It was almost like you're undeserving of this parking placard. I can't explain it, other than his demeanor has completely changed it for me. I was like, okay, it will be used wisely. I'm just going to park my car, right? That was followed with other people, more senior ranking to me in the [special] unit, which also had this animosity, because all of a sudden, I got to park [in this special parking spot] when nobody else did. It just kind of built upon that sentiment of, man, there's so much hate because I have this damn parking placard. You know, you just sense it in the room, you sense it in the way people act with you, where once they were very friendly and open and then all of a sudden, they're so much more reserved and stand-offish with you."

The daily path these women of color had to traverse to simply complete menial tasks was laden with hidden pitfalls, dangerous vipers, rocky terrain, and misplaced signs. The experiential wisdom the participants gained along the way created a figurative map that could be trusted to other women coming behind the participants.

Each participant spoke to the importance of opening the door for other women who looked like them. The sense of responsibility that the women felt to the generations before and after them was shared widely. Having had both positive and negative experiences with mentors, the women aimed to do their best to share, while also honoring their mentees' experiences and understanding that times change. When describing her current relationship with her mentees, Eva Anne shared:

So I'm now in the position of being able to give all of those lessons learned to these brand new, doe-eyed, safety folks, who are hopefully not going to make the same mistakes that I did... I, specifically with my folks of color, my women of color, will have

those sort of “Hey, you want to stay on for 15 extra minutes and we’ll just talk about what your experience has been?” ... I do share that they do look at you and see a young brown woman—what do you know about safety? They do! And so, I guess to answer your question, I try to validate their experiences, and also say this is what I did, I don’t think it’s right, but here’s an option. And then just really be someone there to listen.

Eva Anne’s ability to recognize that the strategies she employed may not work for every woman of color in similar positions revealed the reflective nature of a *parrhesiastes*. Additionally, it keeps the flow of outspoken women of color going, unlike the advice Grace received about keeping her mouth shut.

Strategies

The rules served as an unspoken yet agreed upon social contract that established how participants were to engage with each other and those around them. They dictated *how* participants expected to play the game. In the following section, I highlight two unique strategies participants shared to *setup* the *parrhesiastic* game. Overwhelmingly, the women discussed how they created and used their relationships to achieve their various goals. Then, they discussed the importance of establishing boundaries. When used effectively, these two strategies allowed women to mitigate harm and risk while speaking their truth. Akin to setting up the bowling pins only to be bowled over by the truth when the timing is right.

Strategy 1: Manipulate Relationships

Four of the participants specifically highlighted that they pursued science because they appreciated the challenge it offered. When discussing their efforts to speak truth to power, it was evident how that appreciation for challenge seeped into the ways they navigated the *parrhesiastic* game. Providing feedback to their white colleagues and supervisors was like a puzzle.

Determining which piece went where took some maneuvering and trial-and-error processing. Each piece was a stand-in for place, time, severity, volume, and so on. Participants attempted to figure out which combination would work for which person.

The term “manipulating” might raise some eyebrows. I even second-guessed using it, but I kept coming back to it because one of the women themselves used it to describe her method of creating social capital. I also believe it adds an element of strategic processing the women used through social situations. Foucault (2001) suggested “charm,” the ability to mix assertiveness and sweetness, as a useful strategy when enacting *parrhesia* (p. 130). Cultivating social capital was an expressed concern for all 13 participants. Sometimes it came in the form of building relationships. Other times it showed up as circumventing certain people to get things done. Many participants learned how to protect themselves by limiting who got access to their true thoughts, opinions, and personality. Selena gave voice to these experiences:

People think they know us more than they actually do... Like they think we're best friends. I'm like I talk to you once a year at this meeting. You don't know me. But I'm going to let you pretend that you know me if it means that I get around you or get what I need from you. And so I manipulate relationships in a way, particularly with white people.

Ava also spoke to a new element of the *parrhesiastic* game—the long game versus the short game. Depending on the immediate goal, women were willing to fall short every once in a while to succeed in the future. Ava shared:

Knowing how to play [white people]. That sounds very evil, but... Knowing how to play them and try to get the outcome that you want to get from it. Even if it's not the short term. If you're playing the long game, which I think my stuff is more the long game,

because I do tend to piss people off in the short game and then win them over in the long game.

While it may sound evil, the women overwhelmingly described manipulating relationships as an act of survival within the *parrhesiastic* game. As a strategy, it took a long time to become useful and an even longer time to be perfected. But the women had lifetimes of practice. Nikki and Walter reported honing this strategy in grade school by using their talent in the sciences and subsequent favoritism from teachers to leverage friendships with other Black children.

Sometimes the women expressed taking advantage of the opportunities they received for being tokenized in science spaces, while other times they manipulated relationships by downplaying their visibility. Nikki said, “When in Rome, do as Romans do, or at least look like the Romans do.” She shared her interpretation of the famous phrase as she described how she tried to “blend in” and “water herself down.” She explained her decision by wanting to focus on the science and not have to explain her fashion choices of wearing a turban or dreadlocks to her white supervisor. “I’m not taking time from white people to have them explain themselves to me.” Lauren and Nidia shared similar experiences of downplaying their uniqueness to fit in. Having come back to Puerto Rico from New York to teach at a nursing school, Nidia recalled her students looking at her distinctly New York ‘70s-era clothing style like she was from outer space. She was told by administration to tone down her style. Lauren shared how she felt like she had to leave her identity at the door of her engineering classroom:

In my mind, there’s always been this separation of how I showed up in a classroom, doing my absolute best in trying to be another student, while also recognizing in most of those classrooms, I was the only Black person in the room. I was maybe one of five who wasn’t white. And maybe one of ten in the bigger classes that wasn’t male. I knew those

things were there and I think because of that, I tried to make myself as normal as possible. Normal being as close to my white male counterparts for those 90 minutes or 75 minutes that I was in the classroom. Once I left, I was able to pick up my identity as I walked out the door and actually do what I needed to do to affirm myself and in other spaces.

In this passage, Lauren expressed her strategy of attempting to blend in with the crowd despite her visibility. This strategy was described by participants as an attempt to preserve energy for other fights. Foucault's analytic of *parrhesia* suggests melding or making an attempt at "normalization" is characteristic of giving into power systems. The fact that participants described these moments as brief, happening within work or school hours, suggested to me this approach is used as a specific strategy versus giving in completely. It can be likened to sacrificing a pawn to take a bishop on your next turn in chess.

While I disagree with Foucault's assessment of normalization in this instance, understanding power structures and dynamics were significant keys to the strategy of manipulation. The women had to know who they were dealing with. Ava proudly reveled in her practice to "read the room" and "fake it 'til you make it." She understood that power was ranked, so she went into every room "knowing who's ranked where." Knowing this information allowed her to gauge how she should walk into the room, what she should be prepared to say, and how she should be prepared to say it. Ava was an avid believer in reading body language, so she made sure "that [her] body language comes in like [she owns] the room because otherwise you're prey." Through her experience, she learned how to "sum people up" quickly so she could determine what tactic they may respond to. Her skill comes with one major disadvantage—she's exhausted all the time. Turns out that "figuring out relationships, alliances, who is on your side

when shit blows up, while you're still trying to blow shit up at the same time" takes a lot out of a woman who still has a job to do. We see women trying to fit in and women trying to stay on top of everything. We see women taking a breath and women holding their breath. I propose the ways women manipulate relationships is congruent with how much energy they can afford to expend at that moment.

Strategy 2: Create Boundaries

As women of color, we are told to fight for what we believe in, for our families, and for our communities. We are taught to grit our teeth and dig our nails into the ground as we inch our way up the mountain. For those of us who are taught that the only way through is to push and make space for ourselves, it can be hard for us to let go.

Nine participants brought up the significance of creating boundaries as a strategy. I have already shared how the participants discussed the potentially overwhelming consequences of speaking truth to power. As Walter said, "I had to learn how to let go. That is not what they teach you when society is telling you to be your outspoken Black woman self. They don't teach you how to let things go." Unfortunately, Walter found herself in deep water having to take a medical leave and delay her college graduation by the time she recognized she needed to let go.

Creating boundaries was seen as a strategy to keep the white people at bay. Nikki's mentality was "I stay in my lane, you stay in your lane." The women had many reasons to create boundaries. Nikki, Skynet, Isabela, and Ava created boundaries protecting their productivity and reputations. Selena, Walter, and Lauren created boundaries protecting their rest and wellness. Nidia, Eva Anne, and Grace created boundaries protecting their families' wellbeing. Katherine's boundaries protected the people in her lab she felt responsible for. Margarita and Gloria established boundaries that continued to connect them back to their appreciation and passion for

the land. In essence, the women drew a figurative line in the sand and dared white people to cross it.

And cross it, white people did. Gloria noted how predictable her white colleagues and supervisors could be. While it took her some trial and error to understand the predictability of her colleagues, Gloria and several other women anticipated the eventual line crossing. When it happened, the participants shared how they were prepared to give feedback to their white counterparts. Participants were not surprised when their white peers would get angry and “turn” on the women of color. By the time the participants were working professionally, they had extensive practice managing white people’s emotions.

While honing their manipulation skills, the women were also learning how to adapt their communication to successfully meet their goals. Universally, the women in this study shared how important it was to tailor their communication style to best fit the power dynamic and context of the situation. Skynet provided an example of this technique:

It was then that I learned, okay, I’m going to have to come at this lady differently. And what I mean is I have to be intentional about it. It’s a point of education more than correction. So I say, “Tell me a little bit more about why or how you came to make that statement?” I use questions like that to see if I can pull out her lived experiences. Because I understand the power struggle. She’s already seeing me as... I wouldn’t say inferior, but someone who is not on her level. I can discern that, right? So this is her hard stop.

In this passage, Skynet was attempting to make her boundary known to her supervisor. Skynet purposefully chose “education” over “correction” because she had to opt for the long game.

Skynet’s relationship was not changing anytime soon. She was trying to strategically share that

she found her supervisor's words inappropriate by feigning ignorance. Several participants shared this approach.

Another example of a boundary that several participants shared included creating or finding a *counterspace*. A place where the women of color could find community and be their whole selves. Gloria, Lauren, and Nikki describe the thrill and awe of finding like-minded community with women of color at conferences. "Finding your people," as Walter put it, became critical to many of the participants' psyche. These were moments of escape that provided reprieve from having to explain oneself or read the room continually. These *counterspaces* provided a mental break from the constant strategizing that seemed to take up critical space in the participants' minds.

Summary

The game is *parrhesia*. The goal of speaking truth to power is to say what needs to be said while avoiding the most dangerous consequences. The participants of this study were raised to be proficient at this game. Whether they wanted to or not, they have played this game every single day of their lives. In the process of training to speak truth to power, a social contract of rules and expectations were developed that the participants of this study came to understand and follow without any formalized education. The participants outlined these rules as:

1. Stay true to yourself;
2. Avoid ruining it for other women of color;
3. Live to die another day;
4. If you must leave, go out on your own terms;
5. Share the map with others.

Along with the rules, participants described two strategies, manipulating relationships and creating boundaries, that participants uniquely employed to while using *parrhesia*. By doing so, participants juked their opponents and jumped over obstacles toward accomplishing their goals. Participants were willing to forfeit short-term goals for their long-term visions of a science where they were recognized for their accomplishments and could *finally* get back to work on projects that could solve some of the world's most complicated problems.

Chapter 5: Discussion

The purpose of this study was to explore the experiences of women of color in science as they speak truth to power. Using Critical Race Theory, Critical Feminist Theory, strong objectivity, and Foucault's analysis of *parrhesia*, I aimed to understand the risk, responsibility, and reward that each participant weighed when choosing to speak truth to power. The research questions for this study were:

1. What motivating factors guide women of color in the sciences to choose to speak truth to power?
2. How do women of color in the sciences envision the future of science culture?

To answer these questions, I interviewed 13 women of color who graduated with a science degree from a higher education institution in the U.S. Using both one-on-one semi-structured interviews and a focus group, I provided participants an opportunity to add their experiences to the growing number of *counternarratives* describing the harmful impacts of the competitive, isolating, weed-out, color-evasive, and heteropatriarchal culture of science. In this section, I summarize findings, offer implications, and propose areas of further research that this study uncovered.

Summary of Findings

Through the lens of strong objectivity, science has been used to minimize contributions of non-Westernized and Indigenous knowledge (Harding, 2015). Its connection to white supremacy values has also created a culture that has proven to be a “chilly” and unwelcoming environment for women of color (Harding, 2015; Morris & Daniel, 2008; Seymour & Hewitt, 1997). Still, women of color enter these precarious environments for the love of the discipline. Some described having an innate scientific ability, while others struggled to pass their science courses.

Regardless of ability level, participants described empowering moments when they were inspired into the field. Whether it was caring for the class pet or volunteering at a hospital, many participants were drawn to science with specific professional outcomes in mind, such as becoming doctors, animal conservationists, environmental scientists, public health professionals, nurses, veterinarians, and more. Other participants were less sure about the professional outcome, but passionate about the process of learning how the world works through the scientific lens. To be successful in science, participants quickly discovered they needed something else that could not be taught in the classroom.

When I asked about moments they had that discouraged them from science, many participants answered with an emphatic “of course” or “absolutely.” “There are so many to choose from,” one participant retorted. One participant described an instance where things were thrown at them by their supervisor. Participants were publicly humiliated in classrooms or explicitly told they did not belong in science. They shared moments of complete isolation and times when their self-esteem was reduced to almost nothing. They shared times they were barely acknowledged for being in the room. They brought up time after time when they felt gaslighted to believe *they* were the problem. While I was fully prepared to also hear stories of sexual abuse and sexual assault, participants did not share any of these stories. Yet, we know it happens (McClintock, 2018)

The additional component participants needed to be successful in the sciences was courage. Courage allowed all participants to brave the isolation, the color-blind ideologies, the uncertainty, and other oppressive experiences. For participants, courage was not an innate quality. It was learned and practiced. Courage was a skillset that required strategic foresight and *la facultad*. Strategic foresight is a self-reflexive strategy rooted in learning from past mistakes

(Page-Reeves et al, 2019). *La facultad* describes a unique strategy rooted in marginalization and allows women of color to respond to power dynamics by “reading the room” and choosing actions accordingly (Anzaldua, 2012). Participants of this study seemed to embody these two skills instinctively. But these skills were learned through trial and error and feelings of regret and/or guilt when strategic outcomes were not met. Both strategic foresight and *la facultad* are by-products of racial realism within society, especially the scientific community. To be recognized for their science ability—which is key to the adoption of a successful science identity (Carlone & Johnson, 2007)—participants had to become skilled in the areas of *la facultad* and strategic foresight. In the process of practicing these skills, participants also became aware of and followed rules that served as a social contract or rules of engagement for women of color in the sciences. The rules that participants of this study used to muster the courage to speak truth to power were:

1. Stay true to yourself;
2. Avoid ruining it for other women of color;
3. Live to die another day;
4. If you must leave, go out on your own terms; and
5. Share the map with others.

Participants were willing to live with the consequences of their actions when following these rules.

What motivating factors guide women of color in the sciences to choose to speak truth to power?

In answering the first research question, these rules served multiple purposes. First, they served as motivations for participants. Participants explained the importance of staying true to

their personal morals and ethics. The decision to speak truth to power weighed heavily on their bodies. They spoke of churning stomachs and lumps in throats as they analyzed whether the risk of speaking their truth was worth any negative consequences they may receive. Many of the women shared the responsibility that they felt toward others that looked like them. Often the only woman of color in the room, they understood their actions and words were often the standard that their white colleagues and supervisors used to judge other women of color. Additionally, participants described not wanting to perpetuate stereotypes. Having experience being “wronged” by other women of color, participants shared a need to also be cautious around other women of color. Moraga and Anzaldúa (2015) declared women of color are often not able to reflect on how they “have taken the values of [the] oppressor into [their] hearts and turned them against [themselves] and one another” (p. 27). I found that the participants of this study had previously reflected and were very candid about how both internalized and institutionalized oppression affected their positive and negative experiences with other women of color in science. Another rule involved a win-some, lose-some mentality. The concept of living to die another day meant the women were willing to sacrifice short-term gains for their long-term goals. Many of the participants shared having to decide if engaging a supervisor or white colleague on their oppressive behavior was worth it at the time. Weighing the consequences of speaking truth to power, the whole of the situation mattered. Who was present, what their relationship was to the participant, who or what was affected, and timing of the incident impacted the participants’ choice of strategy in providing critical feedback. When it seemed like leaving a position or situation was inevitable, participants described the importance of going out on their own terms. The final rule that participants collectively shared was a desire to serve as a mentor and share what they learned from their experiences with other young girls or women who looked like them.

Overall, these rules were never taught publicly in any formalized fashion. Participants learned them through a variety of personal experiences. Some women learned these rules through mentors. They also described watching how other women of color were treated. Still others learned them by getting too close to the fire and surviving severe consequences. In general, this social contract granted participants the ability to break other standards. Other rules were meant to be broken, such as white, patriarchal beliefs of professionalism and positivist, colonial ideas of scientific inquiry. As Foucault (2001) noted, one of the nuanced tactics of maintaining power differentials is dictating what is normal. By following these rules and perfecting strategies, such as manipulating relationships and creating boundaries, participants resisted harmful norms that poked holes in their self-identities as scientists and were allowed (or made) to redefine what success in the sciences could be. Women were forced to *play* this game, but they did not *have* to speak truth to power. It is evident that not all women do. But those who do have the courage, reason, and skill serve as *parrhesiastes*. In fact, outspoken women of color may be the *most* qualified to serve in this capacity in regard to creating more equity and inclusion within the culture of science.

How do women of color in the sciences envision the future of science culture?

In answering the second research question, participants asked us to imagine a world where researchers discover the first decline in greenhouse emissions since the industrial revolution. Or one where we get to explore the world using a sustainable mode of transportation. A participant also envisioned a science where we learn to give back to the earth as much as we take from it. These are the kinds of futures that participants envisioned if the terrain through science education and professions did not require the women to work “twice as hard” to get just as far as their white counterparts. Frustratedly, Eva Anne explained, “we have other issues to deal

with, like our planet burning.” Pulitzer Prize winning novelist, Toni Morrison (1975), described racism as a distraction. “It keeps you from doing your work. It keeps you explaining, over and over again, your reason for being.” Participants envisioned a science culture where they did not have to spend as much time navigating tumultuous situations rooted in racism and sexism. Participants craved working on projects that contributed positively to their respective disciplines. More than anything, they wished to inspire others to join them in this work.

At the end of each interview, I asked if it was all worth it—the trauma, the anguish, the sacrifices, and so on. Overwhelmingly, participants of this study said yes. Despite these circumstances, they willingly stayed because they knew they could contribute to their respective fields if only they were allowed to do so. Even Walter and Selena, who were no longer working in science disciplines, still found value in the lessons learned through their experiences. The reward for speaking truth to power was the promise of contribution. They simply wanted to be recognized for their sense of duty to other women, their respective families, and their individual ethnic/racial communities. The promise of contributing to an equitable and inclusive science culture, of making it better for the next generation of young scientists of color, was *the* reward for speaking truth to power.

Implications of Findings

For this study, I found value in using Carlone and Johnson’s (2007) science identity conceptual model as a framework to better understand the impact of performance, competence, and recognition on participants’ overall science identity. Participants confirmed the model’s emphasis on recognition as a significant factor of persistence in the sciences. While participants agreed that it was important to be recognized for their talent and performance in science, it was the specific *lack* of recognition for sacrifices they made and extra work they took on to be

successful that made participants question their continuation in the field. It took a tremendous amount of dedication and responsibility to themselves, their families, their ethnic/racial communities, and other young women of color to attempt to redefine the forms of recognition that would keep them motivated within their fields. As a counternarrative to the STEM pipeline, the science identity model is very useful. Alternatively, it lacks a nuanced understanding and appreciation of additional social skills that are required for women of color to navigate oppressive situations within the culture of science. This study filled in those blank spaces and further defined skills and strategies that women of color used to form their science identity. Combining the science identity framework with CRT, I offer alternative classifications to describe the educational and professional journey of the study's participants. While Carlone and Johnson classify their participants into research scientists, altruistic scientists, and disrupted scientists, I suggest altering the "disrupted scientist" category to "*disrupting* scientist." By making this change, I argue that this group of women are not only being *impacted* by the oppressive culture of science, but they are also mutually *impacting* the culture by their resistance and redefinition of success.

Additionally, it became apparent that each science discipline had nuanced expectations of professionalism and scientific inquiry. For instance, participants in conservation science were very vocal about the inclusion of Indigenous practice and knowledge while other participants rarely, if ever, brought it up. This study showed that each discipline required a distinct use of similar social skillsets, like manipulating relationships and creating boundaries. I propose more opportunities for women of color in higher education settings to engage in cross-discipline work. I understand the desire to focus on discipline-specific networking and *counterspace* opportunities. In line with CRT and CRF frameworks, I argue for purposeful interdisciplinary

opportunities where the possibility of coalition-building between and among research scientists, altruistic scientists, and disrupting scientists could serve as a catalyst for more movement toward equity and inclusion in the sciences. Establishing *counterspaces* for women of color in science while they are in college has been connected to a more equitable and inclusive science culture (Castro, 2014; Lane, 2016; Ong, 2005). Participants described being the only or one of few women of color in their professional settings. A collegiate *counterspace* may be one of few intentional times women of color may practice engaging with others who look like them and can counter or provide opportunities to question the oppressive norms of their respective disciplines. This study showed that the participants felt beholden to other women of color, and consequently were motivated to speak truth to power. Additionally, participants described the importance of learning how to navigate the politics of using Perdomo's (2012) unfiltered *raw tongue* and confident *symbolic voice*. By establishing strong relationships with other women of color in various disciplines who are learning different aspects of similar skills, I contend those relationships may provide a foundation of collective voices of women of color to be heard amidst the isolation in later professional spaces strongly reported by the participants of this study.

Last, the ability to communicate scientific information and its significance to the masses has continued to be an important aspect of scientific inquiry. Posselt (2020) called for graduate science education to focus on the training and development of cultural translators. Cultural translators are individuals who “used the language and sensibilities of the existing culture to communicate and collaborate across boundaries—decoding, valuing, and applying perspectives different from those to which long-standing members [of a culture] had been socialized” (Posselt, 2020, p. 150). When Skynet, a Black nurse, described herself as “the familiar” when engaging with Black patients, she was serving as a cultural translator. Similar experiences were

shared by Isabela, Gloria, and Margarita. This study not only proved the significance of cultural translators within scientific disciplines but also showed that women of color who successfully graduate with a science degree are at an advantage for serving as cultural translators between scientific research and racially marginalized communities. As a CRT scholar, I note the interest convergence of science communication communities and their cultural translators. Assuming the cultural translator role may continue to perpetuate the oppressive nature of women having to work “twice as hard,” I pose a warning for science communication to tread lightly. In participants’ pleas for a more equitable and inclusive science culture, I do hear a call for potential allies and advocates to not rely on women of color to be the *only* ones serving their communities as cultural translators.

Future Research Recommendations

I learned a lot from the research participants of this study. One of the more intriguing aspects of participants’ experiences involved the isolation that the women felt by either being the only or one of few racially marginalized women in their fields. I found myself asking: Does the social contract change if there are more women of color around? The implications of isolation were strong in this study, but I would be interesting in finding out if similar experiences and rules of engagement existed within a less racially isolating environment.

Research that is rooted in Critical Race Theory and Critical Feminist Theory requires researchers to distinguish between races, ethnicities, and genders to capture a robust depiction of systemic oppression. While I aimed to differentiate the unique experiences of the participants, I do think there is ample opportunity to explore similar research questions within specific science disciplines/professions and racial categories. There is no one-size-fits-all solution to creating more inclusive and equitable cultures within various science environments. By investigating the

experiences of women of color within certain disciplines, we can discover unique opportunities to co-create positive and supportive spaces for women of color to thrive.

Final Reflection

We give because someone gave to us.
We give because nobody gave to us.

We give because giving has changes us.
We give because giving could have changed us.

We have been better for it.
We have been wounded by it...

You gave me
What you did not have, and I gave you
What I had to give—together, we made

Something greater from the difference.

—Alberto Rios, “When Giving is All We Have”

“If you’re safe in the space, be brave in the space.” Ava said she routinely repeats this mantra to herself during critical moments that may require speaking truth to power. I contend that no woman of color is ever really safe in the isolating, competitive, oppressive, and unwelcoming culture of science. I further argue that if one does feel safe, then theoretically one cannot be brave. Bravery is an act of resistance to the norm—what society deems appropriate (Foucault, 2001). Despite Ava’s saying, she truly does take a leap of faith every single time she speaks up for herself and others.

Throughout our interviews, I would catch participants contradicting themselves. Consequently, the rules I outlined are also filled with contradictions: What happens if a woman’s attempt at being true to herself is seen as stereotypical? The science profession can be brutal to women of color, but almost all the participants say the lessons they learned through it were worth

it in the end. The life of a woman of color in science redefining success for herself is complicated. It is like having an astigmatism, where the eye has trouble focusing. In this case, I envision the women of color holding on to taut ropes. One rope is tied to their work—their passion and inspiration for science—and another rope is tied to the responsibility she feels toward her family, her communities, her patients, her post-docs, her partner, her parents, her dreams, her idea of social change, and so on. I tried to come up with a pretty model that could depict what I heard from participants. I came up dry every time. I will leave you with an image of tension—women of color in science with gritted teeth and burdened shoulders holding on to a web of responsibility repeating their own personal mantra to muster the courage to stand for what their gut tells them is the right thing to do in that moment. They play this *parrhesiastic* game by their own rules.

Chapter 6: Letter to Women of Color Who Choose a Science Major

While completing this project, I had to continually remind myself who my audience was for this study. Was it for white allies or white people who want to be better white people? Was it for the scientists or science educators who perpetuate much of the violence described by the participants of this study? I purposefully orient my words to the young women of color I meet every day in my profession as a higher education administrator. The previous five chapters of my dissertation take on a traditional format of outlining the problem and formatting the study. Rooted in my theoretical perspectives of mixing the standards of a traditional research study and the complexity of human emotions, I add this direct line of communication to my intended audience—the women of color who choose a science major.

To the young women of color who choose a science major,

So, you chose a science major or are already planning on going to graduate school for something science-related or chose to explore a variety of majors but know you want to do something science-y or decided to come back for a science degree after finding it was required to do that one specialized job that you're interested in. Regardless of your reasoning or how you got to this point, you are joining an ever-growing cohort of racially diverse women who are entering into a complicated relationship with science culture.

If you are anything like the women I interviewed for my research study or befriended along my career, chances are you fell in love with science at a fairly early age. Perhaps it was that PBS special on Arctic animals or that hike in the woods with one or both of your parents or the time your family paid for you to go to space camp or that

really cool chemistry teacher who seemed to make experiments come to life before your eyes or that time you broke a bone and experienced the medical field and countless hours going to physical therapy or when you learned how to take care of the animals on your family's small farm or the summers you spent gardening with several generations of women in your family... you found your way toward understanding the complexity and connections of the biological and physical environments around you. Despite what you may have been told, there is no one-size-fits-all journey toward a successful career in the sciences. But there are some similar experiences that tend to arise for women of color in predominantly white science spaces that should be acknowledged.

If you are at a predominantly white college (less than 50% students of color), there is a high chance you may be one of few racially diverse students in a science classroom. If your class size is less than fifty students, there is an even higher chance the amount of students that share similar racial and gender identities as yourself can be counted on only one hand. Additionally, you may never experience having a faculty member of color in any of your major specific courses. You may shrug and dismiss these facts, like I did, by telling yourself this is no different from any other educational experience you have had in your past. At some point (and maybe it's not now), you will pause to think about this phenomenon and come to understand how truly fucked up it is. If you are not already psychologically there, you may be wondering why I even bring this up.

Many of the women of color in science that agreed to interview with me for this study mentioned how lonely they feel. By being one of few women of color in their educational professional spaces, they spoke of the responsibility they feel to be a positive

representation of their gender and race. Their inability to be their authentic selves, even if it is a bit stereotypical, eats away at their psyche. Every action, every word is strategized and carefully enacted with the utmost of precision to withstand any potential negative impacts. And that shit is tiring! It leaves little space for sparks of ingenuity in their mind and has been described as a hinderance toward their professional goals.

Your visibility can be both a blessing and a curse. To be successful in the sciences, you must figure out what boundaries to set in place for your distinct presence in the classroom to serve you well. It is important for you to find your people. Racial identity development theory suggests that “your people” does not have to be secluded to one particular race or ethnicity, but the lack of people of color in science spaces can feel especially egregious when you already feel academically and psychologically overwhelmed. Finding your people does not have to veer you away from fulfilling your academic expectations either. Many science disciplines have inter/national organizations led by and for students and professionals of marginalized identities. Some of those organizations have local chapters or national conferences you can attend at discounted costs to students. These are great opportunities to network within your specific discipline. My research also highlights the importance of networking within an interdisciplinary science space where connections and relationships with other students of color in various science disciplines can be fostered. More and more of science research requires an interdisciplinary perspective to creating solutions to wicked problems. Fostering these relationships and honing these skillsets early in your undergraduate experience can have a tremendous effect on your career.

Depending on your trajectory, chances are high that you not only worry about passing your major specific courses, but also a selection of other courses curated to meet graduate school requirements. I hope your academic advisor is helpful in navigating your institution's academic policies. Unfortunately, it's common for students of color in science to be overlooked or dismissed by their academic advisors and faculty. While these folks can serve as great resources for you, I advise you to take reasonable responsibility for your own educational path. I beg of you not to pigeon-hole yourself into taking only science courses. I challenge you to take courses in sociology, communication studies, literature, and ethnic studies. Participants of my study noted how important these courses were to engaging other parts of their brain and developing a language to better define their lived experiences that most science courses left them wanting. An advisor may attempt to sway your course selection decisions. I admit it takes courage for you to address your unique academic interests outside of your major to an advisor. The lessons you learn in advocating for yourself now will only benefit your ability to do so in the future.

There may be days when you are explicitly targeted because of your identities. These assaults may show up in the classroom from other students or even your instructors, in a residence hall or apartment with your roommate(s), or at an event from a provocative speaker weaponizing their right to free speech. It may feel like there's no one to turn to. Sometimes there are people around you who do care and are willing to assist you toward your goals. I hope you can surround yourself with these types of people. These connections may serve as crucial friends and mentors who may help you navigate and understand the complex system of higher education.

With that being said, there is a convoluted truth I must share with you. The university you are attending has a vested interest in your academic progression toward graduation. Your success shows that the university is preparing you adequately for the workforce. Government oversight agencies require universities to share their 4- and 6-year graduation rates publicly. The higher these percentages, the more clout an institution has to receive federal or state funding. At the same time, your institution also creates courses that provoke students to compete against each other and perpetuate oppressive practices. Rather than teach successful study practices for science courses, the university creates a cat and mouse game of providing academic resources where the winners are students who (a) are already familiar with course concepts from previous accelerated academic experiences from high school or community colleges, (b) are knowledgeable of where and who to go to for assistance, (c) are able to pay out-of-pocket for private tutoring, or (d) have access to a specific community, department, or counterspaces where specific cultural and academic needs are provided for. Everyone else has an uphill battle to access academic help when needed.

The hot and cold relationship between universities and women of color in science mirrors an abusive one, where the women of color are left to ask, “what did I do to deserve this?” The answer: We exist. We dare to learn. We dare to question. We dare to challenge. We dare to be heard. We dare to be acknowledged. We are made to intentionally question our sanity. At the end of the day, we ask ourselves, “Have we done enough?” Painfully, we fail to often ask, “Have they done enough for us?” We internalize guilt and shame through the lens of responsibility that weighs heavy on our hearts and minds. We have learned only to trust ourselves, yet we must be trusted by others. We seek

authentic relationships while learning to contort ourselves to reach specific outcomes. We must recognize the vicious cycle of guilt, responsibility, and regret that fuel our motivation to become greater than ourselves are also the cinderblocks that weigh us down from fulfilling our greatest potential.

Chances are you recognized the path you have chosen will continue to be challenging. I hesitate to say that it will be worth it in the end. That is not for me to judge. Every participant of this study agreed that it was, indeed, worth it—if only to freely and authentically be themselves. As you embark on this journey for yourself, I propose that you reflect on what you're willing to risk, what consequences you are able to live with, and what vision for the future you are working toward. By doing this work now, I hope you will be able to create sound boundaries as you navigate an oppressive science culture.

In solidarity,

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Appendix A

Intake Form

The intake form will be accessible via the study's website for participants who find me through indirect recruitment. Potential participants will fill this out prior to scheduling an interview or focus group. The link will go to a Qualtrics survey.

1. Do you self-identify as or have been described by others as outspoken (in a professional context)? Do you self-identify as a cis- or Trans-woman of color? Did you complete middle and high school in the U.S.? Have you completed a Bachelor's, Master's, and/or terminal degree in science? [If "Yes," Continue]
2. First and last name.
3. Preferred method of contact. (Phone, text, email)
4. List Preferred Method of Contact Information (Open ended question)
5. What science field do you resonate with? (Check all that apply with an open ended option)
6. How do you want to participate in this study? (Check all that apply) 60-75 minute individual interview? 90 minute workshop and focus group?
7. I am using a snowball/network sampling method for finding potential study participants. The participant selection criteria of this study include self-describing or having been described as outspoken, opinionated, or something similar, identifying as a cis- or trans-woman who racially and/or ethnically identifies as a woman of color, completed middle and high school education in the U.S., and graduated with a Bachelors, Masters, and/or PhD in a science field from a higher education institution in the U.S. If you know of someone who fits these criteria, please feel free to share email or social media contact

information here. You can also help me by sharing this info on your social media accounts or emails [add link to advertising information].

Appendix B

Interview Protocol

Procedure

I will be conducting one semi-structured 60-90 minute interview with each participant.

Participants will be able to choose a time that works for them among my availability using Calendly. The interviews will occur via Zoom and be audio recorded. The audio recordings will be downloaded into a CSU-provided cloud network under participant-selected pseudonyms.

The following are guided questions for the interview. Depending on initial responses, I may ask participants to elaborate on certain experiences related to the study's topic.

Interview Questions

Thank you for agreeing to speak to me about your experiences in the science field.

Consent and confidentiality.

Clarify any information from the in-take form.

Describe purpose of the study.

Science Identity:

- Explain Carlone and Johnson's (2007) science identity model. Which description of science identity do you personally identify with? Why?
- Describe 1-2 salient experiences that helped you solidify that science was something you enjoyed and wanted to focus on.
- Were there any moments that made you lose confidence in yourself as a science-identified person? If yes, describe 1-2 of the most salient.

- Can you describe any moments in science that made you feel empowered and/or made you come back to it if you took a break?
- How have your identities as a woman of color impacted your experiences with science?

Parrhesia

- Can you share why you've either self-identified as outspoken or the circumstances that you felt led to you being described in this way... with particular attention to a professional context? How has this changed throughout your professional career?
- Can you describe in as much detail a moment when you had to speak up about a situation that you deemed oppressive, racist, sexist, classist, etc.? What happened? How did you weigh the consequences before choosing to speak up? What were the outcomes of that moment?
- With the concept of strategy in mind, how do you analyze/manage risk when moments like these (when something oppressive that you feel like you have to respond to) come up for you? Is this strategy being used repeatedly? How did you learn to rely on this strategy?
- Can you describe in detail any consequences that being outspoken has had on your professional life?
- What kinds of expectations (societal, professional, community, familial, personal) do you feel guide your day to day? Are they the same expectations that guide your professional career? When you wake up in the morning...
- What has been your experience with other women of color in your field?
- Have you ever served as a mentor to another woman in your field? How did that experience go for you? What kinds of advice did you share with them?

- How would you define a successful career in your field? Can you describe any strategies or changes in behavior that you think you'd have to use to be successful (using your own definition)?
- What impact do you want to have with your career?

Quick Rapid-Fire Questions

Fill in the blank:

- Science is...
- Success for a woman of color in the sciences is...
- Speaking truth to power means...
- Is it worth it?

Thank you.

Invitation to focus group.

Invitation to invite others.

Follow up.

Appendix C

Focus Group Protocol

Procedure

I will conduct 1-3 focus groups depending on interested participants. They will last 60-90 minutes in length of approximately 4-6 people in each focus group. They will be scheduled using Calendly. The focus groups will be video and audio recorded using the Zoom platform. Those recordings will be downloaded onto a CSU-provided cloud network. The following are guided questions and activities for the focus group. Depending on initial responses, I may ask participants to elaborate on certain experiences related to the study's topic.

Focus Group Questions

Thank participants.

Consent and confidentiality.

Purpose: I am interested in exploring ways that the science environment could be more inclusive for women of color currently in the sciences and for those who are thinking about entering the field. For today's focus group, I will be asking questions related to what type of science culture or environment you all think would be more socially just and equitable for us and future women of color.

1. In what ways do you feel like your presence in the science field benefitted communities of color?

Visioning Activity

I want you to suspend reality for the moment. Let's say science got its act together and was now a welcoming environment for us, what would the headline of tomorrow's newspaper be? What scientific discoveries would be highlighted? What future research questions would be asked? What would be different in your work environments?

Have participants go around and share the headlines and context behind them.

2. If your headline were to come true, what would be the most significant impacts to the current science environment? What would change the most?
3. What role do you feel like you have in establishing that type of environment?
4. Finally, I work with a lot of young people of color envisioning a future in the science fields. What advice do you have for women of color entering the science field?

Thank you.

Invitation to interview.

Invitation to invite others.

Appendix D

Coding Tables

Code	Brief Explanation	Example of Quote
Rule 1: Stay True to Self	Examples of participants reflecting on regret, authenticity, and performance	I think a lot of it comes back to if I go home tonight, will I respect myself? (Ava)
		I was the articulate one. They were so happy they were talking to me. I am so understanding. I understand how this works. You are not going to make me a coon in here. But you're... Being the lightest Black woman. Being the most outspoken Black woman. I... they wanted me to perform with the situation in a way that I refused to and it tainted a lot of the relationships that I had cherished, when it came to my dean and my admin and stuff. (Walter)
		I would hope that it's an asset... in a job like that to have someone that is outspoken and willing to take risks, but the good kind of risks. To do bigger and better things than yourself. (Isabela)
		I truly can say that I can look at myself in that proverbial mirror at the end of the day because I have never been a hypocrite. I have never lied. I have never felt like I have ever done everything that I can do to make the work place better when I leave it than when I got there. (Isabela)
Rule 2: Don't Ruin it for Other Women of Color	Examples of participants reflecting on advocacy, guilt, stereotypes, community, responsibility, and connections	What I noticed is that for me the women, the few that were in those positions of power, or in authority, or had made it, it almost, especially in the military, becomes competitive. It's almost like they don't want you... maybe that's not fair, but there's always a degree of don't be too good, because you're going to take over my role. You can't be too good. (Isabela)
		So if I get Black, then it's like oh, we saw this coming. You know? And I don't. I have to stop and think. I have to be cognizant of that because if I want other women of color to have an opportunity to come in, I have to set a standard. Okay, we're not harmful. We're not all going to be snapping our necks, rolling our heads, or snapping our fingers and things. (Nikki)
		we have students of color who are expecting us to come through for them. (Nikki)

		I knew it was important that I made it. Because I was the only one. They needed the poster kid. I think there were ways that I got more attention, but not actual classwork. It was more like connection to industry. (Selena)
Rule 3: Live to Die Another Day	Examples of participants reflecting on humility, abusive relationships, regret and guilt related to responsibility, and social change	But right now, what I'm realizing with these last two years of grad school when I've finally been out of those harmful spaces. Now all of the emotions, all of the trauma, that through those seven years that I literally pushed down and was just trying to get through it all. Well, now it's all coming out. It feels like it's all at the surface of my body. Like I literally feel it here in my chest and in my throat all the time. Like the emotions. (Gloria)
		At that point, and I learned this from a woman that I used to work with at the CDC, but I created, I opened up a memo book and I wrote today's date. When did I get into the office? This is when I got in the office. What did I do today? These are all the things I did today. These are the emails I sent today. This is the interaction that happened with this person. These are specific quotes. Like I started documenting the crap out of every single day to protect me and my family because I am the primary earner and if we lost my income for whatever flippant reason this guy wanted to claim, my family's at risk. (Eva Anne)
		Regardless of how many times people were checking on me, and you know, hey it's okay to slow down. I was just kind of like, okay, cool, thanks, and pushed ahead anyways. That continues to be kind of my biggest takeaway of the consequences because it's something that had a residual effect, positive and negative. Continues to honestly. At the time I was just, I was in full-fledged denial of it. (Lauren)
Rule 4: If you must leave, go out on your own terms	Examples of participants reflecting on pride, redefining success, and responsibility to self and culture	I felt like my whole reputation at like finding another job was going to be out of this... impossible. That's another reason why I didn't stay. There's no way I'm going to get another job at [institution]. In another lab and succeed or do well and move up (Nikki)
		But something that those experiences taught me that has helped with my confidence and deal with stuff that has continued after that is that I don't owe anything to any of these white people, pretty much.

		I think being a woman of color in range, in the very white spaces in undergrad, I started feeling like that. (Gloria)
		I'm going to do science. I'm just not going to be the best at science. And I'm okay with that. That was a weird understanding to have. (Walter)
Rule 5: Share the Map with Others	Examples of participants reflecting on responsibility to open doors, connect, and mentor	Also I would say getting this position as an Assistant Professor still kind of shocks me that I have this job sometimes. The impact that I have on students is... can be huge. They put a lot of confidence in me, and so that's kind of cool. I have learned that I have to embrace that. (Katherine)
		find your people and find your spaces. I used to say that and tell people that without recognizing what that actually meant. Because the people and the spaces are so important... so important! (Walter)
		It was about giving the two women of color this leadership opportunity and access to things. So I think even in that moment it was about hoping that I could show, that I could be able to show these two people that you were valuable in these ways and like you are important and you do have the opportunities that other people have. (Selena)
Strategies: Manipulation of Relationships	Examples of participants consciously/intentionally acting a certain way to meet specific goals	It's a matter of so many complexities and just one opportunity to impact someone's life that I take seriously. That I'm passionate about. It's a delicate balance that I'm trying to... you're basically trying to... entice someone to agree to what you're saying. (Skynet)
		I just kind of water myself down. Just for the sake of... when in Rome, do as Romans do, or at least look at the Romans. That's how I feel. (Nikki)
		So I've had to learn to shift how I approach those to asking a question and sometimes this makes me mad. (Eva Anne)
		It just was like we're going around this and making a decision that we've already told you we won't make just because we don't want to deal with your race. I think that in that moment, I was like fuck this place. Like you need me more than I need you. (Selena)
Strategies: Boundaries	Examples of participants consciously/intentionally creating boundaries or self-set rules for	You don't have to explain yourself or give a story of who you are to prove your standard. (Gloria)
		I don't have or I've never really formed a lot of friends in my major, which everybody thought was

	enacting with people in classrooms or professional spaces	kind of weird. And I didn't really think about it. But I left CSU with not knowing anybody in my class that was in my major unless I lived with them my first year. Thinking about the level of engagement with my major was heavily involved with identities. I didn't really think that was the space where I would be welcomed, so I didn't really put the effort into those spaces to feel comfortable. (Walter)
		Am I going to make more emotional work for myself later on? (Ava)
		I don't want to say on the surface, but at least in part the way that I approached engineering, specifically in the classroom was to put aside my identities and just do the work and keep my head down and get my degree. That was the mindset. (Lauren)