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**Deconstructing Social Constructs:  
Exploring Teachers' Positionality When  
Teaching Race and Human Diversity in  
the Science Classroom**

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Although the topic of race and its impact on education have been well researched (Brown, 2019; Ferguson & Trombetta, 2021; Ladson-Billings, 2014; Trygstad et al., 2020), science curriculum does not directly incorporate anti-racist teaching within approved curriculum for students at the K-12 level (Donovan, 2015; Morning, 2008). Much of the teaching and understanding of race as a social construct does not appear until the college level (Hubbard, 2017b; McChesney, 2015). The topic of race is often examined by looking at racial group outcomes (Adams et al., 2017; McKellar et al., 2016) or racialized experiences and identities (Kang et al., 2019; Morton et al., 2019). At the K-12 level, these conversations often occur outside of the classroom amongst teachers, researchers, and other key stakeholders; high school students are not being directly taught that race is a social construct and racial stereotypes are not scientifically sound (Emenaha, 2022).

There are three main factors that contribute to this gap in high school science instruction as it pertains to the topic of race and human diversity, one being political pushback from conservative lawmakers. Conservative lawmakers have made claims that discussing race is divisive, often making references to educational theories such as critical race theory (Chavez, 2021).

A second major factor is what is referred to as colorblind ideology. Colorblindness occurs when people believe the best way to deal with racist ideas is to not discuss the topic of race, hoping that the less we talk about race, the less of an issue it will be. However, this method is counterproductive to developing anti-racist thinking (Avci, 2016; Kendi, 2019). Another factor that contributes to the absence of anti-racist science instruction is the role of the teacher, specifically their perspectives on the topic. This research will focus specifically on exploring the perspectives of teachers within the context of determining what factors impact their perspectives on addressing such instruction within their biology course.

Teachers play a crucial role in teaching topics such as race and human diversity because it is the teacher who initiates and facilitates instruction (Kincheloe, 2008; Hubbard, 2017b). Teachers cannot leave part of who they are at home, but rather bring the entirety of who they are into their teaching practices, even in non-subjective courses like science. A key factor that contributes to teacher perspectives is their positionality or how they are situated in social and political constructs in and outside of the school setting (Liegeot, 2020). Exploring the dynamic role of teacher's perspectives that shape their positionality can provide insight as to what factors can better support teachers in approaching science topics that have social or political implications, such as race.

As there are many ways one might approach this content, this study examines teachers' perspectives on discussing the scientific and social implications of race through the use of culturally responsive

pedagogy (CRP). CRP was selected because this approach to teaching emphasizes the development of critical or sociopolitical consciousness. Sociopolitical consciousness is an essential approach, as it supports critical questioning relating to established power structures (Jones & Taylor, 2022). As in the case of the current study, teachers ideally should be able to implement instruction that allows for the integration and critique related to the topic of race and human diversity.

Little research exists on understanding how high school science teachers' positionality affects their perspectives on using science instruction to debunk myths related to race and human diversity. As understanding is gained in this area, it can lead to more insight on how teachers' positionality can be leveraged to support science instruction that refutes racial stereotypes. To address this gap in the literature, the following research questions were explored:

**Research Question 1:** In what ways do teachers position themselves with respect to the three tenets of culturally responsive pedagogy (CRP) in their delivery of instruction on race and human diversity?

**Research Question 2:** What factors affect secondary science teachers' positionality when delivering instruction on race and human diversity?

### **Theoretical Framework**

Within education literature, teacher positionality aims to explore the social factors that influence an individual's power, privilege, and perceptions. By examining

teacher positionality, we can better understand how positionality influences teachers' pedagogical practices. How one is positioned is relational; for example, we can explore how one is positioned in an external context, such as school (Moore, 2008). This study takes such an approach by exploring teacher positionality within the school structure, but more specifically how teachers are positioned within the pedagogical practices of culturally responsive instruction.

CRP has been selected as the context to explore teacher positionality because it has been shown to support the needs of diverse students' populations; however, it is under research in science education (Jones & Taylor, 2022; Madkins & McKinney de Royston, 2019). Teachers' ideas and philosophies about instruction are not uniform but vary based on their unique life experiences. These experiences are shaped by their positionality or positional identity within their given social and cultural contexts, thereby influencing their delivery of science content.

### **Literature Review**

#### ***Teacher Positionality***

The term positionality can be used to explain the relationship between teachers to other individuals, influenced by the various social identities that teachers hold (Takacs, 2003). Teo (2015) defined teacher positionality as the stance that science teachers take as they recognize and develop a working meaning of the factors and forces that make up their social and political context. Fasavalu and Reynolds (2019) described positionality as relationally based, constructed within the context of the individual and their environment. Examples

of social constructs that often play a major role in understanding teacher positionality are race, gender, age, religion, class, and power (Mensah, 2012; Rivera Maulucci, 2013; Teo, 2015). Constructs that impact positionality are often negotiated by how aligned teachers' identities are to the dominant culture (Luehmann, 2007). Teacher positionality is not an internal process resulting from a single experience, but it is influenced by internal and external factors.

Positioning can influence how teachers show up in their classrooms contributing to their pedagogical and instructional practices. For science teachers, positional identity serves as a way they acquire, interpret, and make meaning of science learning for themselves as well as their students (Rivera Maulucci, 2013). This positioning can be negotiated by one's choice to be open or passive in regard to diverse worldviews, power dynamics, individual privileges, and the impact of these privileges have on others (Rivera Maulucci, 2013). This negotiation can result in lack thereof, of teacher agency. Teacher agency refers to the perceived level of autonomy teachers have in the classroom to direct student learning and facilitate their own personal growth (Hadar & Benish-Weisman, 2019).

Teacher identity literature suggests three steps on how teachers' positionality can impact justice-centered instruction such as teachings on race and human diversity. First, there is the identification of an unjust system; next, reflection that moves towards action or inaction; and finally, enactment of new practices or continuation of business as usual (Rivera Maulucci, 2013). Applying this to science lessons on the social

construct of race, teachers will first have to be able to identify a lack of anti-racist science instruction as an issue of injustice; next, they would need to make decisions to incorporate more modern teaching of race and human diversity in science teaching, and finally implement justice-centered instruction into their courses.

It is important to note that teachers' positionality is not fixed but rather nuanced adapting to external cues, context, and circumstances (Barton, 1998). In a qualitative study of a Latinx and a Chinese Singaporean female science teacher, their positionality was explored to understand the role outside factors played in how they interacted with students (Teo, 2015). Both women in this study came from poverty and were dedicated to completing advanced science degrees before entering the teaching profession. These unique experiences gave them a critical perspective which influenced their social positioning. Findings from this study showed that as teachers engaged in professional learning opportunities that supported development of their teacher agency, they were more empowered to allow their positionality to influence their approach to teaching. Changes influenced by their agency included supporting students to deconstruct gender norms (in regard to female participation in STEM) and the impact that race has had on who can participate in science (Teo, 2015). Prior to professional learning opportunities, the two teachers in this study were unaware of how their social and political positioning could be used to empower their students. However, as they learned that current science curriculum is not culture or gender neutral, they made shifts in the masculine Eurocentric leanings often found in science instruction (Teo, 2015). Once made aware of

how social and cultural factors have affected their teaching practices, participants in the study were able to use their teacher positionality and support students in making deeper connections between science instruction and the power it has to influence society.

When looking at how race might influence teachers' positionality, it has been cited that power and privilege can work to moderate this positioning (Avci, 2016). Therefore, race and even class act as factors that, when in line with the status quo, afford an individual certain privileges. However, if an aspect of one's positionality exists outside of the dominant culture, this can impact the privileges that someone might be afforded. It is important to note that sharing similar backgrounds (e.g., race or class) does not necessarily position individuals in identical ideological ways. Two individuals of the same racial background with varying life experiences can exhibit uniqueness in their ideas of teaching race and human diversity in the science classroom. In addition to racial identity, other components that can determine a science teacher's positionality are life experiences, professional identity, and career goals (Rivera Maulucci, 2013). These components ultimately impact teachers' orientation towards teaching in culturally responsive ways.

### **Critical Pedagogies**

Critical pedagogy, according to the critical theorist Freire (1970/2000), is the analysis of school systems through the power play between the oppressed (i.e., marginalized students) and the oppressor (i.e., school systems). A critical stance is necessary to address issues of race, equity,

and inequality in urban education (Kincheloe, 2008). Kincheloe refers to critical pedagogy as a political animal with differing and conflicting agendas at work. By not teaching that race is a social construct, or presenting scientific findings that debunk racist stereotypes, current science teaching actually perpetuates biological essentialism (Donovan, 2015), thereby maintaining racial conflicts in society.

Those in the educational sphere who want to dismantle systems of oppression perpetuating racist ideologies must also take a critical approach to education (Gay & Kirkland, 2003). In a qualitative case study, Morales-Doyle (2017) worked with 29 Black and Latinx American high school students to investigate environmental racism in their community. Students in the study collected soil samples from various parts of their communities as part of a class science project. Analysis of the soil samples provided strong evidence that the location of power plants emitting pollutants were in areas with a majority of Black and Latinx American residents. As students became aware of the location of power plants and their role in perpetuating environmental racism, their critical consciousness deepened. Students were then empowered to act and raise awareness about the impact of the power plant on marginalized racial groups. Morales-Doyle's (2017) study exemplifies how a critical approach to teaching science supports students' critical thinking and development of sociopolitical consciousness.

### ***Culturally Responsive Pedagogy***

As work is done to support teachers' pedagogical practices, CRP has been shown

to be an effective way to deliver science instruction (Brown, 2019; Mensah & Jackson, 2018). CRP is the practice of teaching that supports instruction through three core tenets. First, CRP brings students' culture and ways of knowing into the science classroom. Culture within the context of CRP does not only refer to ethnic culture—it encompasses any factor that impacts and/or intersects with students' lived experiences. Although this is not an exhaustive list, student culture can include the use of technology, issues students experience in their local community, popular culture, and students' formal and informal language use.

Next, CRP supports the idea that all students can succeed regardless of their background. This approach to teaching avoids deficit framing and promotes the idea of meeting students at their current level and providing appropriate scaffolding to deliver rigorous instruction. Finally, culturally responsive teachers develop students' critical consciousness or sociopolitical consciousness (Boutte et al., 2010; Ladson-Billings, 2014; Madkins & McKinney de Royston, 2019). Sociopolitical consciousness development helps students find ways that science influences the conditions of their local communities, which in turn influence science (Boutte et al., 2010; Laughter & Adams, 2012; Madkins & McKinney de Royston, 2019). It also supports student activism towards addressing issues that might be in opposition to the status quo and to provide equity and equality (Boutte et al., 2010; Morales-Doyle, 2017).

It is important to note that the third tenet of CRP, sociopolitical consciousness, is often left out of teaching practices even

from instructors who identify as culturally responsive instructors (Jones & Taylor, 2022). Of the three tenets of CRP, this is one of the most powerful components in developing students' ability to use science as a mechanism for social change; however, teachers must first develop their own critical consciousness to effectively incorporate this component into their instruction (Jones & Taylor, 2022). According to Freire (1970/2000) and other critical pedagogy philosophers (Gay & Kirkland, 2003; Kincheloe 2008), the educational system is a highly political landscape where those in power maintain their position by inhibiting the critical thinking and development of sociopolitical consciousness of students and even teachers. To address this gap, current research has called for more teacher professional development as CRP use is growing in science education (Jones & Taylor, 2022; Madkins & McKinney de Royston, 2019). Successful CRP professional development should emphasize the importance of developing students' sociopolitical consciousness, which in turn should support the ability to ask critical questions.

A study conducted by Boutte et al. (2010) found that science teachers who adopt a culturally responsive approach to teaching will have to move away from the ideas that science is neutral, and that current science instruction is factual by acknowledging the Eurocentric slant in science curriculum. Science is cultural and enforces current power structures (Brown, 2019; Kincheloe, 2008). Boutte et al. (2010) documented the discussion of race in the science classroom by having students explore scientific racism and the exclusion of African American scientists from well-known historical science narratives. The

specific aim of the study was to develop students' sociopolitical consciousness using culturally responsive instruction. Boutte et al.'s (2010) work illustrated that CRP should "move beyond the typical neutral, apolitical stance in science and actively address oppression" (p 12). Their work shows that many students are aware of racism and/or bias in science instruction, even if they do not overtly name it.

In another study conducted by Laughter and Adams (2012), middle school students were taught a culturally responsive lesson on racism through use of a fictional story called *Space Traders*. In their study, students participated in a three-day lesson where they discussed and considered important contributions of African Americans in developing American society and what life would be like without these efforts. The stories provided students opportunities to share personal encounters with bias and how it had affected them. Students in the study were able to make connections to how the science community can use evidence-based thinking to mitigate issues of race and bias (Laughter & Adams, 2012). Researchers concluded that successful science instruction should embrace issues of social justice through the use of CRP so students can find the relevance of science to their personal lives.

In yet another study, Madkins and McKinney de Royston (2019) explored similar concepts regarding the sociopolitical nature of science, focusing their work on in-service teacher participants. Specifically, their study examined science teacher positionality with respect to enactment of CRP. The teacher participant in their study was a former science teacher and current vice principal who was temporarily teaching

a secondary science class. The research question in this study was, "How does a science teacher attend to students' racialized and classed realities and position them relative to science?" (p. 1328). The major goal of the study was to focus on the third tenet of CRP, sociopolitical consciousness, and how a teacher's orientation towards this tenet impacted his instruction and the development of students' critical consciousness. From this study we see the use of counter narratives as a means to foster creativity and ingenuity and as an effective instructional practice when teaching students who have been the recipients of racial stereotypes.

### **Methodology**

This study investigates how four high school biology teachers' positionality impacted their delivery of a two-week inquiry-based argument driven lesson on race and human diversity. The two-week lesson included typical genetics unit topics such as predicting genotypic (i.e., genetic) and phenotypic outcomes from parent to offspring, examining various traits including skin color. However, for the purpose of this study the instruction also included historical origins of race and modern genetics research that debunks the idea that humans can be genetically grouped into different races.

This qualitative investigation used a multiple case study approach to reports findings across a group of cases within the context of a single study (Merriam & Tisdell, 2016). The case in this study is defined by each teacher.

## Data Collection

Data collection consisted of teacher reflections; each teacher was asked to write a 1-page summary of their experiences teaching the lesson. Additional data sources included a 60-minute individual interview and one 60-minute focus group interview with all teachers present. Individual teacher interviews took place three weeks after all the teachers had completed the lesson. The 60-minute focus group interview was conducted three weeks after conducting individual interviews. All interviews were moderated by the researcher. Interview questions in individual and focus group interview were identical. The inclusion of focus group interviews provided opportunities for participants to interact with each other, uncovering unanticipated yet relevant issues related to teacher perspectives (Vaughn et al., 1996). Finally, after initial coding of data was conducted, all participants were invited back to a third 45-minute to 60-minute individual interview which served as an opportunity for member checking. All interviews were audio recorded and transcribed verbatim.

## Participants

The four participants, Mr. Santori, Ms. Patterson, Ms. Sanchez, and Ms. Lee (pseudonyms), worked in a large urban city in Southeast Texas (see Appendix). The campus' student demographics was highly diverse: 32.9% African American, 36.6% Hispanic, 24% White, 4.7% Asian, 0.4% Native American, and 1.7% two or more races as reported (Texas Education Agency, 2018). The racial diversity of the high school selected for this study made it an ideal setting to conduct this research.

## *Mr. Santori*

Mr. Santori identifies as a Latino male. At the time of the study, he was unmarried and in his early thirties having been raised in a small town in a low-socioeconomic status (SES) household with two working parents. He moved to a large urban city after completing his undergraduate degree. He recently completed his master's in science education with focus on CRP and has plans of completing a doctorate degree or transitioning into leadership role within education. At the time of the study, he was in his sixth year of teaching secondary science. He was active in the science community as he has presented at local and state conferences on his work in CRP. He teaches both on level and advanced level biology courses.

## *Ms. Patterson*

Ms. Patterson identifies as an African American female. At the time of the study, she was unmarried and in her mid-twenties. She was raised in a military family and spent much of her formative years living in Arab nations. She identifies as a Muslim woman and regularly wears a hijab. She recently completed her undergraduate degree in science education and was in her first year of teaching. During her teacher preparation program, she learned about CRP and how to infuse the strategies into her teaching practice. She is active in the science community as she does work in wildlife conservation awareness.

## *Ms. Lee*

Ms. Lee identifies as an African American female of mixed races (Asian and African American). She was raised in a



middle-class home in the eastern part of the United States. Ms. Lee unmarried in her late thirties and has six years of teaching experience. Transitioning into teaching through alternative certification route, she was currently working on completing a doctorate in education. Prior to participating in the study, she has no formal or informal training in the use of CRP.

### **Ms. Sanchez**

Ms. Sanchez identifies as a Latina female. At the time of the study, she was unmarried and in her mid-twenties. She immigrated to the southern part of the United States in early elementary school and upon arrival as a young girl, she did not speak English and had to learn through formal and informal schooling. She recently completed her undergraduate degree in science education and was in her first year of teaching. During her teacher preparation program, she learned about CRP and how to infuse the strategies into her teaching practice.

### **Data Analysis**

Data was analyzed using constant comparative method as outlined by Lincoln and Guba (1985). Data collected from each case underwent an iterative systemic analysis to produce findings of this study. Direct quotes from participants were used as empirical evidence to support the categories that developed through the coding process. The final iteration of codes produced the themes or findings within this study. Table 1 provides each category and its description as related to the findings of the present study.

To determine alignment or orientation to the tenets of CRP, qualifying terms were added to each tenet. Full

alignment was given the qualifier “high” (i.e., participant espoused ideas that “all students can be successful...”); if the data revealed the teacher was not fully aligned, the qualifier “moderate” was used (i.e.,

**Table 1**

### *Orientation Towards Culturally Responsive Pedagogy*

Category		Description
Academic achievement	High	High school biology students can be successful when learning about the social construction of race.
	Moderate	Some high school biology students can be successful when learning about the social construction of race.
	Low	High school biology students <i>cannot</i> be successful when learning about the social construction of race.
Cultural competency	High	Utilizes students’ culture as a context for learning biology.
	Moderate	Sometimes utilizes students’ culture as a context for learning biology.
	Low	Does not utilize students’ culture as a context for learning biology.
Sociopolitical consciousness	High	Uses biology instruction to develop students’ critical consciousness.
	Moderate	Sometimes uses biology instruction to develop students’ critical consciousness.
	Low	Does not use biology instruction to develop students’ critical consciousness.

participant espoused ideas that “some students can be successful...”), and if the teacher did not align to the tenet, the qualifier “low” was assigned (i.e., participant espoused ideas that “students cannot be successful...”). This system was applied to each of the three tenets of CRP. To stay in line with the purpose of the study,

each teacher orientation was examined solely on their ideas to teaching race in the biology classroom within a genetics unit. This supported the aim of the study to determine how teachers' positionality impacts their likelihood to teach lessons on race and human diversity.

To better understand findings related to teacher orientation towards CRP, an additional comparative or cross-case analysis was conducted using the findings from each teacher participant. A cross-case analysis can provide generalizations across teachers within this study (Merriam & Tisdell, 2016), thus providing a broader context in responding to the research questions.

### **Researcher Reflexivity**

As a researcher, I must be aware of my own positionality—an African American woman, daughter of West African immigrants, and former secondary biology teacher who was raised, schooled, and taught in a large metropolitan city in the South. As a Black female of West African descent, I have had to handle, overcome, and navigate through racial stereotypes experienced in both my formal schooling and social settings. Later as a secondary science teacher, I observed from the perspective of an educator that students of color, like myself, were recipients of these unspoken, but very real, messages that behavior and academic achievement could be linked to race. I disclose my personal story to acknowledge that it has led me to focus my research on addressing misconceptions about race to support scientifically accurate understandings of human diversity.

My awareness from the lens of being a former biology teacher, having racialized experiences, and being a researcher focusing on CRP instruction provide me with a unique perspective that supported me in understanding, relating to, and interpreting the stories of the teacher participants (Laughter & Adams, 2012; Moore, 2008). Being aware of personal biases increases the likelihood of objectivity as it increases self-awareness (Grossman & Porche 2013), an important attribute needed within the scope of qualitative research (Creswell et al., 2011).

During this investigation, a host of steps were taken to reduce researcher bias during the gathering and interpretation of data. Initial steps were taken during the design of the lesson to ensure that the content of the lesson was well balanced and free from persuasive unscientific information. Content added to the lesson was retrieved from research-based findings on modern genetics from researchers in the areas of anthropology (Jablonski & Chaplin, 2000), education (Donovan, 2016b; Hubbard, 2017a), and genetics (Dar-Nimrod & Heine, 2011). The use of an outside reviewer, a pilot study, and member checking were conducted to provide external critiques of the intervention lesson and interpretation of interviews.

### **Findings**

For each participant, data is presented regarding their orientation towards the three tenets of CRP, academic achievement, cultural competences, and sociopolitical consciousness. The themes of this study resulted in three different orientations towards CRP and three different subthemes (high, moderate, low; see Table

1). Factors such as professional development experience in CRP, teachers' interpretations of their own racialized experiences, as well as teachers' understanding of the socioemotional needs of their students played an important role in determining each teacher's orientation towards CRP.

### **Orientation Towards Academic Achievement**

#### ***Mr. Santori***

Mr. Santori's interviews showed that he has a high orientation towards students' academic achievement when giving instruction on race and human diversity in the biology classroom. When measuring academic achievement, each participant's data was analyzed for the degree to which they believed that students could be successful given the appropriate support. He stated, "I think race is the elephant in the room that we need to address, but don't." Mr. Santori was given a rating of high because he believed that students' age, maturity level, race/ethnicity, and/or SES would not be a limiting factor in their success during this unit. Rather he has a strong belief that high school biology was an appropriate setting for students to learn about race and human diversity.

To have a high orientation in academic achievement, participants needed to have confidence that students were emotionally ready to learn and process the subject matter. From his interviews, Mr. Santori was very clear in his estimation that students need to have scientific understanding of race in order for them to decipher scientific and unscientific claims about human diversity: "The kids [students] get messages about race all the time, but they don't get the science behind it that they

need that that's why I felt like it was important to teach this in my genetics unit." He believed all students receive messages about race and, therefore, all students could benefit from instruction to address misconceptions about the social construct of race.

Although Mr. Santori has a high positionality towards all students' academic achievement, he believed that his identity as a Latinx teacher plays a more significant role with students who share a similar background: "When you look inside our DNA it's big time similar, but we experience the world in different ways. I can relate a lot to my kids [students] from Latin America cause that's where I'm from." He shares that growing up in poverty in the South, he understands that American society is very racialized and believes that we should not shy away from this reality. He adds, "And I'm familiar with the stereotypes that students might encounter, so I'm taking this opportunity to tell them, tell all my kids [students] like your race that color stuff is not a limitation."

Mr. Santori did not approach his students learning with deficit framing, which is one of the roadblocks to supporting students' academic success in CRP. He instead had high level of confidence that students could use the information they were learning in their genetics unit to process and understand content knowledge towards the desired goal of student success.

#### ***Ms. Patterson***

Ms. Patterson's interviews showed that she has a moderate orientation towards students' academic achievement when giving instruction on race and human diversity in the biology classroom. She was

given the assignment of moderate because although she did express that high school biology is an appropriate setting for students to learn about race and human diversity, she does believe there are limitations. She shared that some students might not be as successful as others in processing information in the lesson because of ideologies expressed in their family structure and/or personal biases as it relates to race and human genetics.

She also felt that some students might be unwilling to adjust unscientific beliefs if they were not mature enough to reflect deeply and interrogate racial stereotypes. She also shared concerns that some of her White students were less receptive to her instruction during the intervention. She believed that they assumed her instruction was based on a personal agenda and not academic content. She shares, "I feel like it's easier for some of them [White students] to dismiss me as like another one of those socially concerned Black people or something like that."

Ms. Patterson also noted that her students of color felt more comfortable engaging in dialogue during class discussions. Although her rating was moderate overall for academic achievement, she did express belief that most students could benefit from the lesson if they were open-minded. She adds, "I think that them [Black students] seeing somebody who looks like them or who has shared experiences with them, who's open and willing to talk about these things, I think could be really powerful for them."

Although Ms. Patterson believed that some of her non-Black students might struggle with the lesson, she expressed

strong beliefs that all students at an early age should be presented with scientific facts on the social construction of race:

I care a lot about the actual content of biology, and I think it's important that kids know about issues that face them today. Like, the genetics of people and how that fits in society and how we might discriminate or not discriminate on people based on things that are social constructs. So, if at a young age you take that away, then hopefully some balance can be achieved. It is one of the biggest determining factors of where you end up, but, at the same time, there's no scientific basis for it.

From the data presented by Ms. Paterson, her reservations of some students' success were based on students' mind-set and ideologies from their home environment. As these two areas of concern are out of teachers' control, this resulted in less than her fully embracing the first tenet of CRP in regard to teaching about race. She did share that the majority of her students were able to create thoughtful questions and have conversations related to race and human diversity using evidence presented in class readings.

***Ms. Lee***

Analysis of the data gathered from Ms. Lee showed that she has a moderate orientation towards students' success when teaching about race and human diversity within high school biology class. Ms. Lee believed that high school freshmen were not mature enough to discuss the concept of race and human genetics. She stated, "To me, they're still children, they're like hitting puberty." Her view of her students was

based on the fact that most of them were in their first year of high school. She also taught more advanced science course to older students more advanced in their high school career and used these experiences as a basis for comparison. In our conversation she shares, “I believe it should be taught, but I really think it should be at a higher level, maybe at the 12th grade level because a lot of these kids [students] who come in, they’re still very immature. They don’t have that right mindset.”

Ms. Lee believed that freshmen did not have enough life experience to learn about the topic of race and human diversity. She expressed that because many of her students did not have jobs, they had not encountered social issues, particularly those related to race. She also did not believe that her first-year biology students had experienced racial stereotypes; from her viewpoint these types of experiences only occur once students enter adulthood.

Ms. Lee also expressed that she thought students’ SES level would affect their academic success when learning about race and human diversity. Like Ms. Patterson, she also expressed concerns of maturity, but she attributed these to students privileged backgrounds: “Some of them come from backgrounds where they’re more privileged than others or economically” She believed that high SES students who had privileged upbringings may have not be able to relate to the lesson content.

Although Ms. Lee did not feel strongly that the topic was appropriate for students at the ninth-grade level, she did feel that it was a topic that should be discussed because of the societal implications related to race and human genetics. She elaborated,

“it definitely aligns with this generation of kids and I really think it needs to be taught because our society is rapidly changing.”

Ms. Lee’s belief that students could be successful learning about race was predicated by two factors: students’ maturity level (moderated by age/ grade level) as well as students home life (moderated by SES and social privileges). At the conclusion of the lesson, she reported that her students were better able to search for supporting evidence when asked to respond to questions in class and stated that students continued this practice even during the other science unit.

### *Ms. Sanchez*

The analysis of Ms. Sanchez’s interviews showed that she has a high orientation towards students’ academic achievement when delivering a culturally responsive lesson on race and human diversity. Ms. Sanchez believed her role as a teacher was to develop students’ ability to be independent thinkers. She did not distinguish between different types of learners as she described her goals as an instructor. In her interviews, she expressed a general belief that her students would benefit from the instruction she delivered: “For me, my job as a biology teacher is to get my students to think critically and see how science applies to their lives. I feel like this lesson was able to do that for the kids [students].”

When Ms. Sanchez observed her students’ thinking process, she noticed they did not readily make the connection between the concept of race, human diversity, and science. She commented after the initial engage activity:

A lot of students were like, 'We are talking about race in a science class, shouldn't we talk about this in AP Human Geo or something like that?' But as we got into it, they saw we were talking about genetics and that was able to help them bridge the real world and science.

Ms. Sanchez focused her instruction on supporting students throughout the process of learning science by supporting their ability to think and analyze data in scientific ways. She made room for uncertainties and ambiguity, which helped develop students' scientific reasoning. Her ability to allow students to take the lead in their learning process is in line with a high teaching orientation towards students' academic achievement. In her final thoughts she shared:

That is what science is supposed to do, help students think critically and go back to the drawing board to revisit new ideas and using evidence to think through problems to either come up with a conclusion or even sometimes still not have an exact conclusion or one right answer.

Ms. Sanchez's believed that students learning about race and human diversity would lead them to create critical questions; an important skill set for academic success. In her interviews, she did not provide any reservations about her students' emotional maturity in handling the topic, as expressed by some other participants in the study. She did not place reservations or limitations on students' academic success, but rather had high level of confidence that her students would learn a great deal from the lesson. At the conclusion of the lesson, she shared that

she observed growth in students' ability to make stronger scientific arguments to debunk racial stereotypes.

### **Orientation Towards Cultural Competence**

#### ***Mr. Santori***

Data analysis of Mr. Santori's interviews showed that he has a high orientation towards cultural competence. When measuring cultural competence, each participant's responses were determined with how well they were able to incorporate students' lived experiences into their instruction. Due to Mr. Santori passionate nature and extensive training in CRP, he was very skillful in incorporating students' experiences and eliciting emotions to help students make connections to learning.

Mr. Santori was also aware of some of the unique challenges that his students faced at his school, as he reported having observed racial tension between students. In his interviews, he believed his role as a science teacher was to support students in dealing with social issues in a positive way. He was not sure about the long-term impacts of the lesson, but he hoped that it created a lasting impression in how his current students view and handle racial issues.

Mr. Santori attributed his high orientation towards cultural competence to his experiences as a child of two immigrant parents growing up in a home with limited resources. He shared that he and his family were mistreated by others because of stereotypes about Latinos. His teaching practices are highly informed through his life experiences and his training in CRP:

For me all I know is a racialized America, I remember seeing how my

parents we treated when I was younger and that stuck with me. [I] think it's important that students realized there are so many different American experiences and the more of them they are aware of the more socially conscious they will be.

Throughout his instruction, Mr. Santori provided opportunities for students to share their ideas and encouraged them to support assertions with evidence from the text. He also created space for students to ask questions and share their personal experiences with the topic of race and how that has impacted their beliefs about the social construct.

### ***Ms. Patterson***

Data analysis showed that Ms. Patterson had a high orientation towards cultural competencies. She was aware that her students brought different strengths and challenges to the table, and as a part of her teaching philosophy, she worked to make her classroom a space where students felt accepted. She attributed this practice to previous training she received in the work setting and during her preservice teacher training.

Ms. Patterson did not shy away from incorporating the students' and her personal experiences into her instruction, using them as teachable moments. During the engage activity, students completed an online interactive simulation created by Public Broadcasting Service (PBS), an American distributor of educational media, and the goal was to guess people's race based on appearance alone. As students completed the activity, she observed students verbalizing stereotypes about the characters in the activity. Having a high orientation in

cultural competence, she used her personal experiences with race as an opportunity to address what she felt were unkind generalizations. In a teachable moment she shared, "I explained to them what it was like to be told that you are something that you're not, or to just be put in a box that you don't agree with, it's really difficult."

Ms. Patterson shared with her students her experience of being a Black Muslim girl going to school in the Middle East. She shared that although both of her parents were Americans, she dealt with lots of questions based on stereotypes, such as her peers not believing she was an American because she was Black and not White. She used her personal childhood experience to discuss how assumptions people make based on race impacted her:

It was because "How is it possible that you're American but you're Black? All of the Americans I see on television are White." So first of all, not possible. Second of all, "You don't speak our language and it's not possible for you to be Muslim because you're from America. And all Americans I see are not Muslim." So it didn't work for them. They couldn't reason through that.

She also added that when she moved to America, she experienced inaccurate assumptions by other American because of her race. She described the stereotypes she encountered based on assumptions people made about her because of her race and her religion:

I get misidentified all the time because of my hijab, people assume that means that I am not American. So, I told my kids about this too. I

wanted my students to let people tell you who they are. Because race has no scientific backing, and it should not be used to make certain decisions about people. I think that you always lose a little bit of knowing anyone when you make assumptions about them first.

She told her students that inquiry and questioning were a part of the lesson. She provided space in her class for students to share ways they might have been mislabeled or prejudged. She then brought the conversation back to the lesson and made connections using evidence-based reasoning to understand the world around them.

***Ms. Lee***

Ms. Lee received a low ranking in cultural competencies. She expressed a mixture of anxiety and support for using students' culture and ways of knowing as a part of regular classroom instruction. Ms. Lee believed that she should be very aware of students' diverse racial and economic backgrounds, but as more of a precaution with the goal of not offending anyone. She explained,

My students' parents come from different places, different religions, different types of background and money. And we have to be very careful how we talk and respond and present ourselves in class because we don't know who's in that room.

Unlike other teachers in the study, Ms. Lee also felt that her minoritized students would not be comfortable having a discussion about race and human diversity in classrooms if there were not an equal number of students in the class that shared

the same background. When asked if she had any concerns about teaching the lesson she explained:

Well, it was a big concern at first because the diversity in my classes are not equally spread out. And I had one class in mind where the number of minorities was far less than any other of my classes. So, I kind of felt like this is going to be a very uncomfortable experience for them [students of color].

Ms. Lee's concern for her students may have been a result of her racial positionality and previous experiences with her own racial identity. Ms. Lee shared that she experienced complex issues with race as a child having one Asian and one Black parent. Her personal experiences with her own racial identity were a source of stress as she did not believe she was fully accepted in one group or the other. Her personal issues with her own racial identity resurfaced, creating apprehension for her as she provided instruction to her students:

So, the thing is from my personal experience, being at school, it was always a sensitive thing because I didn't know where I belonged. I was never accepted by the Asians, the Blacks or whatever because I didn't belong, and I want to talk to the kids about it. So, because of these labels and race, it kind of makes people feel like they don't belong in a certain group because they're not enough this or not enough of that. And so, with my personal experience, I really felt like teaching this lesson caused me a little anxiety because it



reminded me of my past being in school and stuff.

Ms. Lee's positionality led to a lowered orientation in cultural competence within the context of this lesson. She experienced challenges because of her background and thus was less inclined to use students' lived experiences as a source for learning and teaching within this study. Because she felt disempowered by her racial identity, she projected this in her teaching resulting in apprehension when addressing this topic with her students.

### ***Ms. Sanchez***

Ms. Sanchez showed a high orientation regarding using students' lived experiences to inform her instruction. She, like other teachers in the study, shared her own lived experiences with race in efforts to support her students conceptualizing class content with real-world applications. Although she had some concerns about how students would process the learning content, her prior training and experiences were crucial to her confidence level in herself and her students as she taught the lesson. She explains, "I have done stuff with CRP before, I try to make sure what I am teaching is relevant to my kids [students], but this topic can be controversial to some, so I wanted my students to get the science out of it and see how it relates to their real lives."

Ms. Sanchez also shared that she used her own culture to support students' learning and relate to them. She shared her experience as a young girl moving to the U.S. and having to learn English. She believed that her experiences made her more relatable to students:

I told them my story and I think it helps so they can relate, you know. I am very open with them sharing thing about me in class. I definitely feel like it helps me relate with them more. I feel like it makes a difference especially with my minority students 'cause some of them have the same experiences as me.

Ms. Sanchez was identified as having a high orientation toward cultural competencies due to her preservice teacher experience in combination with her acceptance and use of various cultures in the classroom. Ms. Sanchez used her experiences as a place to connect and be vulnerable with her students. She showed that finding connections with her positionality and that of her students was an opportunity to make the learning space more of a shared community rather than something she should shy away from or not address.

### **Orientation Towards Sociopolitical Consciousness**

As it pertains to sociopolitical consciousness, each participant was assessed based on their ability to develop and encourage students' use of academic content towards addressing social issues. Participants were asked about their ideas about science content being used to address racial stereotypes to create social change.

### ***Mr. Santori***

Mr. Santori's data showed that he had a high orientation towards the development of students' sociopolitical consciousness. Mr. Santori believed that what students are learning in his class can lead to future political and economic

decisions, as can be seen in the following statement:

Ninth graders should definitely be exposed to this type of instruction before they are out making economic and political decisions that are affecting society as adults. These conversations allow them to pull from different experiences in different groups in America, not just the experience in their home.

One hallmark of Mr. Santori's teaching style was that he would ask his students what they are going to do with the knowledge they were learning in the classroom. He often spoke of his students as if they were in the process of entering the next phase of their lives. He was very masterful in the way that he provided context that students are the leaders of the future. He challenged his students to not be afraid to share what they are learning in class or what they believed to be true and just. Mr. Santori's overall orientation as a culturally responsive teacher when delivering a culturally responsive lesson on race and human diversity was a high orientation across all three tenets, including sociopolitical consciousness.

***Ms. Patterson***

Ms. Patterson received a rating of high positionality towards sociopolitical consciousness. She encouraged students to consider how they can use what they are learning in the classroom to bring about societal changes: "They [students] know that we're comfortable challenging societal patterns from previous lesson." Ms. Patterson had a strong positionality towards the development of students' sociopolitical consciousness, as she encouraged her

students to ask tough questions and related issues that impact students' lives on a local to global scale. She used opportunities within the intervention to explain to students that stereotypes and biases can be roadblocks in achieving a more tolerant society.

In our interviews Ms. Patterson shared that she observed conversations that illustrated students were developing a critical lens. She shared that students began to question why the concept of race is used if it does not have scientific basis, she also shares that students started to question why they had not learned this in other classes. This questioning of school and schooling is an important step in the development of students' sociopolitical consciousness. Data presented by Ms. Patterson's showed that she had a high orientation towards the development of students' sociopolitical consciousness.

***Ms. Lee***

Ms. Lee received a low ranking in the development of students' sociopolitical consciousness as she did not understand societal implications of racial stereotypes. She also did not explicitly promote the use of academic content to create societal changes when addressing race. She instead expressed that education about racial stereotypes can be beneficial but cautioned against speaking up, particularly for minoritized groups. She believed it could result unwanted conflicts with the judicial system or law enforcement officers:

For me with CRP, I feel there is a line. I have worked in an all-White company and although I am half Asian I am seen as a Black woman. For me I teach my students to

reacting to social differences, it's a difference between keeping your job or walking out in silver bracelets. There are a lot of things that will be said, but you have to learn not to react and ignore ignorant comments. In certain situations, it's okay to speak up, but you got be smart 'cause it could cost you your job in the future.

She showed strong leanings towards not speaking up to maintain one's social status, which is not aligned to CRP which aims to develop students' critical lens and support students in being change agents in their local communities and beyond. Ms. Lee shared that past conflicts that her students perceived as racist were often not related to stereotypes or biases, and often a result of individual people's actions, as opposed to larger systemic issues. She explains, that "My students will come back and they go, "Oh look at what happened," "In the news they did this," or "The cops treat people unfairly." But then I ask some other questions like, "What did the person do to put themselves that situation?"

Ms. Lee also shared that on previous occasions when students have expressed that they believed they had experienced racial biases from a teacher, she often finds they do not understand how racial biases work. Ms. Lee explains that if the teacher or individual did not make a generalized statement then that is not enough evidence for students to use the "race card." She explains, "If they did not say anything about all Black people, they are not racist. If the teacher made a comment to you then it was about you. Students always want to say someone is being racist because [that is] the card everyone plays."

Her reference to "race card" illustrates that she believes that issues related to race might sometimes be exaggerated or inaccurate. This is contradictory to the ideals of CRP as this learning paradigms understands that it is because of racism that CRP needs to be implemented to correct an inherently biased and Eurocentric educational system.

It is important to note that Ms. Lee has never received any prior training in the use of CRP in the classroom, but she believed it could be helpful to her and other colleagues: "I do wish we would have some type of training on CRP, because a few things other teachers have done have caught my eye as not very culturally responsive, and I think training would help." Ms. Lee also shared, "this lesson was the first time I've done anything culturally relevant 'cause I wanted to stay away from that 'cause, you know, it's a sensitive subject. But I took a risk, because I really like how you organized the information it was focusing on science and very straight forward."

Ms. Lee received a moderate rating for academic achievement but a low assignment for both cultural competencies and the development of students' sociopolitical consciousness.

### *Ms. Sanchez*

Ms. Sanchez showed a high positionality towards sociopolitical consciousness development. During Ms. Sanchez's formative years, she attended a high school with a large population of students of color. As an adult, she later realized that there were differences in schools based on racial demographics. She believes the difference contributed to opportunity gaps that exist between non-

minoritized and minoritized student groups. She has used her role as a teacher to inform students of these gaps and has encouraged them to seek ways to bring about change. She recalled, “as a student, I was aware of racial issues but in a very subtle way, as I got older it became more apparent to me how race can be a determining factor in education. I learned that my experience had been very different. So, I really want my students to be aware that there are differences that exist, and those differences make an impact on their future.”

One example of how Ms. Sanchez supports her students' sociopolitical consciousness occurred during the lesson. Students read a short article about a pseudoscience called craniometry. Craniometry proposed that skull size was related to intelligence. Researchers in the early 1800s used biased data collection methods to rank human intelligence by skull size and results from these studies were used to advance racist agendas. Ms. Sanchez used this an opportunity to share with students the relevance of ethical practices in science, “When we read about Morton, students were able to see scientific bias and have a conversation about how scientists should be honest in the way they report things. A lot of the students were able to see that Morton was intentionally biased.”

Ms. Sanchez's teaching practice was based on her ability to support her students in speaking out when they observed issues of unjust or unfair practices. She appreciated her students' ability to observe and call out bias and supported them in making connections and pushing back on bias in their everyday lives. Her overall orientation as a culturally responsive teacher when delivering a culturally responsive lesson on

race and human diversity is a high orientation in all three tenets of CRP.

### Teacher Orientation to CRP Tenets

An important takeaway from this work is that teachers can exhibit varying orientations with respect to the three tenets of CRP. Table 2 provides a summary of each teacher participants' orientation to CRP across the three tenets.

**Table 2**

*Teacher Orientation to CRP Tenets*

	AC	CC	SC
Participants			
Mr. Santori	High	High	High
Ms. Patterson	Moderate	High	High
Ms. Sanchez	High	High	High
Ms. Lee	Moderate	Low	Low

*Note.* AC = Academic achievement; CC = Cultural competence; SC = Sociopolitical consciousness

### Discussion

I argue that teachers' racial positionality impacts their experiences and ideas around race; these experiences in turn impact their teaching philosophy as it relates to using science in addressing issues of race. Teachers who feel disempowered by their racialized experiences will be more likely to project this feeling onto their students. Likewise, those who feel empowered by their racialized experiences will be more likely to support teaching related to the social construct of race, with the belief that students can benefit from such instruction.

Teachers who are empowered by their racial positionality are more likely to believe that students can explore the concept of race and human diversity. For example, Mr. Santori, the son of immigrant parents, experienced racism, and its impact at an

early age. He considered himself someone who achieved success despite his experiences and that gave him a sense of accomplishment and feelings of empowerment. He felt empowered though his racialized experiences and therefore believed his students could be empowered as well. When approaching the lesson, he believed that his teaching could support students to refute racial stereotypes they might have internalized.

Likewise, we see Ms. Sanchez, who shared that she was unaware of how different her educational experiences were until she became an educator herself. Having immigrated to the United States at an early age, she shared that her socioeconomic and racial positioning did not allow her to get the best educational experiences. She believes that had she been more aware of the differences that exist due to her positioning in society, this would have been beneficial to her. The same idea was reflected in her approach to the lesson. She emphasized the value of students not waiting until adulthood to be aware how their backgrounds might support or limit their educational experiences. From her interviews I saw Ms. Sanchez focusing on wanting students to be aware of the imbalances of power and creating opportunities to address these gaps. She believed the more her students were aware of social differences due to race, the more empowered they can be.

On the other hand, teachers who feel disempowered by their racial positionality are less likely to believe that students can benefit from lessons on race and human diversity. This can be seen by Ms. Lee who stated she was initially hesitant to teach the lesson. She shared that her experiences with

race created anxiety due to her childhood feelings of not being fully accepted by either African American or Asian people. Again, these internalized racial experiences were projecting onto students as she expressed feelings of concern that her students, particularly those in classes with few minorities, would also feel isolated. Ms. Lee was projecting her racialized feelings of anxiety and isolation onto her students, creating the initial resistance in her approach to the lesson. This resistance can often be found in literature on White teachers and the topic of race; because they do not experience life through racialized context, they project their experiences onto their students and deny, avoid, or approach the concept of race with a colorblind ideology (Mensah & Jackson, 2018; Segall & Garrett, 2013).

Although Ms. Patterson did not express the same degree of resistance to the lesson as Ms. Lee, she projected her racial experiences of being doubted and questioned onto her students. As stated earlier, because of Ms. Patterson's positionality of being an African American Muslim growing up in the Middle East, she often dealt with being told who she was or was not. Although she found great value in the instruction, she worried that some of her students might reject the lesson ideas because they would doubt her motives. She projected her feelings of doubt from her racialized experiences onto her ideas about her students. In her interviews, she shared that the part of the lesson she emphasized most strongly was the importance of allowing individuals to define who they are and not to put others in a box based on assumptions.

This study provides evidence for individual analysis of the three tenets of CRP within an individual teacher's instructional practices. Additionally, I propose that the tenets of CRP can be measured using a scale of high, moderate, or low orientation. I argue that it is important for researchers and practitioners who align their teaching practices to Ladson-Billings' three tenets of CRP to consider how their practice adheres to each tenet (Ladson-Billings, 1995, 2014). This is important because relevant literature on CRP shows that the third tenet, critical conscience, is one that is underutilized by those who call themselves culturally responsive practitioners despite its importance in empowering students to take academic content beyond the classroom (Jones & Taylor, 2022; Madkins & McKinney de Royston, 2019). When using science instruction to explore the social construct of race, this is a conversation not only about debunking the inheritance of race, but also an opportunity to deconstruct ideas around biological essentialism or racial superiority (Donovan, 2015, 2016a, 2016b). The goal in looking at CRP in this way is to ensure that it is being implemented in a manner that truly aligns to the core principles of this pedagogical teaching practice and moves teaching and instruction towards social change.

I was also able to glean from this work that although all teacher participants identified as members of minoritized groups and reported having negative experiences with racial stereotypes, this did not automatically ensure they had a higher orientation towards CRP. When looking at positional identities (i.e., race, class, gender, educational level), the biggest indicator towards having a higher orientation towards

CRP was teacher training. Therefore, the evidence provided indicates that it is not enough to simply place teachers of color in classrooms with students of color and assume that this will provide the cultural and classroom support students need. Instead, this study reveals that there is a need for direct teacher training on the three tenets of CRP, regardless of positionality. Teachers without previous exposure to CRP training, when provided curriculum and support that aligns to CRP, can deliver instruction at least at moderate levels as can be seen by Ms. Lee.

Not only is it beneficial to revisit CRP professional development to ensure emphasis is placed on all three tenets, but such training should also include development of reflective practices. It has been noted that part of being a culturally responsive educator also includes use of reflective teaching practices (Gay & Kirkland, 2003). Reflective teaching practices allow teachers to consider and recognize how their individual biases might impact student learning. As can be seen from the data, teachers' areas of resistance were not recognized as personal biases, but rather they believed that their perception of the lesson was reality for their students.

We cannot deny that we live in a racialized society and many people's lives have been shaped one way or another by their racial positioning. Therefore, professional development around these types of instruction will be most successful when teachers are given the opportunities to explore how their experiences might present within the learning space. These opportunities are crucial because they can address common signs of resistance and provide teachers with the support they need

to move past resistance in efforts to reduce unscientific racial stereotypes among high school students.

Science is not free of culture (Brown, 2019) and teaching is not free of bias (Starck et al., 2020). For this reason, opportunities for teachers to explore their positionality, limiting beliefs, and bias are essential steps to work that needs to be done to support teacher training related to teaching race and human diversity.

### **Limitations & Recommendations for Practice**

#### **Limitations**

To ensure the lesson was taught with fidelity the researcher met with teachers for a half-day debriefing on how to implement the intervention lesson. The goal of the debriefing was to support consistency in the implementation of the lesson.

Students' tendency to seek out the right answer might put more weight on the teachers' opinions of the topic. To address this issue, teachers were encouraged to use an inquiry-based approach in their instructional delivery. Teachers did not present themselves as the gatekeeper of knowledge, but as facilitators guiding students with the use of student-centered instruction. Students were encouraged to take ownership of their learning by leading class discussions throughout the intervention lesson.

Finally, time constraints were a limitation of this study. Two weeks was enough time for students to process the information in the lesson, but more data would be needed to determine the long-term impacts of the study on students' understanding of race and human diversity.

#### **Recommendations for Practice**

Opportunities to further develop this study include increasing the sample size by including more teachers. An increase in sample size can provide greater insight on teacher experiences when providing instruction on race and human diversity. Furthermore, based on the findings of this study, there is evidence that suggests a need for research on teacher professional development concerning the use of CRP in the secondary science classroom. Such training should incorporate reflective practices to help mitigate personal biases that can lead to resistance when using science to address social issues such as race.

This research can also be extended to include students as participants. Ongoing work in the area that include students' interviews can support researchers in understanding factors that contribute to student misconceptions about race and human diversity as well as developing strategies to shift student thinking to a more scientifically accurate understanding of human variations.

#### **Conclusion**

This study adds to the body of educational research on methods to address biological essentialism among high school students. The study shares the experience of four in-service biology teachers who embraced an opportunity to challenge students' perceptions of others and address racial stereotypes through the use of scientific evidence. It is evident from the study that more work is needed to address misconceptions that students possess about race and human diversity. The evidence

brought forth in this investigation suggests that actionable steps can be taken to support student scientific discourse and communication as it relates to social construction of race. The aim of this work is not to erase students' racial identities; albeit a social construct, one's race has very real implications in society. The long-range goal of this work is transitioning to a better understanding and celebration of human diversity.

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**Appendix**  
**Participant Positionality**

Demographics	Participants			
	Mr. Santori	Ms. Patterson	Ms. Sanchez	Ms. Lee
Background	Raised in low SES household	Raised in military household	Raised in low/moderate SES household	Raised in middle class SES household
Marital status	Single	Single	Single	Single
Age range	30-35	20-25	20-25	35-40
Gender	Male	Female	Female	Female
Race/ethnicity	Latino	African American	Latina	African American & Asian American
Teaching experience	6 years	< 1 year	< 1 year	6 years
Courses taught	Biology	Biology	Biology	Biology, Advanced Science
Highest degree obtained	Master's Degree in STEM Education	Bachelor's Degree in Biology	Bachelor's Degree in Biology	Master's Degree in Education