International Journal of Science and Mathematics Education (2021) 19:997–1013
https://doi.org/10.1007/s10763-020-10091-9

How Secondary Mathematics Preservice Teachers Grapple with Enacting Culturally Responsive Practices at Placement Sites

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Received: 17 September 2019 / Accepted: 2 April 2020 / Published online: 19 May 2020

Abstract

Many scholars call for teacher educators to provide experiences that can lead prospective teachers to adopt and implement culturally responsive pedagogy in mathematics classrooms. This qualitative investigation analyzed interviews from preservice secondary mathematics teachers using Hernandez, Shroyer, and Morales framework for culturally responsive mathematics teaching. Analysis of the data demonstrates how preservice teachers grapple with enacting a culturally responsive framework at practicum sites. Findings reveal that while some participants reported comfort implementing some aspects of culturally responsive practices at placement sites, others reported apprehension. The data suggests strategies for teacher educators interested in supporting culturally responsive teacher-learners through professional modeling.

Keywords Culturally and linguistically diverse students · Culturally responsive mathematics pedagogy · Preservice teachers · Teacher preparation

Introduction

Cultural homogeneity of teachers and the consequential mismatch between teachers and students remains a ubiquitous concern for education researchers (Clewell, Puma, & McKay, 2005). Many (see, Gay, 2000; Jett, 2012; Ladson-Billings, 1995a, b) have called on teacher education programs to embrace culturally responsive practices in preparing teachers. Illuminating this call are racial demographic imperatives such as in the United States of America (USA), which show students of color as a collective majority of students (Maxwell, 2014). For mathematics teaching and learning, culturally responsive pedagogy remains a viable approach for the effective teaching of

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mathematics, to possibly increase not only interest and achievement but also a more useful holistic approach to mathematics (Gay, 2000; Jett, 2012; Ladson-Billings, 1995a, b).

Culturally responsive pedagogy is a socially constructed concept that seeks to respond to both community and classroom environments, and mathematics teachers who subscribe to culturally responsive tenets sustain positive teacher-student relationships. These positive teacher-student relationships lead to less conflict in mathematics classrooms and promote positive classroom environments that boost academic learning. Supporters of culturally responsive pedagogy argue that both the theoretical and practical significance of preparing culturally responsive pedagogues lie in the possibility of combatting significant academic discrepancies across racial groups. Culturally responsive practices in mathematics classrooms could ignite the intellectual engines of culturally and linguistically diverse students, such as Black children (Jett, 2012). However, even with the intentional preparation to produce culturally responsive pedagogues, many prospective teachers still feel inadequately prepared to teach culturally and linguistically diverse students (Vega, Moore, & Miranda, 2015). Therefore, more studies that delve into how prospective mathematics teachers use culturally responsive practices as a worthwhile option for teaching mathematics to culturally and linguistically diverse students, such as Black children, are needed. Such research studies could identify the different affordances and constraints prospective teachers face when venturing to become culturally responsive pedagogues.

With a dearth of studies focused on preservice teachers' experiences with practicing their interpretations of culturally responsive tenets (Lucey & White, 2017), this paper begins to respond by examining the experiences of four preservice secondary mathematics teachers (PSMTs) who grappled with enacting a model of culturally responsive mathematics pedagogy (CRMP) at their practicum sites. The research question addressed was: What factors influence PSMTs' enactment of CRMP in their internship placement site? Analysis of interview data assisted with answering the study's research question.

Relevant Literature

In recent years, a considerable body of literature has emerged on culturally responsive pedagogy as a practical option for teachers to tap into the intellectual engine of culturally and linguistically diverse students. Culturally responsive pedagogy is founded within critical theory, and critical pedagogy traditions that seek ways in which teachers might teach, and students might learn to often further social justice and equality through teaching and learning (Ladson-Billings, 1999). Gay (2002) described culturally responsive pedagogy as an inclusive pedagogy whereby teachers develop a knowledge base about cultural diversity, demonstrate care, build learning communities, communicate with ethnically diverse students, and respond to ethnic diversity in the delivery of instruction. Ladson-Billings (1995a) and Gay's (2002) calls to push teacher preparation programs to produce culturally responsive pedagogues reflect a consistent pattern in scholarships that seek to improve the school success of diverse students, such as Black children.

Overall, culturally responsive pedagogy is highly encouraged and minimally critiqued. However, in offering an alternative to culturally responsive pedagogy, a critique comes from educational scholar Django Paris. In rethinking culturally responsive pedagogy both in theory and practices and in the spirit of renewing teachers' commitments to affirm students' racial, cultural, and ethnic identities, Paris (2012) proposed culturally sustaining pedagogy. Culturally sustaining pedagogy "seeks to perpetuate and foster—to sustain—linguistic, literate, and cultural pluralism as part of the democratic project of schooling" (p. 93). Culturally sustaining pedagogy offers an alternative to culturally responsive pedagogy, given its focus on the multiethnic and multilingual present and future. Nonetheless, considering the alternative toward embedding culturally responsive pedagogy in teaching and learning with multiethnic and multilingual tenets, the critical question becomes, does culturally responsive pedagogy add more to the education community?

The inclusion of culturally responsive practices within mathematics classrooms afford teachers with opportunities to academically, culturally, politically, and socially transform mathematics curriculum for students, and help teachers to address diverse student needs (Sampson & Garrison-Wade, 2010). Reviewing literature that addresses what we know about PSMTs enacting culturally responsive practices, and how they are supported, demonstrates the need for this study. The next four sections discuss specific pieces of literature that provide insight into factors that influence the extent to which preservice teachers enact CRMP—the first section reports on preservice teachers' negotiated experiences with preparation and practice. The second section focuses on the importance of teacher-student relationships and how such relationships affect students' access to mathematics. The third section discusses the impact of teacher-student cultural incongruities and the fourth section shares information about how racial differentness could lead to teachers' discomfort with incorporating equity pedagogies.

Dyad Between Preparation Practice

Past research (see Thompson, Windschitl, & Braaten, 2013) suggest that preservice teachers' enactment of culturally responsive practices is often impacted by the duality of what teachers learn in their preparation program and the reality they face at their school sites. According to McDonald (2005), preservice teachers categorized their university preparation as theoretically sound, but unhelpful in practical academic instruction for culturally and linguistically diverse students. In other words, preservice teachers viewed their preparation mainly as theory rather than practical tools for the classroom (Endo, 2015). Aguirre, Zavala, and Katanyoutanant (2012) suggested that the lack of meaningful opportunities to connect theory to practice poses a challenge for teacher preparation programs. Without opportunities for preservice teachers to apply theories and concepts, many avoid the enactment of equity-based practices such as CRMP throughout their internships and other programmatic experiences with culturally and linguistically diverse students, such as Black children (Endo, 2015; Williams, Connella, White, & Kemper, 2003). This dyad between preparation and practice remains problematic (Thompson et al., 2013).

Building Teacher-Student Relationships

Building positive teacher-student relationships is central to the successful enactment of CRMP (Battey, Neal, Leyva, & Adams-Wiggins, 2016; Langa, 2014; Stipek, 2006). According to Battey (2013), teacher-student relational interactions mediate student access to mathematics content. Whether through addressing behavior, framing mathematics ability, acknowledging student contributions, or attending to culture and language, teachers help to shape the mathematics trajectory for their students. Teachers' relational interactions speak to the quality of instruction that seeks to encourage student strategies, affirm students' mathematics ability, connect mathematics to familiar contexts, and help move students to a more sophisticated understanding of mathematics. However, creating and sustaining positive teacher relationships can be a challenge. According to Weinstein, Curran, and Tomlinson-Clarke (2003), "when teachers and students come from different cultural backgrounds, planned efforts to cross social borders and develop caring, respectful relationships are essential" (p. 272). Teacher-student relationships across and within culture impact student expectations, success, and access to mathematics (Jimerson & Haddock, 2015). Thus, PSMT's ability to form and bolster positive teacher-student relationships with their students, unsurprisingly, impacts how and to what extent CRMP practices are endorsed.

Teacher-Student Cultural Incongruity

The need to prepare culturally responsive pedagogues is undoubtedly a global phenomenon as many teaching forces remain homogenous. For example, each year in the USA, teacher education programs work toward preparing over 3563 teachers to be future educators (NCES, 2016). However, of this population, PSMTs are overwhelmingly White making up about 81.5% of high school mathematics teachers while Black or African American and Hispanic/Latino teachers collectively make up about 12.6% (NCES, 2016). According to Clewell, Puma, and McKay (2005), this racial and cultural homogeneity in education creates cultural incongruities in classrooms that serve to the disadvantage of students. Teachers' racial and cultural awareness impacts their perspectives on students' mathematical abilities as well as their approach to mathematics instruction (Dunleavy, 2015). Thus, given CRMP call for the use of students' cultural referents as part of their learning experiences, cultural mismatch serves as a challenge for cultural hybridity and creates a barrier between effective CRMP implementation and teacher-student relationships (Howard, 2008; Irvine, 2010; Norman, Ault, Bentz, & Meskimen, 2001).

Discomfort with Addressing Racial and Cultural Issues

Some researchers (see Gay & Kirkland, 2003; Irvine, 2010; LaDuke, 2009) posit that the barrier for cultural hybridity stems from preservice teachers having little experience and interactions with culturally and linguistically diverse students. The limited interactions, knowledge, and experience with diverse students fuel resistance to discussing the historical marginalization of culturally and linguistically diverse students in terms of racial and cultural issues. Subsequently, fueling resistance for these teachers engages in critical examinations of historic racial and cultural issues relevant to culturally and

linguistically diverse students and thwarting the eventual implementation of culturally responsive practices (Tinkler & Tinkler, 2013). Conversely, commonalities of race and culture between teachers of color and their students of color positively impact their use of culturally responsive practices (Achinstein & Ogawa, 2012; Clewell, Puma, & McKay, 2005; Villegas & Irvine, 2010), further suggesting that the racial and cultural makeup of teachers impacts the endorsement of CRMP.

Conceptual Framework

Varying teaching models of CRMP are available for mathematics teachers who seek to become culturally responsive in their teaching. Grounded in some constructs of CRMP, including enhancing students' critical consciousness, academic achievement, and cultural competence, the models provide teachers with practical ways of infusing CRMP within mathematics classrooms. Culturally relevant mathematics pedagogy (CureMap) and culturally responsive mathematics teaching (CRMT) are two conventional models of CRP used in mathematics classrooms. Rubel and Chu's (2012) CureMap model of CRMP provides teachers with ways to develop students' critical consciousness about and with mathematics while Bonner and Adams's (2012) CRMT model views teacher knowledge, communication, relationship, and trust with students as cornerstones of student's learning and academic success. With varying CRMP models, teachers have flexibility in choosing how to utilize students' cultural experiences in the classroom.

Comparatively, Hernandez, Morales, and Shroyer (2013) CRMP model is a synthesis of various culturally responsive practices and considers the dispositions and teaching performances that become what teachers do and think. Hernandez et al. (2013) model provides teachers with a tool for self-analysis of mathematics instruction and assessment for cultural responsiveness. This model embraces a fundamental idea of the pedagogical philosophy of both the National Council of Teachers of Mathematics (NCTM, 2012) and the ideologies of a CRMP classroom, which supports teachers' need to be well aware of children's knowledge. Thus, teachers can examine and reflect on their teaching practices. According to Hernandez et al., mathematics teachers who embrace CRP as a teaching framework incorporate tenets of CRP that include content integration, facilitating knowledge construction, prejudice reduction, academic excellence, and social justice in their mathematics classroom.

Hernandez et al. (2013) model of culturally responsive mathematics teaching undergirds this study as a tool for comprehensively defining CRMP in the context of teacher education and as a guide for the study's data collection and framing of key findings. Given its synthesis of various culturally responsive practices, theoretical strands of culturally responsive teaching from numerous scholars including Gay (2002); Ladson-Billings (1999); Nieto (2004); and Villegas and Lucas (2002) undergird this investigation. Specifically, this study addresses the following two tenets of Hernandez et al. (2013):

1. *Prejudice reduction* involves teachers' use of mathematics, in context, to build a positive, safe classroom for all students and includes supporting students' native language in mathematics.

2. *Social justice* is evident when teachers are willing to act as agents of change in mathematics classrooms and support the development of students' sociopolitical or critical consciousness with mathematics which show evidence of practicing social justice for CRMP.

Methods

Participant Selection

This case study of PSMT learning and experiences enacting CRMP was conducted during their mathematics method coursework and internships within a yearlong summer to summer initial teacher preparation and certification program that was part of a Master of Arts of Teaching (MAT) cohort program at an urban university in the Southeast region of the USA. The population of the study was 13 PSMTs, 10 of whom were White, and 12 of whom were monolingual English speakers and included 11 women and two men. The demographics of the population generally mirrored the US secondary mathematics teaching force, which is about 81.5% White and 77% female (NCES, 2016). From the population of 13, four PSMTs were chosen. Criteria used for selection were (1) holders of a bachelor's degree in mathematics and (2) responses to an administered open-ended questionnaire. The first criteria helped to ensure that the understanding and application of mathematics content would not be an issue. For the second criterion, consideration was given to how well volunteers articulated themselves. In particular, given that the study sought to examine how PSMTs grapple with enacting CRMP, responses to the following questions were carefully examined: (a) what do you think you need to learn about teaching mathematics to culturally diverse students, (b) what could you learn from culturally diverse students, and (c) what role should teachers play in encouraging pride in students' culture. Participants whose responses expressed a desire to want to learn how to teach "other" students were selected. The theoretical value of the selected participants emerged throughout the analysis, and the choice of these four participants highlighted a continuum of understanding and enactment of CRMP.

Data Source

The study's timeline spanned over two semesters across both of PSMT Introductory Methods course in summer 2016 and Advance Theory and Pedagogy Methods course in fall 2016. Two 30-min semi-structured individual interviews were conducted, and written reflections were utilized to collect the study's data. Both interviews were held toward the end of the fall semester after PSMTs wrote about their experiences enacting CRMP tenets in their classrooms. One interview session was for member checking, and the other was for clarification purposes.

Data Analysis

PSMT interviews and written reflections about enacting CRMP and about CRMP readings were analyzed. Constant comparative methods (Corbin & Strauss, 2008) were

used to determine major themes regarding PSMT reported experiences about their journey to enact CRMP. Constant comparison methods were appropriate for this study as it allowed the researcher to watch for similarities and dissimilarities amongst the data. Through constant comparison, researchers can question whether emerging themes embrace the study's focus or whether the researcher should broaden their initial thinking about the theme (Corbin & Strauss, 2008). Data from the study were triangulated. For example, when a PSMT referred to a CRMP tenet to share an experience, interviews and written reflections of that PSMT and other participants were reviewed for similar experience. After combing the data for PSMT experiences with enacting CRMP, an analysis was conducted for PSMTs' sense-making and interpretation of CRMP. Although some variations existed in the way PSMTs embraced and interpreted CRMP, the overarching theme emerged was based on the frequency of occurrence. Finally, the data were re-coded again using Hernandez et al. (2013) CRMP tenets.

Findings

PSMT immersion in CRMP activities helped to build their awareness of issues related to the overall schooling and mathematics experiences of historically marginalized students such as Black children. Nevertheless, PSMT perception of Black children and ultimately enactment of CRMP tenets varied and depended more on their understanding and interpretation of CRMP. The various explications of CRMP align with Frye, Button, Kelly, and Button (2010) and Harding-Dekam (2014), who assert that when preservice teachers embark on a journey to become culturally responsive, they make interpretations of themselves, their students, and their need to become culturally responsive. This study extends this line of research by providing concrete evidence of PSMTs' experiences with enacting Hernandez et al. (2013) CRMP model to teach Black children at their practicum sites.

Enacting Prejudice Reduction Practices in Mathematics While at Placement

Findings from interviews and written reflections of Susan and Marlene (pseudonyms used for names of people and places) demonstrate PSMT developed awareness about prejudice reduction in mathematics classrooms. Research (see Battey, 2013; Cheema & Kitsantas, 2014; Hernandez et al., 2013; Martin, 2013; Noltemeyer, Ward, & Mcloughlin, 2015; Spencer, 2009) reveal that paramount to students' learning of mathematics is the essential component of establishing safe classrooms that promote healthy teacher-student relationships. The following excerpts share Susan and Marlene's experiences with opportunities to enact the prejudice reduction tenet in their classrooms:

> Susan: During an afterschool tutorial session, I overheard a few students making fun of an African student's last name. Although she laughed at the jokes of her peers, I quickly intervened and had a discussion with them to address the inappropriateness and connotation of their remarks. Even though the school is almost entirely Black/African American, I think that many fail to realize the diversity that lies within that demographic. My students are from various

> backgrounds, including Guyanese, Trinidadian, Jamaican, African, and Dominican descent, to name a few. I have designed a math project activity that will allow them to explore the cultures of one another in the scope of mathematics. As we read in Brandt and Chernoff (2015), "Ethnomathematics has the potential to help students feel accepted, become more accepting of others, and even help in the fight against racism" (p. 35).
> Marlene: The struggles that I have in creating a safe and comfortable environment for my students come mostly from other students... I regularly hear negative comments toward women (usually by males), toward African American students (usually by other African American students), and toward other marginalized groups like those with intellectual disabilities, immigrants whose first language is not English, and members of the LGBT community. I have even heard teasing over religion this year. I try my best to consistently redirect such conversation, but it still does not seem like enough.

As a Black educator, in a predominantly Black school student population, Susan's comment showed that she elected to deliberately and intentionally intervene with her student's conversations to correct disrespectful behavior toward one of her Black students. Susan's endorsement of the prejudice reduction tenet exemplifies her support and comfort with enforcing this tenet through leading by example. In showing that she does not tolerate statements or behaviors based on cultural stigmas, Susan is effectively making her classroom a safe zone for diverse cultures. Moreover, while classmates "making fun" of students' names could be harmless and acceptable, Susan saw an opportunity to deescalate any possibilities of humiliation, or conflict. Her description of how she embraced the tenet and her understanding of the diversity amongst her Black students showed that she gained an awareness of how race differs from culture. Susan's recognition of her students' cultural differences is a start toward creating healthy teacher-student relationships.

Additionally, Susan's assignment of a mathematics project centered on cultures could create diverse and inclusive mathematics content. Diversity in mathematics can produce a feeling of acceptance amongst the different cultures in her classroom. By allowing students to research diverse cultures within the scope of mathematics, Susan is essentially attempting to modify her teaching methods and materials to support and respect the cultures and experiences of her Black students. Her actions emphasize the importance of engaging preservice teachers in dialog and activities that further PSMT's understanding of the intricate connection between students' school experiences and the shaping of their sociocultural identities (Villegas & Lucas, 2002).

Professional modeling during preparation could further support Susan in ways that amplify her ability to reduce prejudice in her classrooms to build positive, safe learning environments.

Conversely, in Marlene's comments, we can examine how a White teacher in a predominantly Black school population grapples with the ability to create a safe and comfortable environment for students who are different from her both in race and culture. Marlene's comments, coupled with her description of her upbringing, suggest that her socialization in a homogenous community and prior lack of experiences with diversity made it uncomfortable for her to address students' negative comments. According to Gay and Kirkland (2003); Irvine (2010); and

LaDuke (2009), cultural mismatch or incompatibilities between students' home culture and their teacher's culture, in classrooms, cause some teachers of Black children to avoid discussions involving other races, and cultures. Literature (see Howard, 2008; Irvine, 2010; Norman, Ault, Bentz, & Meskimen, 2001) on how cultural mismatch between teachers and students creates a barrier between effective CRMP implementation and teacher-student relationships speak to Marlene's experience and struggle to reduce the prejudice in her classroom of Black students. Her struggle with enacting the prejudice reduction tenet of CRMP is not surprising and calls into question how preparation models could assist White PSMTs, like Marlene, to become more comfortable and willing to address prejudice and other discriminatory issues in their classrooms.

Enacting Social Justice Practices in Mathematics Classrooms While at Placement

In its actual implementation, CRMP bridges the connection between education and social justice and creates needed space within classrooms for discussing a social change in society (Bassey, 2016; Codrington, 2014). Evidence of the endorsement for the social justice tenet is present in mathematics classrooms when teachers act as agents of change and support the development of students' sociopolitical or critical consciousness (Hernandez et al., 2013). Teachers as subscribers of social justice have a "willingness" to be change agents while encouraging their students to critically examine their present situation and continuously assist with students' "development of sociopolitical or critical consciousness" (Hernandez et al., 2013, p. 814). Meaning, teachers guide students toward critical engagement about the world around them, in hopes that students can themselves become change agents. What follows are excerpts about the extent to which PSMTs subscribed to the ideologies of social justice when teaching Black children:

> Rose: I want my students to question whether there is a correlation between the availability of fresh fruits and vegetables, walking trails, and commuting to work, and health problems in the Black community. Many believe that the eating habits of African Americans are responsible for the high numbers of diabetics and the prevalence of high blood pressure in the African American community. Addressing social conditions are culturally responsive and are within the scope of middle and high school mathematics standards. By introducing social concerns for students to investigate, we encourage exploration and inquiry within their community and daily existence. As African Americans, my students need to validate statistics and popular knowledge pertinent to them, analyze data, draw accurate conclusions and know if police tend to use excessive force more often when confronting African American males than other groups.
> Susan: Given how social justice issues have dominated the media and continue to be a topic of discussion in my students' community, it is especially important for me as a mathematics teacher of Black children to incorporate current affairs into my lessons. I created a lesson on a statistical analysis of data to connect recent police shootings of Black males and mathematics. I encouraged students to ask "why" and never to be afraid of questioning something they do not agree with or understand.

> Amanda: I still struggle with including extremely controversial topics, like the recent police shootings. That is a harsh topic, and I am working on approaching these types of injustices while keeping mathematics as the focus.
> Marlene: Social justice is not an area into which I have dived yet. I think that it is difficult to relate math to political or social issues unless you are learning about statistics. Unless my students are learning about statistics, I do not see where social justice tenet is applicable.

In Rose and Susan's comments, we can see how the two Black PSMTs in this study subscribed to the ideologies inherent in the social justice tenet of CRMP when teaching their Black students. Rose and Susan exhibited a willingness to act as agents of change and to develop student's sociopolitical and critical awareness. Within their classroom spaces, both PSMTs initiated instruction that confronted social justice issues and empowered their students to critically examine their current situations. Rose and Susan encouraged their students to become forces for social change through exposure and engagement in critical discussions about the state of physical, mental, and social health in their communities. For example, the students in Rose's classroom were stimulated and challenged to expand on real-world and relevant issues that included the examination of the quality of life by examining the disproportionate abundance of unhealthy foods in the Black community. Her position was that her students should investigate their access to healthy foods as a potential explanation for health disparities. Rose's connection between neighborhood food environments and health as a social justice issue is warranted. Researchers, Diehl, Heard, Lockhart, and Main (2020), posit that differential access to healthy foods contributes to racial and economic health disparities. The researchers further assert that when access to healthy food is limited, particularly in areas serving historically disadvantaged people, such as Black and Latinx, and those within a low socioeconomic bracket, households must expend more time and or money to eat a nutritious diet leading many, to be more likely to substitute unhealthy foods for healthy foods. Rose's awareness of how the mathematics classroom could be utilized to address sociocultural issues could prove meaningful in helping teachers find ways to contextualize mathematics while igniting students' social consciousness about equity, and access.

Moreover, while both PSMTs mentioned the disproportionate accounts of police violence against Black people, Susan shared how she created a statics lesson specific to police violence. Susan's mathematics lesson was centered on the analysis of statistics relevant to the race-based police shootings targeting Black communities. She afforded students with opportunities to develop their sociopolitical consciousness by asking "why" these events happened, therefore, building students logical reasoning. Susan's emphasis on students asking "why" challenges her students to uncover the root causes of unjust police brutality and demonstrates Susan's readiness to act as an agent of change. Rose and Susan's practices showed students how to incorporate critical and mathematical thinking into real-world problems and encouraged problem identification and solving. These accounts of their classroom practices, coupled with their background as Black female teachers, present opportunities for teacher preparation programs to embed the use of Black professionals, who are successful culturally responsive teachers of Black children, as models of how social justice issues can be incorporated in classrooms.

Contrasting Amanda and Marlene's comments about the social justice tenet of CRMP illuminates the discomfort and intentional avoidance White PSMTs in this study had with endorsing social justice as part of their mathematics instruction. For example, in addition to her uncomfortableness with discussing "harsh" topics in her mathematics classroom, Amanda's comment suggests that her "struggles" include "controversial topics" like recent police shootings of Black people, stem from her view of the social justice tenet as a detractor from mathematics. Amanda's approach is in stark difference to Rose and Susan, who used relevant and accessible data as part of their students' experiences to conduct data analysis and mathematically examined the social experiences of their Black students to include police shootings. Amanda's experience exemplifies how some White teachers from homogenous backgrounds often struggle and, in many cases, resist discussions about racial issues (Tinkler & Tinkler, 2013). Teachers with little experience and interactions with culturally and linguistically diverse students, such as Black children, are often resistant to discussing cultural and racial issues (Gay & Kirkland, 2003; Irvine, 2010; LaDuke, 2009). Here, Amanda's background experiences growing up with limited access to experiencing and interacting with culturally and linguistically diverse students could have affected her ability to incorporate social justice issues, and even more her ability to see the need for developing her students' sociopolitical consciousness. If not addressed, Amanda's instructional tactic of disassociating social justice issues and mathematics could further exacerbate the disconnect between Amanda and her Black students' personal lives and experiences.

Like Amanda, excerpts from Marlene demonstrated that her difficulty and deliberate avoidance with enacting the social justice tenet of CRMP stemmed from the limitations she placed on what it meant to enact social justice in mathematics classrooms while teaching Black children. By not "diving into it," Marlene's Black students are left with subtractive mathematics learning experiences rather than one that supports the engagement and development of their sociopolitical consciousness. We can also see from Marlene's comment that she has restricted the usefulness of the ideologies within the social justice tenet to teaching statistics and, therefore, not relevant to other aspects of mathematics. Marlene's view of the tenet suggests that access to culturally responsive lesson plans that disrupt the disassociation between mathematics curriculum and culturally responsive pedagogy as well as examinations of race could lead to increase enactment of CRMP practices. Unlike Rose and Susan, Marlene fails to see the importance of social justice issues in her students' social, cultural, psychological, and economic well-being. Amanda and Marlene's struggles with endorsing social justice practices in their classrooms raise questions about teachers' background experiences as essential factors impacting their enactment of CRMP and of how teacher preparation can begin coherent efforts to assist preservice teachers with how to enact social justice practices throughout all course work and field placements (Aguirre & del Rosario Zavala, 2013; Tawfeeq & Yu, 2012; Walker, 2007). Professional modeling of how to enact social justice in mathematics classrooms from both Black and White successful teachers of Black children can add to the cohesiveness of PSMTs' willingness and practices as agents of change.

Discussion and Implications

Understandably, the knowledge, skills, and disposition PSMTs need to educate culturally and linguistically diverse students, particularly through culturally responsive practices, should not merely be relegated to the margins of teacher education programs (Gay, 2013). Instead, coherent efforts by and through teacher education programs are needed to help PSMTs learn how to enact CRMP across course work and practicum sites. Although the PSMT's understanding and interpretation of CRMP tenets governed their eventual ways of embedding CRMP practices in their classrooms, their experiences in many ways highlight issues with (a) teacher-student relational interactions (Battey, 2013), (b) attitudes toward and perceptions of culturally and linguistically diverse students such as Black children (Dunleavy, 2015), and (c) discomfort with addressing racial issues (Tinkler & Tinkler, 2013) which are all central to how new teachers endorse CRMP practices.

PSMTs' perception and interpretation of how to enact CRMP to teach Black children indeed reveal the complexities and challenges of practicing CRMP as an inclusive and equity pedagogy. For example, with enacting the social justice tenet, PSMTs Rose and Susan focused on the negative experiences within the Black community, rather than showcase the diverse experiences of their Black students, while PSMTs Amanda and Marlene avoided controversial issues impacting their Black students by taking the more traditional approach to mathematics education. Now although these PSMT responses are valid, subscription to the social justice tenet of CRMP calls for an awakening of students' sociopolitical consciousness (Ladson-Billings, 1995a, b) about the world around them including positive, negative, and uncomfortable experiences. Thus, these enactments of CRMP, or lack thereof, demonstrate that PSMTs viewed CRMP cursorily. PSMT perceptions of CRMP could have resulted from the study's instruments, which did little to include precise examples of how to enact each of the CRMP tenets and instead focused on readings and reflections.

In reviewing the findings from this study, and considering the benefits of professional modeling, teacher education programs could go beyond generalities, theories, and principles to guide PSMTs with specifics on how to enact CRMP. To start, coupled with a CRMP model, inviting diverse, thriving, culturally responsive pedagogues of Black children to demonstrate professional modeling of CRMP and provide concrete CRMP examples aligned to curriculum that disrupt the cultural irrelevance associated with standardized testing could lead to improved ways new teachers become culturally responsive pedagogues of Black children. Next are brief discussions of how integrating professional modeling with CRMP models during preparation and integrating strategies to disrupt cultural irrelevance associated with testing can assist in preparing culturally responsive pedagogues of Black children. Afterward, discussions of how such changes could have supported PSMTs in this study are shared.

Integrate Professional Modeling of CRMP Tenets During Preparation. Teacher educator programs should expose their teacher candidates to diverse academically, successful, culturally responsive mathematics teachers through professional modeling. Such exposure, through professional modeling, could help link theory to practice for many preservice teachers caught in the dyad between preparation and practice (Endo, 2015). Professional modeling of CRMP could mean that PSMTs are given

opportunities to observe, interview, and interact with successful, culturally responsive pedagogues to share viewpoints on how to meet the mathematical needs of students of color. Observations, interviews, and interactions with successful, culturally responsive mathematics teachers are not to produce scripted manuals that prospective teachers can receive and become culturally responsive pedagogues themselves. Instead, the process would serve as ways in which teacher educators promote a culture that seeks to transform current teacher preparation programs from places where students learn about CRMP to places where students learn how to enact CRMP—thereby creating inclusive and transformative spaces for prospective teachers (Tinkler & Tinkler, 2013). Leonard and Moore (2014) proposed that providing teachers with examples of how to enact culturally responsive pedagogy helps preservice teachers visualize themselves becoming culturally responsive.

Similarly, exposing preservice teachers to diverse culturally responsive mathematics pedagogues, both past and present, could serve as a catalyst for discussion and as a mechanism to help PSMTs see themselves as future culturally responsive mathematics pedagogues of historically underserved students such as Black children (Averill, Anderson, & Drake, 2015). It seems practical from the findings that professional modeling of pedagogical practices from successful Black and White teachers of marginalized students should be solicited. There is much to learn from culturally responsive pedagogues who are successful teachers of diverse students, and professional modeling could enlighten PSMTs about specific interactions in mathematics classrooms that move beyond theory to practice (Battey & Leyva, 2016; Bonner, 2014).

Supporting PSMTs: How Integrating Professional Modeling of CRMP Tenets During Preparation Could Help. Using professional modeling as demonstrations could assist preservice teachers with enacting social justice and prejudice reduction tenets. Having the experiences of two African American teachers and two White teachers in the study disclosed how race demographics could impact CRMP teaching experiences. Aligned with Clewell, Puma, and McKay (2005), the findings suggest that teachers of color who serve students of color are motivated by their personal experiences and connections with their students to improve the educational outcomes of their students of color. Note that the data did not indicate that White teachers from homogeneous backgrounds are least likely to become culturally responsive pedagogues. Nor did the study's findings suggest that African American teachers are more suited to teach Black children. However, the experiences of participants Rose and Susan who are African American teachers align well with Achinstein and Ogawa (2012), Clewell, Puma, and McKay (2005), and Villegas and Irvine (2010) who posit that the commonalities of race and culture between teachers of color and their students of color impact the extent to which culturally responsive practices are enacted in classrooms serving predominantly Black children.

Furthermore, findings of this study suggest that when teachers of Black children have a solid sense of the historical, educational disadvantages Black children have faced throughout the US education system, their enactment of prejudice reduction and social justice tenets increases. Teachers who understand how policies, practices, racial, and cultural experiences work to constrict mathematics learning experiences of students of color are determined in their efforts to be culturally responsive pedagogues (Battey & Leyva, 2016; Buchanan, 2015; Simic-Muller, Fernandes, & Felton-Koestler, 2015; Ukpokodu, 2011). Using both Black and White culturally responsive pedagogues of Black children as

professionals to model how to enact social justice and prejudice reduction in mathematics classrooms could help PSMTs. From the findings, we see how both Amanda and Marlene struggled with including controversial topics in their lessons or found it challenging to relate math to social and political issues. Professional modeling could help Amanda and Marlene become more aware of how to incorporate sociopolitical issues into their mathematics curriculum or how to act as agents of change (Villegas & Lucas, 2002) and develop students' sociopolitical or critical consciousness (Ladson-Billings, 1995a).

Conclusions

Based on the context of the study, and in reviewing the findings, the study in several ways demonstrates that even with a specific model of CRMP, PSMT endorsement of an equity pedagogy such as CRMP is primarily impacted by access to strategies and ways of how to enact CRMP. By teaching responsively and utilizing strategies that go beyond readings, and reflections, teacher educators could guide PSMTs in transferring CRMP concepts into practices. PSMT access to professional modeling of CRMP and teacher educators' consistent efforts, examples, and demonstrations of each CRMP tenet could develop PSMT sociocultural competence and help them negotiate and integrate what they experience at practicum. Undeniably, the development of PSMT awareness with regard to sociocultural issues impacting education is needed (Roofe, 2015; Tawfeeq & Yu, 2012; Waddell & Ukpokodu, 2012). However, PSMTs as learners (Watkins, 2015) could benefit more if teacher educators went beyond theories and principles and instead guide PSMTs in more concentrated ways of how to enact CRMP tenets (Brandt & Chernoff, 2015). PSMT interaction with successful culturally responsive pedagogues of diverse students could help PSMTs integrate and negotiate the values inherent in CRMP at their practicum sites. Attaching what they have learned through coursework with specific instructional interactions through modeling can help PSMTs synthesize theories, concepts, and principles of CRMP with their actual practice.

Limitations

This study is bound by the timescale of PSMT participation in their teacher preparation program with a concentration on PSMTs during their practicum experience. This time frame can serve as a limitation because observation is limited only to the start of a process and not the evolution of the entire process. A full picture of their learning trajectories, including their knowledge skill and learning dispositions before and after their teacher preparation, leaves unanswered questions. Future research based on observations in actual classrooms could validate whether these PSMT's understanding and use of CRMP during their practicum experience lead to consistent and authentic incorporation of CRMP when teaching mathematics. Additionally, to corroborate the results obtained here within a US context, it is proposed that this research about how prospective teachers grapple with enacting culturally responsive practices be extended to other countries. It would be interesting to investigate whether the findings obtained during this study are as significant with other prospective teachers outside the USA.

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