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Applying Symbolic Convergence Theory to Pre-service Teachers' Responses to Mathematics Education Organizations' Statements on Racial Violence

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In June 2020, the National Council of Teachers of Mathematics (NCTM) and the Association of Mathematics Teacher Educators (AMTE) released statements regarding racism, racial violence, and mathematics teaching. Pre-service elementary teachers (PSTs) in a mathematics content course wrote reactions to the organizations' statements. After using an emergent coding process to code the reactions for major themes, the authors used a theory from communication studies called symbolic convergence theory (SCT) to analyze how closely the PSTs' understanding of the statements aligned with the vision espoused by the organizations in the statements. PSTs largely understood the need to make their classrooms safe and supportive spaces; however, they struggled to connect antiracist ideals specifically to mathematics teaching. The authors discuss potential ways NCTM and AMTE can address this disconnect.

KEYWORDS: symbolic convergence theory, mathematics education, antiracist teaching, organizational communication

In June 2020, following the deaths of George Floyd, Breonna Taylor, and Ahmaud Arbery, the National Council of Teachers of Mathematics (NCTM) and the Association of Mathematics Teacher Educators (AMTE) released social justice statements regarding racism (See Appendix A & B for transcripts of the statements). Even a cursory reading of the statements makes it clear that both organizations were working to advance the following rhetorical vision: the math classroom must be an antiracist space. For example, the NCTM statement argues, "As mathematics educators, we must engage in anti-racist and trauma-informed education in our daily practices as processes of learning and adjustments" (2020, para. 2). In a similar vein, the ATME statement contends,

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> We must actively work to be anti-racist in our acts of teaching, research, and service. Today we call on you to not simply express allyship, but to engage with a new resource to strengthen your own ability to see and to act in ways that are anti-racist and to critically examine your own practices and the biases implicit within them. (2020, para. 5)

Though several mathematics education scholars have advocated this vision for some time, prominent mathematics education organizations have only more recently made this an explicit part of their mission (Battey & Leyva, 2016; Gutiérrez, 2017; Martin, 2009, 2013). How well this vision has chained out or will chain out to new members of the math education community, K-12 pre-service teachers (PSTs), is unclear. Yet, understanding this phenomenon is particularly important for urban mathematics education and K-12 students of color for a number of reasons.

First, before teachers and PSTs can begin to address the problem, they must realize how race has influenced mathematics education to the point of making it a white institutional space. Martin (2013) discussed how mathematics education is used to reproduce the current state of capital and market-based ideas that are largely biased in favor of white people. Furthermore, Battey and Leyva (2016) devised a framework to study the impact of whiteness on mathematics education that both addressed this reproduction of racial privilege and documented the harm caused to minoritized students. The framework focused on three dimensions of mathematics education as a white institutional space: institutional, labor, and identity. Leyva (2021) later offered another framework for studying whiteness in mathematics education along institutional, ideological, and relational dimensions.

One example is the ideological dimension of Leyva's (2021) framework in which he states that this dimension concerns how mathematics achievement is often viewed as a meritocracy. As Goffney et al. (2021) noted, teachers often compare "students' academic performance without accounting for inequities in schools and districts" (pp. 13–14). Such comparison results in the perceived existence of an achievement gap, which, in turn, only serves to cause further harm to minoritized students (Gutiérrez, 2008; Martin, 2009).

Some teacher beliefs also impact on the institutional dimension of the framework (Leyva, 2021). Battey et al. (2021) showed how racial bias among teachers can result in differential evaluation of students' mathematical thinking. The PSTs in their study were prone to evaluating "Black students' thinking less favorably compared with White students" (p. 62). Even if unintentional, this ultimately leads to a phenomenon known as the "soft bigotry of low expectations" (Rubel & McCloskey, 2019, p. 120).

When mathematics teaching and learning is racialized, the effects on minoritized students in general and Black students in particular are many and varied (Martin et al., 2019). Moreover, though this process begins at the elementary school level, it continues and grows throughout a student's educational experience. It affects choices regarding course selection and feelings of belonging in upper-level STEM courses

(Leyva et al., 2021). Nishi (2021) also found that at the university level, White college algebra students would often exclude minoritized students even if they were assigned into a working group together. The disparities throughout students' mathematical educations have profound impacts on students' economic prospects in their lives after exiting formal education (Battey, 2013).

Once teachers recognize the problem of racism in mathematics, teachers can take actions to reduce the harm caused by racist structures. Instances in the literature show mathematics teachers and educators critically examining their beliefs about race and how they affect their instruction so that they can work to make antiracist changes (Anderson et al., 2020; Fonger, 2022). One example of an action teachers can take at the classroom level is considering problem contexts. Many mathematical problem contexts come from the perspective of consumers or employees, whereas few mention race or inequality (Rubel & McCloskey, 2021). Battey and Coleman (2021) provide an example of having students use police data in a mathematics assignment as a way to engage in antiracist mathematics teaching. At a broader level, mathematics education researchers have also called for the enactment of a "more race conscious mathematics curriculum" (Battey, 2013, p. 332), the creation of mathematics curriculum content that centers Black people (Matthews et al., 2021), and moves from being merely inclusive toward creating a "Black Liberatory Mathematics education" (Martin et al., 2019, p. 45). Of course, none of these changes, small or large, can be enacted by teachers on a broad scale without making them accessible to and usable by teachers (Gutiérrez, 2008). And before that, teachers must desire to enact antiracist mathematics education and want to seek out information on how to do that.

The purpose of this manuscript is threefold. First, in her call for field disruptions and field connection in mathematics education research, Cannon (2020) challenged researchers in the field to seek out underutilized theories and methods to advance research in areas like the one outlined above. We argue that theories developed by scholars in the communication discipline offer one potentially fruitful starting point for such endeavors. As such, we introduce mathematics education researchers to one such theory, symbolic convergence theory (SCT). Second, we apply SCT to the statements of NCTM and AMTE and examine the responses of PSTs to those statements to explain their effectiveness in persuading PSTs that being antiracist must be central to future work. Third, we offer theoretically grounded strategies for improving future messaging.

Literature Review

SCT explicates the development of group consciousness (Bormann, 1985). To understand how/why this theory is useful in analyzing not only the messages offered by NCTM and AMTE but also whether or not the messages were successful in

persuading PSTs to share their rhetorical vision, it is important to thoroughly outline the five-decade development of the theory before proceeding.

Studying the processes of classroom groups, Bales (1951) discovered that classroom groups, particularly zero-history groups, dramatized communication such that they developed fantasies that chained out (as cited in Bormann, 1972). Fantasies, in the realm of SCT, are not figments of the imagination as in fairytales; rather, they are the means by which "communities of people create their social reality" (Bormann, 1982b, p. 52). Though fantasies may contain imaginary characters, they regularly address real-world events, arouse emotions, and move people to action (Bormann, 1985). Bormann (1972, p. 397) termed "the composite dramas which catch up large groups of people in a symbolic reality" *rhetorical visions*.

Bormann (1972) extended Bales' work by applying it to other types of groups because dramatizations, once they have chained out in small groups, are integrated into speeches and media content, which then may chain out to mass audiences. Bormann (1982a) also noted, "Our studies of consciousness raising communication theory and of such groups in action revealed that the technique was essentially that of intentionally dramatizing highly emotional fantasies drawn from an established rhetorical vision to induce neophytes to share them" (p. 291). Further, he noted that other studies found that analyses of target audiences were sometimes used to plan what fantasies could be used to persuade them. Therefore, he contended that a rhetorical analysis of the fantasy themes that chain out to create the rhetorical visions of groups provide rhetorical critics "a way to examine messages for insight into the group's culture, motivation, emotional style, and cohesion" (p. 396) and that fantasy theme analysis is powerful because of "its ability to account for the development, evolution, and decay of dramas that catch up groups of people and change their behavior" (p. 399). Such analyses, he argued, are useful because they help scholars understand movements.

Building on the work of Cragan and Shields (1998), Bormann et al. (2001) provided a comprehensive summary of the history, development, and anatomy of SCT. As the theory developed, its terms and definitions shifted. As such, Bormann et al.'s (2001) definitions of the technical concepts of SCT relevant to the current study are used herein for consistency.

Bormann et al. (2001) argued the first important aspect of the anatomy of a theory is to identify its basic concept or "the thing one must be able to find and identify" to understand a particular theory (p. 282). They claimed that the basic concept

of SCT is the *fantasy theme*.[1] A fantasy theme "is a dramatizing message that depicts characters engaged in action in a setting that accounts for and explains the human experience" (p. 282). According to Bormann (1982b), this could be stories about living or historical persons or about an imagined future. In essence, fantasy themes allow rhetors[2] "to make visible (understandable) a common experience and shape it into social knowledge" (1982b, p. 52). When a rhetor decides which person(s) to include in the fantasy theme, what the scenic elements will be, places events in a certain order, and/or assigns motives to persons, they are working to form a specific rhetorical vision (Bormann, 1985). The *principle of explanatory power* is central to the process of developing a new consciousness. According to Bormann et al. (1996), "The *principle of explanatory power* asserts that, when events become confusing and disturbing, people are likely to share fantasies that provide them with a plausible and satisfying account that makes sense out of experiences" (p. 3).

The second anatomical aspect laid out by Bormann et al. (2001) are the message structure concepts. They argued that *rhetorical vision* is the central message structure concept of SCT and retained the definition of rhetorical vision (Bormann, 1972) as outlined above. However, they also noted that there are four substructural elements of a rhetorical vision: "*dramatis personae* or characters, *plot lines* or action, *scene or* setting, and *sanctioning agent* or legitimizer for the rhetorical vision" (2001, p. 285). Rhetorical visions have a five-stage lifecycle: consciousness-creating, consciousness-raising, consciousness-sustaining, consciousness-decline, and consciousness-terminus (Bormann et al., 1996). The first stage is central to the current study. The consciousness-creating stage "involves the sharing of fantasies to generate new symbolic ground for a community of people" (p. 2). Bormann et al. argued that consciousness-creating, or the creation of a new rhetorical vision, are grounded in novelty, explanatory power (defined above), and imitation. They argued,

> The *principle of novelty* asserts that, when established visions lag behind changing here-and-now conditions, they will often fail to attract members of the second and third generations of those who inherit them. As old visions lose their vitality, rhetoricians who use an innovative set of dramatizations will find fallow ground among substantial segments of the lukewarm inheritors of the older visions. (p. 3)

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[1] Though symbolic cues, fantasy types, and sagas are also basic concepts of the theory, no evidence of their use was found in the messages analyzed for this study. Therefore, they were not outlined in this literature review.

[2] Rowland (2012) asserts, "Rhetoric involves the use of symbols (primarily language) to persuade or inform" (p. IX). Therefore, a rhetor is one who persuades or informs.

Further, "The *principle of imitation* asserts that, with boredom or confusions, people begin to share fantasies that give some old familiar dramas a new production" (p. 3). Visions are tagged here with cues like new and neo to help people draw on familiar, historic heroes and values.

Third, Bormann et al. (2001) outlined the dynamic structure concepts of the theory or the tensions/wars that underlie the theory. In SCT the tension/war occurs between three competing rhetorical visions (sometimes referred to as master-analogues): *righteous*, *social*, and *pragmatic*. Righteous rhetorical visions "stress correctness, the right way, morality, and so forth" (p. 288). Social rhetorical visions "stress such elements as humaneness, social concern, family, brotherhood and sisterhood, and so forth" (p. 288). Pragmatic rhetorical visions "stress such elements as the bottom line, what will work, what is expedient, and so forth" (p. 288).

Fourth, Bormann et al. (2001) laid out the communicator structure concepts of SCT; these concepts "focus on the names given to communicators from the lens of a particular theory" (p. 288). For SCT, the communicator structure concepts are "*fantasizers* and *rhetorical community* along with their attributes such as *propensity to fantas*ize and *dramatistic communication style*" (p. 288). Central to SCT is the investigation of fantasizers. The current study also allows for an examination of the existence (or lack thereof) of a rhetorical community. Rhetorical communities, as defined by Bormann (1985), are "the people who participate in a rhetorical vision" (p. 53). Therefore, assessing how PSTs communicate about the messages put out by different math associations can help us understand whether or not they buy into the rhetorical visions being laid out by the associations.

Fifth, Bormann et al. (2001) laid out the medium structure concepts of SCT, noting that media are the "propagating substance" of a theory or what makes it grow (p. 290). Growth of fantasies are beholden to group or public sharing. Without substantial fantasy chaining, the creation and maintenance of rhetorical visions are stunted because there is little or no shared communication and, therefore, no shared consciousness in the rhetorical community.

Last, Bormann et al. (2001) overviewed the evaluative concepts of SCT. These are: *fantasy theme artistry, shared group consciousness,* and *rhetorical vision reality-links*. Fantasy theme artistry "concerns the rhetorical creativity, novelty, and competitive advantages of fantasy theme, symbolic cues, fantasy types, rhetorical visions, and sagas" (p. 291). It is also important to note that when examining fantasy theme artistry, scholars must assess *closeness of fit,* meaning a fantasy theme must "fit its rhetorical community and be consistent with other fantasy themes of the rhetorical vision" (p. 292). Shared group consciousness is simply looking for evidence of symbolic convergence. According to Bormann (1985), when elements of the group fantasy recur in group meetings and other contexts, it is evidence of symbolic convergence. Reality-links "tie rhetorical visions and fantasies to the objective reality of the public record and material facts" (p. 293). As noted by Bormann et al. (2001), studies

that found a lack of symbolic convergence have attributed that failure in the absence of artistry, reality-links, novelty, channel access, and/or "competing, symbolic consciousnesses that provide a better accounting of the phenomena being explained" (p. 293).

Though the bulk of SCT studies look at fantasy themes, rhetorical visions, and the chaining of messages sent by one organization or individual, SCT's conceptualization of rhetorical communities and prior studies (e.g., Kroll, 1983; Huxman, 1996) afford the rhetorical space for scholars to use the messages of more than one entity to examine the existence or shift in rhetorical visions, particularly when they are tied to the early stages of the life cycle of rhetorical visions outlined above. For example, using the rhetoric of two different women's movement organizations, Kroll (1983) explained how the fantasy themes, types, and rhetorical visions of the women's movement in the twin cities of Minneapolis and St. Paul required subtle but necessary shifts to advance the movement beyond the consciousness-raising stage. In doing so, Kroll thoroughly outlined how the fantasy themes and types advanced by each organization led to the success or failure in building support for or opposition to the organizations' rhetorical visions.

Huxman (1996) argued that cross-movement rhetorical analyses using SCT as a guide also have a place in advancing knowledge because they allow scholars to find the conceptual core of multiple movements. To make her point, Huxman used the rhetoric of three pillars of the women's movement, operating in different eras of the movement, to demonstrate how their problem congruence as well as their congruence on ideational and stylistic levels undergirded and helped advance the rhetorical vision "codified in the expression of rights at Seneca Falls" (p. 26). Therefore, she argues that examining cross-movement rhetoric allows scholars to examine more deeply and celebrate the achievements of individuals in a movement.

Although the work of Kroll and Huxman is encouraging, and other studies look at how SCT can be used to improve organizational and small group communication (e.g., Bales, 1951; Bormann, 1975; Bormann et al., 1978; Cragan & Shields, 1992), more work is needed. As indicated in a study by Gilmore and Kramer (2019), which analyzed how public school teachers used fantasy themes to navigate the changing nature of education in the United States and develop shared identity, education is an excellent site for advancing this mission. As mathematics educators who have pushed for the mathematics education field to take on a more antiracist social justice perspective have been subjected to significant online and media backlash and harassment (e.g., AMTE, 2018; Gutiérrez, 2017, 2018), the current study offers a way to both fill gaps in the SCT literature and provide mathematics educators who support the antiracist social justice rhetorical vision with tangible feedback on how their rhetorical vision is being received and interpreted by PSTs. This is central to predicting whether future members of the rhetorical community in question would rally around

the new rhetorical vision and, if not, offering guidance for adapting the themes to be more persuasive to this audience in future communications.

Positionality Statement

Understanding the authors' positionality can be helpful in understanding how the data below were collected, viewed, analyzed, and discussed. Both authors are professors at a university in the South of the United States. The first author is a white, U.S.-born mathematics education scholar who has expertise in mathematics education policy, in particular how different stakeholders in mathematics education view their work, communicate with each other, and understand their responsibilities to others. He led the data collection and original coding and analysis process. The second author is a white, U.S.-born communication scholar who has expertise in organizational communication and rhetoric, particularly in the areas of persuasion, sport, crisis communication, and image repair. As such, she led the analysis of the NCTM and AMTE statements using SCT as the framework for analysis. Given our commitment to diversity, equity, and inclusion and our interests in communication in general and within the mathematics education community, we were well-positioned to explore this project.

Site and Participants

The present study included the participation of 27 elementary and/or special education PSTs enrolled in the third of three mathematics content courses in their program during the spring 2021 semester at a large, regional, public university in the Mid-South. The university is classified as a doctoral/professional university with very high undergraduate enrollment (American Council on Education, n.d.). Twenty-six of the PSTs were female, and one was male. Three students were African American, and the remainder were White. Given the sensitive nature of the assignment described below, the African American students were given the option to do a different assignment for the same amount of credit. All three chose to do the assignment described below.

Method

The authors of the present study sought to understand what PSTs understood and took away from the NCTM's and the AMTE's June 2020 statements on the deaths of George Floyd, Breonna Taylor, and Ahmaud Arbery. As part of a larger assignment, the PSTs were given two brief paragraphs describing the missions of NCTM and AMTE and the two statements mentioned above. The PSTs were asked to write a paragraph summarizing the NCTM statement, a paragraph

summarizing the AMTE statement, and to write a half page responding to the following prompt: "Considering your role as someone who is preparing to become and will soon be a math teacher, write at least half a page in reaction to these two statements. The reaction is yours to write as you wish, but feel free to include any questions or uncertainties you may have."

To identify whether or not symbolic convergence had occurred among the participants, the NCTM and AMTE statements first had to be rhetorically analyzed using fantasy theme criticism. According to Foss (2017), a fantasy theme criticism requires three steps prior to writing the research essay: selecting the artifact(s), analyzing the artifact(s), and formulating a research question(s). She asserted that the artifact(s) selected should demonstrate that at least some symbolic convergence has occurred. The NCTM and AMTE statements were chosen for student response because of the two organizations' prominence in the mathematics education community. NCTM is the world's largest mathematics education organization, boasting tens of thousands of members, including K-12 teachers and other mathematics education professionals. AMTE is America's leading organization for mathematics teacher educators at colleges and universities.

Though both statements were written by the leadership of the organizations, there is evidence in each that a number of current members agree with the statements. For example, the AMTE statement ends with, "While the words in this statement were assembled and edited by President Mike Steele, President-elect Megan Burton, and Executive Director Shari Stockero, they originate in large part from the lived experiences of educators of color within AMTE leadership who contributed their perspective and wisdom" and then it lists the names of all who contributed. While NCTM's statement is not as explicit, it harkens back to the work of other mathematicians who made similar statements after events in Charlottesville, VA, in 2017 and references its own *Catalyzing Change* series, which has already begun addressing these issues. Further, because these statements were put forth by associations with large memberships, it stands to reason that many of their members agree with the statements.

To analyze the artifacts, Foss (2017) established that researchers must first code for fantasy themes, carefully examining the artifact(s) to discover settings, characters, action themes, and sanctioning agents (if they exist). Then, the researcher must construct the rhetorical vision from the fantasy themes, which requires one "to look for patterns in the fantasy themes" (p. 113) in order to "come to some conclusions about the worldview constructed by the rhetor…" (p. 114).

This project was guided by three, overarching research questions:

1. What were the fantasy themes and rhetorical visions developed in each statement?
2. Where, if at all, did the two statements converge on themes and vision?

3. How, if in any way, did those themes and visions chain out to the participants?

To answer the first two questions, the second author performed a fantasy theme criticism on each message, looking for themes in each message and then any thematic convergence or divergence between the messages. The first author then verified those findings. To answer the third question, the PST's reactions were coded using an emergent coding process. Two researchers began the analysis process by individually reading all of the PSTs' reactions. During that initial reading, each researcher made notes about general themes they saw in the reactions. Then both researchers met to develop and agree upon a coding scheme for the reactions. Once the coding scheme was complete, the researchers individually reread all of the PSTs' reactions. During this reading, the researchers coded approximately sentence-sized pieces of the PSTs' reactions according to the coding scheme. Then both researchers met, discussed the reactions and the coding scheme, and resolved all differences in codes in the PSTs' reactions. In addition to this process, reactions were also coded for whether the PST identified their race or their hometown within the body of the reactions.

In the larger analysis, 13 codes emerged and were applied to the PSTs' reactions by the researchers. For the purposes of this article, the focus will be on a subset of those codes: statements having to do with teaching mathematics for social justice, statements generally about mathematics, statements of concern about their own classroom practice, and statements about whose responsibility it is to take action regarding the content of the statements as well as the proposed actions. Collectively, these are five of the 13 codes in the coding system. The codes regarding taking action comprised the most often used codes in the coding scheme and had the most students with comments coded as such. Therefore, they seemed to be the most important to discuss. Similarly, considering the purpose of the organizations' statements, PSTs' views on teaching mathematics and social justice were important to include in this analysis. Most of the remaining codes were either sparsely used or highly concentrated in the reactions of just a few PSTs.

Message Analysis

It is important to note here that many members of NCTM and AMTE may be in the consciousness-raising and consciousness-sustaining phases of the life cycle of the rhetorical vision being advanced in these statements as these organizations have been advancing this rhetorical vision for at least half a decade (e.g., AMTE, 2017). However, the PSTs were likely unaware of this fact. The PSTs studied were nonmembers of either organization; they are potential future members. Therefore, most, if not all, participants of this study inhabited the

consciousness-creating phase of the SCT life cycle, meaning these messages represented new symbolic ground for them to process.

Even if the PSTs were aware of the rhetorical vision being advanced, the deaths of George Floyd, Breonna Taylor, and Ahmaud Arbery clearly provided a new setting in which to advance their novel rhetorical vision. These tragic events were reality-links for the rhetorical vision advanced by NCTM and AMTE. These three instances of objective reality were facts upon which these organizations could argue that old rhetorical visions for the math classroom were lagging behind current conditions, establishing a solid foundation for this novel rhetorical vision. As noted above, it is clear the NCTM and AMTE represent similar rhetorical communities and are advancing the same righteous rhetorical vision: the math classroom must be an antiracist space. In fact, both explicitly state as much.

Fantasy Themes

While each statement differed in rhetorical style and fantasy theme artistry, both organizations, acting as sanctioning agents, shared three primary, action-oriented themes in support of this vision.

Math Classrooms (and Their Affiliated Organizations) Must Be Supportive/Safe Spaces.

First, NCTM's statement couples antiracism with trauma-informed education, indicating it understands the link between the two. Not surprisingly, NCTM's third position statement directly addresses the need for math classrooms and affiliated organizations to be safe spaces; it states, "We encourage all educators to create socially and emotionally safe spaces for themselves, their students, and colleagues" (para. 3). AMTE's statement on this issue begins,

> As mathematics teacher educators, each of us must be cognizant of the lived experience of Black Americans by reading the history of the United States through a social justice lens. Next, we must learn ways to empower and provide access to students who often are judged by the color of their skin and not by their knowledge and abilities. (para. 2)

Further, AMTE hits on this theme, in whole or in part, in four of its qualities describing well-prepared math educators; it notes these educators should "recognize their responsibility to cultivate positive math identities with their students," "identify and implement practices that draw on students' mathematical, cultural, and linguistic resources/strengths," "understand the roles of power, privilege, and oppression in the history of mathematics education," and be "knowledgeable about, and accountable for, enacting ethical practices that enable them to advocate for themselves and to challenge the status quo on behalf of their students" (para. 2).

While analyzing the data, the researchers coded two areas with respect to taking action: who PSTs said was responsible for taking action and what actions the PSTs proposed. Overall, 20 PSTs (74%) stated that some action was needed in response to the organizations' statements. Among those, 19 PSTs (70%) made 45 statements noting that teachers, schools, districts, and/or the field of education should act, whereas only 14 PSTs (52%) made 29 statements saying they themselves specifically needed to act.

In general, this theme chained out to the PSTs significantly more than the other two fantasy themes. Thirty-three of the PSTs' proposed actions (almost half of the total proposed actions) were along the lines of creating a safe environment, leaving no one out, and/or holding students accountable for racist remarks. When PSTs proposed these actions, though, the context tended to be either nonspecific, superficial, and/or related to classroom management. Extremely few connections were made to the four AMTE qualities describing well-prepared math educators quoted in the previous paragraph.

Antiracism is Everyone's Job (Not Just the Job of Those in the BIPOC Community).

NCTM's second position addresses this notion: "We encourage all educators to challenge systems of oppression that privilege some while disadvantaging others" (para. 3). It also hits on this theme by using the inclusive term "we" when discussing those who must act. For example, NCTM asserts, "Anti-racist and trauma-informed education not only raises our awareness of racism and trauma experienced by Black, Latinx, Asian, and all marginalized peoples, but it also recognizes that we must be purposeful in addressing racism and trauma" (para. 3).

AMTE's statement is more explicit in this regard: "We cannot look at what is happening to Black Americans and other oppressed groups as problems that they alone need to solve" (para. 1). Further, after its bulleted list of attributes of well-prepared educators, AMTE argues, "we as an organization strengthen our own ability to serve as advocates for those whose voices have been muted and prepare a generation of teachers who are willing to address the systemic problem of inequity in our schools, nation, and world." (para. 3). The statement also notes that its specific call to action is aimed at White members of the math education community, asserting "It is long past time that we assume the burdens that have been largely left to mathematics educators of color" (para. 5).

This theme of antiracism being everyone's responsibility chained out significantly less with the PSTs than the theme regarding creating safe and supportive spaces. Nine statements were made that noted the need for advocacy, with some PSTs specifically citing their own white privilege as a reason they need to be involved in advocacy. Eight PSTs (30%) noted a need to educate themselves to

mitigate bias, and seven PSTs (26%) noted a need to educate themselves on the Black experience. Seven PSTs (26%) discussed the need to be culturally inclusive in their classrooms, including things like having representative classroom libraries. One PST specifically mentioned the homework gap, how that specifically affects students of low socioeconomic status and otherwise minoritized students, and how they would address it. In this study, none of the PSTs mentioned taking any action that involved mathematics or mathematics teaching specifically with respect to antiracism. While analyzing the data, the researchers coded two areas with respect to taking action: who PSTs said was responsible for taking action and what actions the PSTs proposed. Overall, 20 PSTs (74%) stated that some action was needed in response to the organizations' statements.

Mathematics is an Appropriate Site to Challenge Power, Privilege, and Oppression.

Not surprisingly, both statements call for math educators to go far beyond the provision of equal access, calling for them to use their classrooms and careers as a site to challenge power, privilege, and oppression. In fact, NCTM's first sentence is "As president and past president…we are committed to a position of social justice that challenges the roles of power, privilege, and oppression" (para. 1). Further, its statement reiterates calls made by Larson and Berry (2017) following events in Charlottesville, VA. The first of its positions states, "We support the use of mathematics as an analytical tool to challenge power, privilege, and oppression" (para. 3). Further, it states, "As NCTM's Catalyzing Change series advocates, we need to engage in critical conversations that urge educators to create structures where each and every student can be fully engaged in our democratic society" (para. 4).

Likewise, AMTE notes that well-prepared math educators will be able to "recognize the difference between access to and advancement in mathematics learning and work to provide both access and advancement for every student," "challenge policies and practices grounded in deficit-based thinking," and "question existing education systems that produce inequitable learning experiences and outcomes for students" (para. 2). Notably, AMTE goes a bit further than NCTM within this theme, arguing that it and its members need to go beyond the math classroom, partnering with organizations like Black Lives Matter, to dismantle systemic racism in this country.

This theme chained out least among the PSTs studied. In the 27 PSTs' reactions, four PSTs (15%) each made a single nontrivial statement generally about mathematics or mathematics teaching. Here, nontrivial means a mention of mathematics itself beyond simply as part of the organizations' names. The four statements mentioning mathematics were:

- "I realize that mathematics knowledge is a powerful tool."
- "I really like how the NCTM's statement went about what they were saying. I completely agree that math can be a tool to challenge and empower."
- "As a future educator I am up for the challenge of making the world a better place one math problem at a time."
- "I know it is a math class … but everybody could benefit from reflecting on these two statements and learn something."

In terms of what NCTM's and AMTE's statements were advocating for, there is not much in the PSTs' reactions related to mathematics or mathematics teaching. Two of the statements note that mathematics can be a powerful tool but go no deeper than that, the third makes a superficial reference to math problems, and the fourth merely notes that the statements were important to read and reflect on despite such reading happening in a mathematics content course. There were no statements in any PST's reaction that attempted to apply antiracist ideas specifically to mathematics teaching or that discussed how mathematics could be used to challenge power, privilege, and oppression.

Furthermore, in the 27 PSTs' reactions, three PSTs (11%) each made a single statement about concerns they have regarding incorporating the aims of the statements into their own classroom practice:

- "I am concerned a bit because as a teacher, relating with your students is an important part of your effectiveness and I can recognize that there are some things concerning this topic that I will never truly understand."
- "Parents of students may not agree with supporting and standing with African Americans and supporting the Black Lives Matter Movement so it is important that as a teacher we can create a warm, welcoming environment for all students."
- "Some uncertainties that I have are the colleagues that I have that do not believe that racism is a problem or do not see themselves as having white privilege. I am not sure what to do if I have teachers who are so adamant that there are not these problems or do not see their privilege or even worse do not believe in Black Lives Matter. What would I do in this situation?"

In all, one PST was concerned about being able to live up to the ideals of the organizations' statements, while two others expressed concern about perceptions by others outside their classrooms. Those concerns provide insight into why NCTM and AMTE may have trouble bringing PSTs into the rhetorical community. As noted above, rhetorical visions rooted in righteousness "stress correctness, the right way, morality, and so forth" (Bormann et al., 2001, p. 288). These concerns indicate that while PSTs might agree with the rhetorical vision being advanced,

they fear the backlash they may face as a result of being an open part of the rhetorical community.

When considering the general statements about mathematics and the statements of concern about incorporating antiracism into classroom practice together, it becomes clear that none of the PSTs truly considered both antiracist teaching practices and mathematics together in a single thought. Given this lack of coordination of the two ideas, it is unsurprising that PSTs found the theme regarding creating safe and supportive spaces to be more salient than the other two themes.

Discussion

There was little evidence that the PSTs studied symbolically converged with the rhetorical vision being advanced by these organizations. Thus, these PSTs are not yet fully part of the rhetorical community. However, there are indicators that show that the first two fantasy themes are, at least partially, salient for the PSTs. Because they are PSTs, one could argue they do not have a propensity to fantasize about this issue quite yet. However, the results above show that the PSTs view racism as they understand it negatively, and that they see the need to combat racism in their teaching. What is absent from the results is evidence that the PSTs were able to meaningfully connect the ideas of fighting racism and teaching mathematics as envisioned by the statements' authors.

Part of the disconnect may be due to some PSTs' narrow understanding of what racism is. If a PST merely views racism as intersecting their future classroom in the form of overtly racist remarks a student might make, then it would follow that their proposed actions would take the form of classroom management strategies. Racism consists of much more than overt remarks, though. NCTM's (2020) and AMTE's (2020) statements both clearly indicate that. Furthermore, many of the PSTs demonstrated that they understand the expansive nature of racism as well, yet they were still unable to make meaningful connections to mathematics teaching in their reactions to the organizations' statements.

Another part of the disconnect may be due to the sample of PSTs being overwhelmingly White. As noted at the outset of this article, mathematics education is a White institutional space (Battey & Leyva, 2016; Leyva, 2021; Martin, 2013). Since this was the first experience many of these PSTs had being exposed to thinking of mathematics education in that way, it is not wholly surprising that they were resistant to the more ambitious themes (Warburton, 2015). Moreover, even if they are open to teaching mathematics for social justice, PSTs may inadvertently reinforce whiteness as they are learning to do so (Harper et al., 2020). That said, the small but promising number of PST interactions with the second fantasy theme, antiracism being everyone's job, give us hope that more White PSTs are taking up the mantle to do this work rather than engaging in the

problematic behavior of leaving that work for the BIPOC community (Beard et al., 2021; Han & Leonard, 2017; Miles et al., 2019).

While we recognize that the target audiences for these statements were current organizational members, PSTs are future members. As this study indicates, PSTs are potentially open to engaging in antiracist mathematics teaching. Thus, NCTM, AMTE, and similar organizations may do well in advancing this novel rhetorical vision by targeting PSTs more directly in future messaging. To do this well, SCT suggests ways to enhance future organizational statements aimed at PSTs to assist them in making the connection.

The good news is both organizations are advancing the same rhetorical vision. Thus, they are not advancing competing rhetorical visions, and the fantasy themes they have established to advance the vision are well aligned. What seems to be missing from the perspective of PSTs is a strong nod to the principles of explanatory power and imitation. In a few PSTs' reactions, they stated that they wanted more than "just words." Those PSTs were reacting almost as they might to a soft drink commercial that promotes antiracism but awkwardly does nothing to connect the product to the idea, leaving viewers to wonder how a soft drink can be antiracist.

By offering PSTs links to resources that can help them more concretely make sense of the world around them, PSTs' propensity to fantasy may increase, which would aid in getting them to take up this vision and begin making statements that more clearly indicate fantasy chaining. For example, the organizations could be more specific about antiracist mathematics teaching strategies in the statements themselves. We acknowledge both NCTM and AMTE have and promote a variety of resources for antiracist mathematics teaching. In their recent statements on anti-Asian violence, for example, NCTM, AMTE, and others (2021) directly referred and linked to sources to promote equitable mathematics teaching. Such resources were absent from the statements analyzed in the current study. Such direct referrals could be useful for PSTs. Including links to resources in the statements could greatly assist PSTs in making the connection between antiracism and mathematics teaching. The organizations could even offer focused professional development opportunities to PSTs, practicing teachers, and university mathematics educators on how to incorporate materials like Bartell et al.'s (2022) or activities like Battey and Coleman's (2021) into their work to help them envision what an antiracist mathematics classroom can be.

As demonstrated by other studies of SCT, the principle of imitation is also useful in establishing symbolic convergence around a novel rhetorical vision. Therefore, it might strengthen statements like those published by NCTM and AMTE to reference or draw upon the work of mathematics heroes such as Bob Moses and his widely acclaimed Algebra Project (Moses, et al., 1989) in statements advancing their antiracist rhetorical vision. Such statements may help calm

fears about the backlash PSTs may face as a result of joining the rhetorical community by showing that mathematics educators have sought to teach mathematics inclusively for decades and have been successful doing so. This inclusion would accordingly help to advance the goal of increasing the amount of antiracist mathematics teaching in the nation.

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Appendix A

June 1, 2020

A Statement on George Floyd, Breonna Taylor, and Ahmaud Arbery

As president and past president of the National Council of Teachers of Mathematics (NCTM), we are committed to a position of social justice that challenges the roles of power, privilege, and oppression. We extend our heartfelt sympathies to the loved ones of George Floyd, Breonna Taylor, and Ahmaud Arbery. As a mathematics education community, we must not tolerate acts of racism, hate, bias, or violence.

Many of you, your students, and colleagues watched the events in Minneapolis, Louisville, and Brunswick, Georgia, unfold on television and social media and have been affected by those incidents and the public reaction to them. The trauma of these developments has an impact on the social and emotional well-being of students and teachers in daily life and in classroom learning. Our colleague Matt Larson reminds us that *We Teach More Than Mathematics*. As mathematics educators, we must engage in anti-racist and trauma-informed education in our daily practices as processes of learning and adjustments.

Anti-racist and trauma-informed education not only raises our awareness of racism and trauma experienced by Black, Latinx, Indigenous, Asian, and all marginalized peoples, but it also recognizes that we must be purposeful in addressing racism and trauma. In August 2017 Larson and Berry made several calls to the mathematics education community in their response to the unrest in Charlottesville, Virginia. In this message we renew these calls. As educators, teachers of mathematics, and a Council, we reiterate our position:

- We support the use of mathematics as an analytic tool to challenge power, privilege, and oppression.
- We encourage all educators to challenge systems of oppression that privilege some while disadvantaging others.
- We encourage all educators to create socially and emotionally safe spaces for themselves, their students, and colleagues.

As NCTM's Catalyzing Change series advocates, we need to engage in critical conversations that urge educators to create structures where each and every student can be fully engaged in our democratic society. We owe this not only to our students but also to the society we wish to inhabit both now and in the future.

> One either allows racial inequities to persevere, as a racist, or confronts racial inequities, as an antiracist. There is no in-between safe space of "not racist." The claim of "not racist" neutrality is a mask for racism. (Ibram X. Kendi, author of *How to Be an Anti-racist,* p. 9)

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Appendix B

To the membership of the Association of Mathematics Teacher Educators,

The Association of Mathematics Teacher Educators (AMTE) stands in solidarity with Black Americans in the face of racial injustice. We are dismayed by the inhumane and unjust treatment of Black Americans by law enforcement personnel in recent months with the deaths of George Floyd, Breonna Taylor, and Ahmaud Arbery. We acknowledge the inequities that the pandemic has illuminated related to health care, economic standing, and education. As an organization, AMTE believes that racism must be interrogated in this country. We cannot look at what is happening to Black Americans and other oppressed groups as problems that they alone need to solve.

As mathematics teacher educators, each of us must become cognizant of the lived experience of Black Americans by reading the history of the United States through a social justice lens. Next, we must learn ways to empower and provide access to students who often are judged by the color of their skin and not by their knowledge and abilities. We must ensure that we foster well-prepared teachers of mathematics who:

- recognize the difference between access to and advancement in mathematics learning and work to provide both access and advancement for every student,
- recognize their responsibility to cultivate positive mathematical identities with their students,
- identify and implement practices that draw on students' mathematical, cultural, and linguistic resources/strengths, and challenge policies and practices grounded in deficit-based thinking,
- understand the roles of power, privilege, and oppression in the history of mathematics education and are equipped to question existing educational systems that produce inequitable learning experiences and outcomes for students, and
- are knowledgeable about, and accountable for, enacting ethical practices that enable them to advocate for themselves and to challenge the status quo on behalf of their students (AMTE, 2017, p. 21–24).

Through these actions, we as an organization strengthen our own ability to serve as advocates for those whose voices have been muted and prepare a generation of teachers who are willing to address the systemic problem of inequity in our schools, nation, and world.

In our lives as citizens, we must look to organizations whose mission is to respond to continued racial injustice and to eradicate white supremacy and build local power to intervene in violence inflicted on Black communities by the state and vigilantes. We must stand with organizations like Black Lives Matter that seek to elevate awareness of the lived experiences of Americans of color and dismantle systems of continued racial oppression.

We must act. We (Mike and Megan) issue this call to action to white mathematics teacher educators, including ourselves. It is long past time that we assume the burdens that have been largely left to mathematics educators of color. All of us must affirm and support the lived experiences of our students and colleagues of color who are and have been suffering. We must actively work to be anti-racist in our acts of teaching, research, and service. Today we call on you to not simply express allyship, but to engage with a new resource to strengthen your own ability to see and to act in ways that are anti-racist and to critically examine your own practices and the potential biases implicit within them. A list of resources specifically related to our work as mathematics teacher educators is available on the AMTE Member Bulletin Board. We invite others to submit additional resources to this site to be shared with our mathematics education community.

To our colleagues of color, to our students, and to all who are suffering in this moment: we see you, we love you, and we support you. Together as mathematics teacher educators, we will bend the arc towards justice.

Yours in Service,

Mike Steele, AMTE President

Megan Burton, AMTE President-Elect

While the words in this statement were assembled and edited by President Mike Steele, President-Elect Megan Burton, and Executive Director Shari Stockero, they originate in large part from the lived experiences of educators of color within AMTE leadership who contributed their perspectives and wisdom. This statement includes contributions from AMTE Past Presidents Marilyn Strutchens, Christine Thomas, and Randy Philipp; AVP for Equity Carlos Lopez Leiva; AVP for Advocacy Zandra DeAraujo; VP for Professional Learning Jennifer Suh, and VP for Publications Babette Benken.