ILLUMINATING THE IDENTITIES OF MATHEMATICS TEACHERS AND
MATHEMATICS TEACHER EDUCATORS

By

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ABSTRACT

ILLUMINATING THE IDENTITIES OF MATHEMATICS TEACHERS AND
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This dissertation builds on research about teacher identities (e.g., Agee, 2004; Sumara & Luce-Kapler, 1996; Ronfeldt & Grossman, 2008), teaching mathematics for social justice (e.g., Felton, 2010; Gutstein, 2006; Skovsmose, 1985; Stinson & Wager, 2012) and learning to teach mathematics for social justice (e.g., Gau, 2005; Gonzalez, 2008). In particular, I aim to illuminate teacher identities (as human beings and as mathematics teachers or mathematics teacher educators) in discussions about teaching mathematics for social justice.

The context for this dissertation was my work with a group of three first-year mathematics teachers in a study group about teaching mathematics for social justice. I interviewed each of the teachers individually both before and after the study group sessions. The study group met four times, for two hours at each session, over seven weeks. The data for this dissertation were the audio-recordings of the interviews and sessions, the field notes I developed after the conclusion of the sessions, and the text of my own reflective journal I kept throughout the study.

The main portion of this dissertation is three manuscripts, which attend to and illuminate different aspects of the identities of three mathematics teachers and myself participating in this study group about teaching mathematics for social justice. Each manuscript presented in this dissertation is intended to be a self-contained articulation of the relevant literature, data, analysis, results, and discussion for the individual research questions posed.

The first manuscript is about mathematics teacher educator positionality and was based on an analysis of my reflections on particular questions designed to increase awareness about mathematics teacher educator positionality in the study group about teaching mathematics for social justice. The first manuscript presents a set of reflective questions (Mathematics Teacher Educator Positionality Heuristic) to be used to illuminate assumptions, beliefs, knowledge, and identities that are influencing one's work as a teacher educator.

The other two manuscripts are empirical studies. The second manuscript in this dissertation describes the identities with respect to race and class privilege that the two male teachers in the study group construed through their language in moment-to-moment interactions as well as over time (e.g., Gee's (1996) d/Discourses). I argue that each teacher's differing personal awareness with respect to racial privilege and class privilege is evident in his d/Discourses over time and in interactions. This manuscript is intended for a journal with a general teacher education researcher audience. The third manuscript in this dissertation analyzed the ways in which the teachers in the study group were able to see (or not see) themselves as teachers who teach mathematics for social justice by describing how the teachers positioned themselves either in alignment with or in contrast to the teacher presented in the text that we read. This manuscript adds to the literature on preparing teachers to teach mathematics for social justice by providing evidence about what possible issues arise for mathematics teachers as they consider themselves as this kind of teacher. This manuscript is intended for a mathematics education research journal.

The other two chapters in this dissertation (Chapters 1 and 5) provide me with an opportunity to situate the study in the context of the relevant literature that cut across the three presented manuscripts as well as to discuss important ideas across the three manuscripts.

For Grandpa,
who always knew I could
Love Always, Your Patricia

ACKNOWLEDGMENTS

"It is not the load that breaks you down; it's the way you carry it." - Lena Horne

"Don't give up when the pressure mounts. Face your doubts. Master your fears."
- Jeffrey R. Holland

The work of a dissertation, while ostensibly a solo endeavor, is not possible without the support, guidance, direction, and assistance from a great number of people. Here, I attempt to recognize some of the people who have been an incredibly important part of my journey and to whom I can probably never adequately express my gratitude.

First of all, I am grateful for the teachers who volunteered to participate in the study group. They were forthcoming and open in many discussions that were difficult to have. They readily shared personal stories about who they were and let me peek into their souls. I was fortunate enough to have known these teachers for two and a half years before the study group began and I am in awe of the teachers they have become. They are amazing, thoughtful, caring, dedicated teachers. I am grateful to have had this opportunity to work with them.

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teacher educator, a researcher, and a person. I am grateful for the other members of my committee who also provided direction and guidance through different phases of the dissertation study. Dr. Angie Calabrese Barton and Dr. Steve Weiland asked important questions and pressed me to consider things deeply and thoroughly. I left every meeting knowing that my work would be stronger because of the thoughtful feedback that each one of them gave me.

I am grateful for Dr. Rico Gutstein and the representation of his own work (and that of his students) that he shared in *Reading and Writing the World With Mathematics* (Gutstein, 2006). This text, and the aspects of Rico that we came to know through it, were a critical part in developing our collective understandings of teaching mathematics for social justice.

To the members of my writing group, Aaron Brakoniecki, Leslie Dietiker, and Mari Levin, I owe a great debt. Your feedback on writing, ideas, analysis, and life were of great value.

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During this dissertation study, I had the pleasure of working with the Young Women of the Lansing Ward (in The Church of Jesus Christ of Latter-day Saints). I continue to be awed and inspired by each of you and your testimonies. I am grateful for your patience when I had to miss a few of our Tuesday night activities. I am also grateful for your love and support. "Never doubt that a small group of committed people can change the world. Indeed, it is the only thing that ever has." - Margaret Mead

I am grateful for the opportunity to have served with the other Young Women leaders (Marisa Christensen, Emily Becker, Stephanie Smedley, Julie Landon, Laurie Johnson, Tiffany Alldredge, and Wendy Wiersma). Each of you has provided me with love and kindness, asked

me questions about how things are going, and listened carefully (even when I was rambling). I am grateful for the leaders of the Lansing Ward who offered their support and love throughout this project. Bishop Rivers, Brother Becker, and Brother Christensen, your smiles, kind questions, blessings, and the opportunities to serve have truly reminded me of the love of my Father in Heaven. Thank you for your dedicated service and for your righteous examples.

To my future department chair, Dr. Steve Williams: Thank you for lighting a bonfire under me to keep me going. I am grateful for your kind questions about "how the dissertation is going" that propelled me out of bed on a number of mornings to sit in front of my computer. I am truly grateful for the opportunity to become a part of your department and knowing it is on the other side of finishing this dissertation has been a tremendous motivating power. Thank you, also, for your time and feedback on parts of this dissertation.

I am grateful to the members of my book club (Kristy Rivers, Sarah Stradley, Ashley Stevens, Elise Palmer, Jessica Andersen, Angela Johnson), my mentor (Shannon Sweeny), my mentee (Lateefah Id-Deen), my visiting teacher (Karen Bruening), my home teacher (Rick Holcomb) and his wife (Marilyn Holcomb), and my office mates—present and former (Jillian Cavanna, Heejoo Suh, Sam Otten, Faith Muirhead, Alex Theakston Musselman).

Lastly, I am grateful for my parents. Mom and Dad, this work would not have been possible without your support. I am truly grateful for your love and for the many ways you understand me. I am glad we can laugh with each other, cry with each other, and remember the many other things we have done together. I have come a long way since "coral is fascinating." "Now and forever, I'll remember all the promises still unbroken, And think about all the words between us, That never needed to be spoken, ... We are the lucky ones, Some people never get to do, All we got to do." – Carole King

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KEY TO SYMBOLS OR ABBREVIATIONS

"TMfSJ" is used to refer to teaching mathematics for social justice

While a virtue, tolerance does not grow on trees, neither is it a concept that can be learned through mechanical transference, from a speaking, active subject who deposits it into subdued patients. The learning of tolerance takes place through testimony. Above all, it implies that, while fighting for my dream, I must not become passionately closed within myself. It is necessary that I open myself to knowledge and refuse to isolate myself within the circle of my own truth or reject all that is different from it or from me. Tolerance is the open, postmodernly progressive way for me, while living with the different, to learn from it and better fight the antagonistic. (Freire, 1997/2007, p. 50-51)

CHAPTER 1: INTRODUCTION

In American Sign Language (ASL), the sign for "oppress" is directional, when signed accurately. That is, the subject and the object are included in the movement associated with the verb based on how the sign moves through the space. The same is true of other verbs in ASL.

[The sign for OPPRESSION: Make a fist with your left hand, holding your hand sideways so that your fingers stack on each other (as if you were holding a pole that was vertical). Your right hand open palmed with spread fingers rests on top of the fist. You push down with your right hand, moving both the fist and open hand together.]

When Deaf people sign about the oppression of Deaf people, the sign makes clear that they are the object of the oppression. The movement of the sign starts in an area away from their body and moves toward their body. As a Hearing[1] person, it is not accurate for me to sign it in this way. I am bound by the grammar of the

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[1] The capital letter "H" on *Hearing* is one way to acknowledge Deaf culture as opposed to a medical perspective of deafness (cf. Padden & Humphries, 1988; Lane, 1992).

language to sign it as if I was the oppressor. *Being implicated as oppressor in this way reminds me that to disassociate from the identity of oppressor, I must be an active agent of change. This change must begin with a deep understanding of my own privileges and my passive participation in the strata that currently exist.*

As a White, Hearing, heterosexual, middle-class Christian, the italicized statement above always lingers in my mind. I have come to understand that it is important to explore the ways in which my memberships in these non-target groups (i.e., a group in which I benefit from unearned privilege) play a role in my interactions with others. Similarly, as a woman and a Mormon, my membership in target groups influences my relations with others. Additionally, as a human being, but also particularly as a teacher, a teacher educator, and a graduate student, I have determined that silence is not the option I want to choose. Despite all its complicatedness, living my life in ways that seek to confront and change the systems in which I am privileged and making my work about ways to confront these systems is indeed the right path.

Confronting systems of privilege and oppression[2] in my life, generally, and in my work as a mathematics teacher educator, more specifically, includes, but is not limited to, engaging in difficult discussions about race, gender, sexual orientation, and ability, as well as using lessons from critical pedagogy in teaching prospective and practicing teachers. "Many educated people, including teachers, fear scrutinizing the meritocratic ideology. Such scrutiny is essential,

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[2] Systems of privilege and oppression are social constructs in which some people benefit from unearned and often unseen privileges while others do not have these same privileges. These systems lead to power differences among people for a variety of reasons such as, race, class, gender and so on. These power differences are apparent when "defining oppression as 'attitudes, behaviors, and pervasive and systemic social arrangements by which members of one group are exploited and subordinated while members of another group are granted privileges (Bohmer and Briggs 1991:155)'" (Lucal, 1996, p. 246). Systems of privilege operate on a variety of levels including personal, interpersonal, institutional, and cultural (Batts, 1998, 2002; Harro, 2000a, 2000b).

however, if we are to engage in substantive discussions of power, privilege, and racism" (Henze, Lucas, & Scott, 1998, p. 207). It is important to participate in discussions that can provide opportunities to address the systems of privilege and oppression in society so that teachers may understand the role they (often unknowingly) play in perpetuating these systems as well as what they can do to change the systems. Increased awareness and the possible subsequent actions that seek to disrupt and dismantle the perpetuation of the systems of privilege and oppression can allow for a more equitable schooling system and society.

Mathematics can be used as a tool for understanding systems of privilege and oppression. For example, people can use mathematics to illuminate inequitable wealth distribution in the world (Gutstein, 2006) or to determine whether or not the police actually target and pull-over more African-American men in a certain location or city (Gutstein, 2006). Many people believe that mathematics is an apolitical subject to be taught neutrally in schools (Felton, 2010; Gutstein & Peterson, 2006). Mathematics, however, is constantly being used to construct arguments for and against a variety of social and political issues (Gutstein, 2006). Even mathematics problems presented in a way that most people would consider 'standard,' communicate values. Word problems about painting and carpeting rooms in one's house, for example, imply a level of economic privilege that includes home ownership. Buying and selling goods communicates ideals about consumerism. Therefore, neither mathematics nor mathematics education are exempt from answering questions about values, such as "What values are communicated, implicitly or explicitly, to students through this mathematics task or teaching?" Teachers and students should be provided with opportunities to explore the relationship between mathematics and social issues as well as to use mathematics to illuminate unseen but experienced social

inequities. This kind of opportunity is like those described above which provide teachers and students with increased awareness of the systems in which they participate.

In this dissertation study, I explored the identities of three first-year mathematics teachers as they participated in a study group or book club about Gutstein's (2006) *Reading and Writing the World with Mathematics*. This dissertation contains three manuscripts, which describe different aspects of the work in this context (these are elaborated on in the next subsection). This dissertation study built on the work of others who have conducted study groups about teaching mathematics for social justice (e.g., Gau, 2005; Gonzalez, 2008) by exploring teachers' identities. Gonzalez (2008) studied how the teachers' engagement in her study group changed their perspective of their role as agents of change or their identity as change agents. That is, her conception of identity was focused on one identity, while this dissertation study illuminated and explored teachers' multiple identities. Gau (2005) characterized teachers' learning to teach mathematics for social justice during her participants' involvement in a study group engaged in lesson study. This dissertation study investigated a population of teachers similar to those in Gau's study (i.e., White secondary mathematics teachers); however, this study focused on characterizing identities as one way to consider learning. Discussion about teaching mathematics for social justice can provide a way to illuminate mathematics teachers' identities because the context provides an opportunity for teachers to engage in difficult conversations about privilege and power that they also could facilitate with their students. Teachers can gain greater understanding of who they are. Also, the mathematics teacher educators working with them can explore how the identities teachers bring to their work shape their practice. Examining how mathematics teachers' identities play a role in their learning about teaching mathematics for

social justice is critical to exploring how mathematics teachers can promote social change through the work in their classrooms.

The Contents of This Dissertation

This dissertation is composed of this introductory chapter, three manuscripts, and the concluding chapter. This introductory chapter elaborates on the identity literature in which the entire dissertation is situated and describes the range of data I collected in order to provide a context for the set of three manuscripts. Each manuscript is intended to be a self-contained articulation of relevant literature, data, analysis, results, and discussion for the individual research questions posed. With respect to the literature, this introductory chapter, then, illuminates only the key aspects of the literature that are foundational to all three articles and further elaborates on the motivation for particular aspects of the work in this dissertation (e.g., what brings me to this study, why did I use a book club as the format for the study group, what data did I collect).

The first manuscript is about mathematics teacher educator positionality and was based on an analysis of my reflections on particular questions designed to increase awareness about mathematics teacher educator positionality in the study group about teaching mathematics for social justice. The first manuscript was written for a mathematics teacher educator audience and presents a set of reflective questions (Mathematics Teacher Educator Positionality Heuristic) to be used to illuminate assumptions, beliefs, knowledge, and identities that are influencing one's work as a teacher educator.

The other two manuscripts are empirical studies focused on my interactions with first-year mathematics teachers in interviews and the same study group. The second manuscript in this dissertation describes the identities with respect to race and class privilege that the two male

teachers in the study group construed through their language in moment-to-moment interactions as well as over time (e.g., Gee's (1996) d/Discourses). I argue that each teacher's differing personal awareness with respect to racial privilege and class privilege is evident in his d/Discourses over time and in interactions. This manuscript is intended for a journal with a general teacher education researcher audience. The third manuscript in this dissertation analyzed the ways in which the teachers in the study group were able to see (or not see) themselves as teachers who teach mathematics for social justice by describing how the teachers positioned themselves either in alignment with or in contrast to the teacher presented in the text that we read. This manuscript adds to the literature on preparing teachers to teach mathematics for social justice by providing evidence about what possible issues arise for mathematics teachers as they consider themselves as this kind of teacher. This manuscript is intended for a mathematics education research journal. It should be noted that when the manuscripts are cited in the text of this dissertation, they are referenced as such: (Johnson, in preparation [Chapter N]), where N is the chapter in this dissertation. They are not included in the reference lists of this dissertation, unlike other manuscripts in preparation, because they are found in their entirety in the appropriate chapter.

The concluding chapter of this dissertation presents a set of questions that cut across the content of the presented manuscripts in order to articulate how this work contributes to educational research and teacher education, more broadly, and mathematics education research and mathematics teacher education, more specifically.

How I Came to This Dissertation Study

In this section, I add to the lists of identities that are important to me that began this dissertation by telling a few relevant life experiences. I do this storytelling in order to illuminate

my positionality or my own identities with their concomitant ways of valuing, believing, knowing, interacting, and so on. My own identities shape my interpretation of the identities of other people, so it is important to provide insight into the perspective I bring by sharing with the readers some of the narratives associated with the categorical lists of identities already presented at the beginning of this chapter. (I recognize that there are many conceptions and theoretical approaches to a consideration of identity and I will elaborate on them in an academic way in the next section. For now, I will state my assumption that I do not think the categorical list above is a sufficient elaboration of how whom I am shapes this work.)

The life experiences I share here are meant to help the reader see how I came to be interested in studying people's identities *and* why I am committed to investigating systems of privilege and oppression (e.g., through the context of teaching mathematics for social justice or in conjunction with people's identities). I organize this section by this duality; however, I do not mean to suggest that the line is so clearly demarcated. There are significant aspects of why I am interested in investigating systems of privilege and oppression that show up in an elaboration of how I came to be interested in studying people's identities and vice versa.

How I Came to Be Interested in People's Identities

My childhood and young adult life were shaped extensively by the fact that my dad served in the submarine force in the United States Navy. Before graduating from high school, I lived in upstate New York, Connecticut (twice), Washington, Northern Virginia (twice), and Ohio. Each move, even when it was back to a place I had already lived, presented another opportunity to get to know a variety of people and begin new friendships. Knowing, at times, that our stay in one location might be only a year or two, I learned to build friendships quickly. That meant getting to know people by asking questions, listening carefully, watching their

actions, and generally, paying attention to who they were. Most of the time, I acclimated to my new environment. I made friends by listening and watching who others were and trying to fit in. I did not always adopt others' perspectives or language but I did begin to develop empathy for others. This development occurred as I began to see how people's life stories or lived experiences were shaped by their prior experiences, their parents' experiences, and, at times, I caught a glimpse of larger cultural or societal influences that shaped their lives.

During my junior year of high school, I began a friendship with someone that would shape how I thought about whom people are. Victoria had been born in India and had moved to the United States when she was in elementary school. Her parents were both well-respected doctors and they sought better educational opportunities for their daughters. Victoria had one sister who was a few years younger than she was. As I began to be friends with Victoria, her mother was increasingly frustrated about our relationship. I wrote about our relationship and my reflections on the influence of race and culture in an assigned reflective writing for a course I took as an undergraduate senior. It was an interdisciplinary course focused on "diversity" that met the liberal arts college requirements. It was the kind of course that existed at most institutions which spends one week each focused on different aspects of diversity (e.g., a race week, a sexual orientation week, a religion week). The following text was what I wrote in a reflection journal one week.[3]

My best friend my junior year in high school moved to the United States from India when she was in elementary school. While she and her sister put on an American front at school, their home life was still entrenched with Indian culture. Her parents brought together by an arranged marriage were both Indian and had moved to the United

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[3] The names are pseudonyms.

States to give their daughters better educational opportunities. I quickly learned about the stress that existed inside the household as her parents fell out of love. Since a divorce would alienate them from their culture, they stayed unhappily married and fought frequently. I didn't understand the culture that Victoria came from, but I started to learn some about it as the problems within the home expanded. Her parents were encouraging her to have an arranged marriage and they saw me as a threat to the family.

I learned that family is the most important thing in the Indian culture and that I was seen as a threat to the familial bonds Victoria and her sister were supposed to share. Victoria's mother saw me taking time away from what should be Victoria's shared secrets with her sister. I was giving Victoria advice on life, love, relationships, and friendships as any high school best friend would from the American standpoint. In this way, I was helping Victoria rebel. Problems escalated in the house unbeknownst to me, and Victoria made an attempt on her own life. During her suicide attempt, she phoned me to discuss what she was doing and to give me the reasons why. She complained about how her parents had become more insistent that she have an arranged marriage and they were pushing their culture from India on to her. She was frustrated by their attempts and was tired of dealing with the clash of cultures that she faced every day when she awoke, going to a suburban [name of city] high school, and having parents who acted as if they were still in India. While she lived through her suicide attempt, our friendship didn't survive the fact that I had saved her life and we set ourselves in divergent directions.

I have many regrets about that situation. Looking back on it, I realize that I didn't understand what she was going through because I hadn't really taken the time to stop and learn about her culture and where she came from. While I did learn some things about

Indian culture from her, it wasn't enough to understand who she is. Learning about Indian culture would have explained more about her family life to me, and the viewpoint her parents took on the situation. To them, she was an Indian girl living in America to further her educational opportunities. To me, and partially to her, she was an American with an Indian background. I didn't know that she struggled with her identity until the day she attempted suicide. During that phone call she revealed her personal struggle with who she was.

I couldn't even begin to understand the pressure she was feeling, or try to understand it because I didn't know anything about where she was coming from. I didn't understand her parents' dislike for me. It was like realizing I was best friends with someone I didn't know. To a degree, this was true. Many high school friends never reach a certain depth of thorough understanding of each other. In a way, this friendship was another example of a surface high school relationship. I just often ponder whether or not I could have helped her differently, or tried to stop her from attempting suicide if I had understood where she was coming from better. From then on, I made a vow to try to understand cultures better to make my friendships more whole.

For the years we had spent moving up until this point, I had become "good" at making friends, really getting to know whom people were, even in short periods of time. The experience I elaborate here about Victoria, however, exposed some important gaps. My relationship with Victoria was built on trying to fully understand the American-not-Indian girl she tried to be at school. What I failed to understand or see was the influence her race or culture, at a much larger level than her individuality, also played in who she was. Victoria was not the first friend I had tried to make who was different from me. I had plenty of friends and acquaintances who

represented a diverse set of races, cultures, religions, and so on. Perhaps, though, she was the first who was not White *and* also not a dependent of a military parent with whom I tried to develop a more close friendship. The commonalities I had had with previous friends obscured our differences (from my perspective). As I learned later in life, this invisibility is part of the unearned privilege I have as someone who is White and economically secure.[4] My friendship with Victoria taught me to expand my notion of what it means to get to know someone and how to better understand how I am different from people.

My friendship with Victoria shifted my thinking about what it means to develop a friendship with someone and to better understand who they are. The many moves had taught me that getting to know people requires thoughtful consideration of the stories they tell, understanding the things that they say and do, and generally observing how they make sense of the world. My friendship with Victoria added new dimensions for me by opening my eyes more fully to the role of race, class, religion, and other aspects of one's identities that bring with them particular ways of valuing, knowing, assuming, and interacting.

Why I Am Committed to Investigating Systems of Privilege and Oppression

Earlier, I described that I would write about both how I came to be interested in studying people's identities *and* why I am committed to investigating systems of privilege and oppression. The latter part is indicated in my work through the context of the study group (a focus on teaching mathematics for social justice) as well as some of my analyses (particularly, Johnson (in preparation) [Chapter 3]). Here, I elaborate on what brings me to my commitment to investigating privilege and oppression.

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[4] I use "economic security" to emphasize that people can benefit from socioeconomic privilege who are not in the wealthiest socioeconomic group. I am grateful for Dr. Angela Calabrese Barton's contribution of the language of "economic security" to encapsulate what others have referred to as "middle-class privilege" (e.g. Liu, Pickett, & Ivey, 2007).

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Fundamentally, I have come to understand that *silence is not an option* but that, unfortunately, it is easy to settle for silence. I have often struggled to understand when it is appropriate to speak up and voice my opinion on some divisive matters (e.g., race, religion, politics), particularly when my opinion is not in the majority present in the group. More than once, I have been reminded through experiences that silence is acceptance or implicitly, agreement. For the same undergraduate course described earlier, I remarked in my final paper about a new understanding of "silence."

Walking into class on the first day of my last semester as an undergraduate, I didn't know what to expect to walk away with on April 25th. Having attended Miami [University in Oxford, Ohio] for four years, I had gotten complacent in many ways. I had come to expect homophobia from people and for them to voice this in some way. I had come to expect that Black people hang out in Shriver and that White people always had a comment about it. ... It had been four months since September 11th and the fear of the Muslim people hung in the air. While I personally didn't fault the religion for the acts of the terrorists and although I grimaced at the hate crimes against the Muslim people, I didn't say anything.

In short, I was silent. Perhaps, even worse, I didn't know I was being silent. I didn't figure this out very early in the semester either. "Forced" to reflect weekly in my journal and my own natural daily reflections only brought my own self to light after several weeks.

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Something I can do ... is break my own silence. I have often been afraid to be an advocate for my own opinions and beliefs. So, I can speak up when I don't agree. I have to

remember that I can't be afraid to confront people when they might express in a very open or even implicit way that they are racist, homophobic, sexist, etc. I can't let my silence be agreement.

After taking this course, I pursued and completed my master's degree and became a high school mathematics teacher at a school for the deaf and blind. Silence was not an option when it came to ableism, audism, and racism in the classroom. I was very clear with my students about expectations for treatment of one another and what was acceptable. We sometimes engaged in direct discussions about political or social topics but not always or often. In other aspects of my life, such as discussions with friends, colleagues, and family, I became more comfortable in my silence again. For example, on a holiday, I walked into a friend's father's house only to immediately discover offensive and racist paraphernalia displayed as "antiques." As a White person, my unearned privilege offered me a choice: to go or to stay. I chose to stay—the "it is not good manners" aspect overcoming my other judgment. I was not silent—I did voice concern and an expression of how offensive the paraphernalia was. I was mostly dismissed by my friend. I have often wondered which choice was the most appropriate and whether or not my speaking out was heard.

The following year, I came to Michigan State University for my doctoral studies. I began to be exposed to critical scholars including Freire, Giroux, and Gutstein. Their work resonated with me and I began to see mathematics teaching and learning through a more critical perspective, but it was still something that my mind fancied and I had not incorporated it into my practice as a mathematics teacher educator or mathematics educational researcher.

During my second year in the program, I applied for an opportunity to attend a seminar entitled "Understanding Privilege and Oppression" with colleagues from the College of

Education.[5] During two extended weekends, we worked with facilitators to better understand racism, sexism, and heterosexism. My eyes were opened anew with respect to some of the ideas (for example, American Indian reservations are an act of racism). I, again, became aware of my silence. I wrote and doodled all over several pages in my journal for the weekend that "silence is acceptance" and "silence is not an option."

What I began to see was that I needed to have experiences in which I was thinking about, understanding, and taking action about privilege and oppression in order to fulfill my responsibilities of whom I intended to become. I have wanted to be an ally, to stand up against discrimination, prejudice, and hate. I cannot do that without constantly working to understand systems of privilege and oppression and how they affect people's lived experiences. When I become complacent in how things are, I begin to fall into patterns of silence which upon further reflection are unacceptable and even appalling. I must do this work. It is what helps me become whom I desire to be.

In summary, I believe that it is important for me to constantly engage in a consideration of systems of privilege and oppression in order to become the kind of person who seeks to disrupt and dismantle those systems. Without constant vigilance, silence becomes an implicitly acceptable alternative. This kind of passivity is bothersome as I reflect on whom I am. Furthermore, I have always found that it is important to study who others are so that I may build relationships with them. Both of these self-understandings are what have led me to this dissertation study.

Situating This Dissertation in Literature About Identity

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[5] This seminar retreat spanned two weekends and was led by individuals from the organization Allies for Change (http://www.alliesforchange.org/).

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Researchers have studied identities in the context of education for both teachers and students (e.g., Agee, 2004; Bishop, 2012; Juzwik, 2006; Leander, 2004; Lortie, 1975; Martin, 2006; McCarthey & Moje, 2002; Ronfeldt & Grossman, 2008; Sfard & Prusak, 2005; Sumara & Luce-Kapler, 1996;). Researchers outside the context of education have also characterized and studied people's identities (e.g., Wortham, 2003; Holland & Leander, 2004; Holland, Lachicotte, Skinner, & Cain, 1998). In this section, I briefly elaborate on some of the ways in which researchers have articulated different theories of identity and in what ways they have studied identity. Following this broad description of literature, I describe the conception of identity on which this dissertation depends and how I have chosen to use some of the conceptions from other work to study and analyze identities in this dissertation study.

Identity Literature

Before articulating the theory of identity on which I draw in this dissertation study, I survey the field of identity literature to describe some of the conceptions or lenses with associated assumptions that have been used to discuss identity. I have organized this section, generally, into four categories: (1) identities as stories or narrative, (2) identities as beliefs, (3) identities as interactions in particular contexts, and (4) identities as d/Discourses. In each section, I describe some of the key literature, assumptions, and methodologies associated with each perspective.

Although this section clearly differentiates literature into separated categories, it is not true that one article or study always perfectly mapped into only one category. The study and theory building related to illuminating and characterizing people's identities often includes borrowing across conceptions or perspectives. At times, authors have carefully described the ways in which they see the perspectives as complementary or in alignment. Other times, the

cross-pollination of ideas is not so well articulated. I have chosen to separate the literature into these four categories so that it might be easier to see what kinds of assumptions come with each of these perspectives. Subsequently, it becomes easier to see the ways in which some are complementary and the borrowing of assumptions is more natural.

Although I reference literature across disciplines, when possible, I have chosen to use examples from mathematics education research to illustrate the perspectives in order to show that mathematics education research is already concerned with characterizing identities (of students and teachers) in a variety of ways and because the reader might be more familiar with these examples. In doing so, I recognize, however, that this kind of attention to mathematics education research will position it in a particular way and I do not intend to suggest that the field of mathematics education research does not benefit from the influence of research in other disciplines (e.g., sociology, anthropology) or other content areas in the context of educational research (e.g., literacy research, social studies education research). In fact, I have argued elsewhere for the value in considering perspectives outside the field of mathematics education research (Bartell & Johnson, 2013).

Identities as stories or narrative. One way to characterize identity is through the idea that identities are particular kinds of stories or that they develop through a pattern of story-telling (e.g., McCarthey & Moje, 2002; Juzwik, 2006; Sfard & Prusak, 2005; Wortham, 2001). This perspective on identity assumes that identities are not just extra-discursive, but in fact, the discursive tellings about oneself and others *are* the identities.

In the context of mathematics education research, Sfard and Prusak (2005) defined identities as "stories about persons" (p. 14). That is, Sfard and Prusak characterized particular kinds of stories as those that are identity stories and Juzwik (2006) expanded their notion of

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identity stories to include an additional attribute. Identity stories are reifying, endorsable, significant and include a moral stance (Sfard & Prusak, 2005; Juzwik, 2006). To be reifying, identity stories are those stories that contain the being or having sentences that are developed over repeated experiences of doing. For example, "I am a teacher" is the kind of identity story that would meet these criteria because it develops over repeated experiences (e.g., interactions with students) and is in the form of a "being" sentence (e.g., "I am..."). Stories are endorsable if they are true to the state of the world or have a kind of external validity. That is, to be endorsable, identity stories must be able to be identified by an outsider. The identity story is significant if it impacts the way another would view or define the person. The final criterion for identity stories is the inclusion of a moral stance (Juzwik, 2006). A moral stance is a disposition that places value on particular ways of living in the world. As identities are single stories, identities are constantly under flux and transformation.

In addition to identities being particular kinds of stories, a perspective that describes identities as stories also includes authors who write about how stories told over time can codify into identity. That is, in contrast to the stories that Sfard and Prusak (2005) and others articulated that are changeable and continuously under transformation and (re)formation, Wortham (1999, 2000, 2001) and other authors, such as Jorgenson (2002), Koven (2002), and Mishler (2004), described identities as stories told over time. For example, Wortham (1999, 2000, 2001) described how people can begin to become identifiable through the stories they tell because, over time, it is possible to see how these stories follow predictable patterns.

This kind of perspective naturally lends itself to using discourse analysis to illuminate and characterize identities. Data are usually in the form of interviews (often longer interviews with very open-ended questions) in which people are asked to describe events in their lives.

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Interviews like this allow people the opportunity to provide details about their lived experiences (e.g., life histories) and to tell stories that conform to characterizations of identity, either particular kinds of stories (e.g., Sfard & Prusak, 2005; Juzwik, 2006) or patterns in story-telling (e.g., Wortham, 1999, 2000, 2001).

Identities as beliefs. Another conceptualization of identity is related to beliefs (e.g., Bishop, 2012; Leatham, 2006). When considering the relationship between identity and beliefs, researchers have described the relationship in a few ways. One perspective is to assert that identities are a particular subset of beliefs. That is, certain beliefs are more central and, therefore, become a way of identifying people (Leatham, 2006). Alternatively, authors assert that people's interactions codify into particular beliefs (Freire, 1970/2000; Howard, 2006; Ladson-Billings, 2009; Lortie, 1975). Considering a relationship between beliefs and identity can be messy because literature on beliefs tends to be grounded in cognitivist perspectives on knowledge and literature on identity tends to be grounded in sociocultural ways of knowing (cf. Johnson & Herbel-Eisenmann, in preparation). The assumptions inherent in each are different and, as a result, it can be challenging to talk across the perspectives. Bishop (2012) argued that "an identity is the set of beliefs that one has about who one is with respect to mathematics and its corresponding activities" (p. 41). That is, particular kinds of beliefs are those that are a person's identity. Researchers situated in this perspective might assume that beliefs are able to be communicated through discourse. Taking particular beliefs to be one's identity leads to methods of studying identity that include interviews and/or discourse analysis of interactions between individuals. The use of interviews would be more common in this perspective; however, Bishop (2012) also analyzed classroom interactions between students using discourse analysis.

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As mentioned previously, another way to consider the intersection between beliefs and identities is to suggest that cultural interactions, over time, lead to cognitive structures or beliefs about the world (e.g., Freire, 1970/2000; Howard, 2006; Ladson-Billings, 2009). This kind of perspective usually relies on another conceptualization on the development of identity which then leads to the development of beliefs which continue to inform interactions and develop identities.

Identities as interactions in particular contexts. Other authors characterize identity by describing people's collective interaction in particular contexts with shared understandings (e.g., Calabrese Barton et al., 2013; Emonde & Langer-Osuna, 2013; Gregory, 2001; Holland & Lave, 2001; Holland, Lachicotte, Skinner, & Cain, 1998; Ma & Singer-Gabella, 2011; Willis, 2001). For example, figured worlds are one way to describe how people act with one another to identify themselves as a particular type of person (Holland et al., 1998). In figured worlds, people become identified by the roles they live and enact, particularly with respect to others (Holland et al., 1998). That is, people come to know one another by these roles, positions, or storylines. Holland and her colleagues described the four characteristics of a figured world to be that: (1) figured worlds develop over time as people interact with one another; (2) in figured worlds, a person's position in social space is important; (3) figured worlds are "socially organized and reproduced" (Holland et al., 1998, p. 41) so that the interactions among the people are what sustain the figured world; (4) people are recognizable based on their interactions with others in the figured world because they take on a particular role. This list of characteristics of the figured world begins to illuminate the kinds of assumptions that are implicit when considering identity through this perspective.

Holland and Lave (2001), in conjunction with several other authors in the book *History in Person: Enduring Struggles, Contentious Practice, Intimate Identities*, described another kind of interactional context in which to situate people's identities. In particular, they discussed the kind of context that develops out of historical struggle against oppression. Within this context, authors, such as Warren (2001), Gregory (2001), Willis (2001), characterized the identities of individuals by describing the ways in which those individuals are situated on the larger context of an enduring struggle against systemic or localized oppression.

In this perspective, authors tend to characterize people's identities in the context of a particular described figured world or other described interactional contexts (e.g., Calabrese Barton et al., 2013; Emonde & Langer-Osuna, 2013; Gregory, 2001; Ma & Singer-Gabella, 2011; Willis, 2001). For example, Esmonde and Langer-Osuna (2013) described how the interactions between two African-American girls (Shayenne and Dawn) and a White boy (Riley) played out during mathematics class as a part of a figured world of friendship (between the girls). The figured world of friendship came with different expectations and possibilities for each of Shayenne, Dawn, and Riley. That is, Esmonde and Langer-Osuna (2013) attended to the overarching context (e.g., the figured world of friendship), an elaboration of the possible roles and actors in the context and, then, situated particular individuals in particular roles or positions (e.g., Shayenne, Dawn, and Riley into their particular roles).

In the context of figured worlds or other described interactional contexts, authors also have drawn on (either implicitly or explicitly) assumptions associated with Bakhtin (1981, 1986, 1993) which include a discursive approach to self-understandings and/or identities. Interactions with others often include some sort of spoken language or other discourse that provide opportunity to analyze. Many authors from this perspective characterize identities through

discourse analyses of interactions among and between people in more natural (e.g., not an interview) settings.

Identities as d/Discourses. Another way to describe identity is through ways of being, speaking, or acting (e.g., Esmonde, 2009; Gee, 1996; Howard, 2006; Moschkovich, 2007). This conception of identity depends on interactions between people to describe identities. I categorize this group as distinct from the previously described "identities as interactions in particular contexts" because authors in this category do not attend to the context in the same way. That is, identities, for authors in this category, tend to be characterized by considering the interactions between and among people but may or may not carefully consider the local context or larger context in which the interactions are taking place (unlike in the previously described category in which the identities are a result of the situated context). For example, Gee (1996) articulates the concept of d/Discourses as a way to identify others.

Moschkovich (2007) analyzed the Discourses present during an interaction among a teacher and students in a whole class discussion. Although she did not explicitly link the uses of different Discourses to identities, Moschkovich did link the different Discourses to different groups of people (e.g., professional mathematicians, students and teachers in the context of schooling). By characterizing how groups of people engage in distinct Discourses, she began to consider the expression of different people's identities. Specifically, Moschkovich highlighted the ways in which the students were using different Discourses, including everyday language and more formal mathematical language. Researchers in this perspective of identity tend to use interactional text, such as small group or whole group discussions or other kinds of interactions between individuals, as their data for analysis. Typically, researchers in this category are also

drawing on Gee's (1996, 1999/2005) conception of discourse analysis to reveal the kinds of d/Discourses that the individuals are using.

What I Mean By "Identity" in This Study

For this dissertation, I have chosen to draw primarily on positioning theory (Harré & van Langenhove, 1991; Harré & Moghaddam, 2003; Harré, 1984) because it is a perspective that assumes that people's actions and words shape social structures (Wagner & Herbel-Eisenmann, 2009). I chose this perspective, in part, because, fundamentally, I believe identities are constructed through people's interactions with others. Although positioning theory typically tends to focus on the moment-to-moment interactions between people to characterize identities, I also attend to the accumulations of these moment-to-moment interactions that can come to define people (cf. Anderson, 2009).

In this dissertation, identities are the positions assumed by people in their interactions with others both in moment-to-moment interaction and as accumulated over time. Identities come with particular values, beliefs, knowledge, and assumptions as well as ways of being, talking, interacting, and so on. One's identities shape one's lived experiences because they can come to dictate what kinds of social interactions take place in one's life. Additionally, lived experiences shape one's identities because how other's interact with someone over time has implications for what values, beliefs, knowledge and assumptions they develop through being, talking, interacting, and so on.

To be clear, I generally draw on the assumptions of positioning theory to describe identities, both over time and in moment-to-moment interactions. I also, however, draw on some of the other authors' conceptions of identity that were already described to empirically study other people's (and my own) identities (just as other authors draw across conceptualizations of

identity). Positioning theory underlines some authors' work summarized in the earlier subsection titled "Identities as Interactions in Particular Contexts" (e.g., Holland et al., 1998; Esmonde & Langer-Osuna, 2013). As such, focusing on particular contexts is a natural complement to a perspective that draws on positioning theory (the one used in this study). Additionally, the perspective of "Identities as d/Discourses" (e.g., Esmonde, 2009; Gee, 1996; Howard, 2006; Moschkovich, 2007) is a complementary perspective as it assumes the interactional aspects of identities. (I articulate the intersection of the conceptions or ideas more fully in each manuscript, but generally preview them in the next few sentences.) In this dissertation study, I characterize identities through d/Discourses (e.g., Gee, 1996, 1999/2005) in order to describe the patterns of knowing, communicating, and interacting that are apparent. I also attend to context, usually in the form of systems of privilege and oppression. Additionally, in Johnson (in preparation) [Chapter 4], I attend to the larger social context of novice teachers learning to teach mathematics for social justice.

In summary, this dissertation is situated in positioning theory but is informed by other theories of identity. People's identities are the positions they assume in interactions with others over time and in moment-to-moment exchanges. As people assume positions collectively and over time, systems form that serve to privilege some and oppress others at a larger level (e.g., institutionally and culturally). The following section describes why I focused on race and class, in particular, as systems of privilege and oppression in the study group as well as the reported results in this dissertation.

Focusing on the Systems of Race and Class

The content of the study group and also the research presented in this dissertation focused primarily on the systems of race and class. These systems were chosen for several reasons. First,

I chose to focus on two systems (as opposed to one system) to provide the mathematics teachers with an opportunity to unpack a multiplicity of identities. Students (like all people) are defined by more than just their race, their class, their religious affiliation, and so on. Each student is the confluence of many identities. Second, students have identities related to many systems of privilege and oppression. Providing mathematics teachers with an opportunity to consider both race and class allowed for discussions about how systems of privilege and oppression operate at a multitude of levels (e.g., personal, cultural, institutional) and in relationship to each other. Teachers can begin to understand the ways in which these systems are similar. Third, studying both race and class can provide an opportunity to consider the ways in which systems of privilege and oppression are different. For example, people's races are (for the most part) observable, while class may or may not be immediately apparent. Finally, race and class are dimensions along which schools tend to be separated from one another. Schools tend to be districted along neighborhood boundaries, which, in the United States, tend to be dominated by a particular race and class due to societal phenomenon, such as White flight to the suburbs.

The Choice of a Book Club and Locating the Antagonists

In this dissertation study, the participating teachers and I read and discussed Gutstein's (2006) book, *Reading and Writing the World with Mathematics*. In this section, I describe why I chose to facilitate a book club in addition to other decisions I made about the study group in order to provide an opportunity for the teachers to learn more about teaching mathematics for social justice. I also elaborate on the choice of presenting one conceptualization of teaching mathematics over presenting a multiplicity of ideas in the professional development, particularly with novice teachers.

Professional development can be a useful way of offering teachers an opportunity to explore teaching mathematics for social justice in all of its complexity (Bartell, 2013; Gutstein, 2006; Gates & Jorgensen (Zevenbergen), 2009; Nolan, 2009). Bartell (2013; Gau, 2005) worked with teachers in cycles of lesson study in order to deepen their understandings of teaching mathematics for social justice and Gonzalez (2008) facilitated a study group about teaching mathematics for social justice in which the teachers also co-constructed a unit plan. After consideration of these types of professional development and drawing from my own experiences as a teacher educator and professional development curriculum developer, I chose to engage teachers in a book club. This type of professional development has been used by others both inside and outside the context of mathematics education and provides teachers with an opportunity to engage in discussion about complex ideas (e.g., Clark, 2001; Flood & Lapp, 1994; Florio-Ruane, 2001; Herbel-Eisenmann, Drake, & Cirillo, 2009; Kooy, 2006; Males, Otten, & Herbel-Eisenmann, 2010; Wortham, 1995). Particularly, the use of a book club can be related to the concepts of practice-based professional development (e.g., Steele & Hillen, 2012; Wilson & Berne, 1999), if the book also includes a narrative of a classroom teachers' practice and presents student work or other artifacts from the practice of teaching.

Additionally, book clubs are one way to provide teachers with an opportunity to explore their own identities (cf. Florio-Ruane, 2001). Mathematics teachers engaging with Gutstein's (2006) *Reading and Writing the World with Mathematics* are able to explore their identities related to teaching mathematics (Johnson, in preparation [Chapter 4]) as well as their identities with respect to race and class (Johnson, in preparation [Chapter 3]). This exploration of identities may provide them with an opportunity to better understand what it means to teach mathematics

for social justice as they talk about important social issues and develop an understanding of the pedagogical practices required for teaching mathematics for social justice.

A reader might wonder about the choice to present seemingly only one way of teaching in this study group. In other words, when working with novice teachers, it might be necessary to present some of the antagonists to a teaching approach so that they are provided with an opportunity to think critically about the perspective by engaging with these antagonists. I would respond to such an inquiry about the inclusion of antagonists by describing the ways in which the antagonists are presented in Gutstein's (2006) book as well as the antagonists these particular novice teachers had already been given a chance to discuss in the context of their methods courses.

Gutstein's (2006) book indicated what some of the antagonists might say about teaching mathematics for social justice throughout his book. As one might expect, the antagonists were constantly positioned in such a way that they were used to move forward the argument for teaching mathematics for social justice. Gutstein, however, does attend to what some of the resistance might be for this pedagogical approach. This positioning still presented the alternative perspective for possible engagement for the teachers. Gutstein wrote about the nature of "mathematical literacy" and the ways in which it is currently framed. He argued that "mathematical literacy" was positioned by the National Council of Teachers of Mathematics 1989 *Standards* to serve to perpetuate the capitalistic nature of the United States. In making this argument, he articulated the *Standards'* perspective on the notion of mathematical literacy and then proceeded to describe why, for example, the *Standards'* goal of "mathematically literate workers" (as quoted in Gutstein, 2006, p. 7) is in contrast to an agenda focused on equity. In this

way, Gutstein acknowledged a potential critique of teaching mathematics for social justice and presented a kind of antagonist to the pedagogical approach.

Another place in the text that Gutstein (2006) illuminated some of the antagonists to teaching mathematics for social justice is in a section about the "Obstacles to Developing Agency" (see pages 88-90 of the text). For example, Gutstein wrote about the role of United States schools in producing compliant workers. Again, the points made in this section are in the service of moving Gutstein's argument forward and are, therefore, not a robust presentation of an antagonistic perspective. These points, though, are possibilities for teachers to argue for and against as they are contained within the text.

One other place Gutstein presented antagonists to teaching mathematics for social justice was through the voices of the students. The students' dissenting voices are seen in a few quotes, such as Rosa's critique of Gutstein, "You need to understand that not everyone agrees with you. It's like sometimes you say your beliefs out and don't let other people say theirs. You need to balance those things in order for kids to believe more" (p. 140). Also, several students wrote a chapter of the text from their own perspective (Chapter 7 of *Reading and Writing the World with Mathematics*). Although most of the text presented is in favor or support of teaching mathematics for social justice, the students did raise a few issues, such as "to this date I believe his [Gutstein's] style of teaching could spend more time on developing our mathematical skills, while simultaneously still emphasizing and fostering the sense of social justice" (p. 169). In another example, a student elaborated on the norms in other mathematics classrooms (e.g., "mathematics is usually taught through tedious repetitiveness and examples" (p. 170)), which is another way to illustrate the possible antagonists to teaching mathematics for social justice.

Here, I have described how Gutstein's (2006) book did portray a few of the antagonists to the pedagogical approach of teaching mathematics for social justice. I do acknowledge, however, that this portrayal was not sufficient elaboration of what perspectives might counter teaching mathematics for social justice and for what reasons because they are still contained within Gutstein's argument for this particular pedagogical approach. I also, therefore, describe the ways in which the book was situated in a larger context of learning about teaching mathematics for these particular novice teachers.

I was a course instructor in the methods courses the teachers in the study group had had in their final two years of their teacher preparation program. As a result, in addition to a presentation of antagonists or antagonistic ideas in the book itself, I knew the ways in which they had already had an opportunity to explore alternative ways of knowing and learning. Specifically, I knew what kinds of discussions they had had around other methods of teaching mathematics and how they positioned teaching mathematics for social justice in the context of their methods courses. In the methods courses, they were introduced to some ideas about teaching mathematics for social justice as we completed three mathematical tasks explicitly set in social justice contexts and had several other activities devoted to considering the intersection of social and political issues with mathematics teaching and learning. The set of activities about teaching mathematics for social justice, however, was a small part of a much larger sequence of courses (four semesters spent together) in which we investigated teaching and learning mathematics.

Across the methods courses, the teachers were provided with opportunities to discuss and experience the teaching and learning of mathematics through the use of high-cognitive demand tasks (Smith & Stein, 1998), the Teacher Discourse Moves (e.g., Herbel-Eisenmann, Steele, &

Cirillo, 2013), questioning frameworks (Boaler & Brodie, 2004), a procedural approach to teaching mathematics, and other ideas. The sources of materials for the courses were the National Council of Teachers of Mathematics journals (e.g., *Mathematics Teacher*) as well as narrative cases from the authors Silver, Smith, and Stein (e.g., *Improving Instruction in Algebra* (2004), *Improving Instruction in Rational Numbers* (2005)). Teaching mathematics for social justice was positioned in the class (by the other instructors and me) as an extension of a thread running through the courses about teaching diverse students. In this sequence of activities, we read articles about teaching mathematics for a democratic society (Ball, Goffney, & Bass, 2005), instructional methods for English language learners (Lee & Jung, 2004), a consideration of instructionally relevant variation (Tom Bird, personal communication, 2010),[6] and teaching mathematics across the curriculum (Peterson, 2006). We also engaged in discussions about curriculum and instruction adaptation. This set of activities and discussions positioned teaching mathematics for social justice as another way of engaging students in mathematics classrooms and reaching more students in diverse contexts. As a result, many of the prospective teachers, over the number of activities, repeatedly raised concerns and questions about the use of mathematical tasks situated on social issues. For example, one of the participants who ultimately voluntarily participated in the study group in this dissertation voiced concerns that these kinds of mathematical tasks were not appropriate for mathematics classrooms because they veered into discussions that did not meet mathematical goals. In this way, many of the views of antagonists to teaching mathematics for social justice had been expressed in the methods courses.

In this section, I have elaborated on the reasons for choosing a book club and study group as a pedagogical tool for mathematics teacher education about teaching mathematics for social

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[6] This is a short, unpublished piece of writing Tom Bird shared with me for use with prospective and practicing teachers.

justice. Additionally, I have described how antagonists were presented both in the text and through the teachers' prior discussions in their coursework in order to provide the teachers with an opportunity to grapple with the pedagogical approach of teaching mathematics for social justice. I include this background information in order to situate the study group in which the dissertation study data was collected as well as provide additional context that extends beyond what is possible to write in the limited space of a manuscript.

Description of Participants and Data Collection

In order to provide an overview of the full dissertation study, in this section, I present a description of the teachers in the study group as well as the data collected over the duration of the study. This section is more detailed than I am able to present in the full manuscripts due to the space limitations and nature of manuscripts. This overview of the project is useful to providing the full context for this dissertation so that the reader may have a good sense of the range of data available for analysis and more detail about the participants in the study.

The context for this dissertation was a study group about teaching mathematics for social justice with three first-year high school mathematics teachers. All three teachers completed the same teacher preparation program in the year before this study group. I had been one of the course instructors in their mathematics methods courses over the two years prior to the study group. They, and a few other teachers who declined, were invited to participate in a study group about teaching mathematics for social justice. The teachers in this study group were Chloe Ames, Luke Fisher, and Josh Wolfe.[7] Chloe and Luke were both teaching at Hamlet High School, an urban high school in a Midwestern city. Josh was teaching at Walnut Knoll High School in a suburban district outside another Midwestern city.

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[7] The names of teachers, schools, and towns are pseudonyms.

Chloe Ames was a White, middle-class woman. She was raised in a suburban district near the urban district she was teaching, which often came up in the context of her classroom. Chloe would describe the assumptions her students would make about her experiences (e.g., that she was from a White, middle-to-upper-class suburb and, therefore, must have been wealthy or privileged in other ways). Chloe described her core beliefs about mathematics, teaching, and students to be 1) all students are capable of learning mathematics, 2) mathematics can give meaning to the world and be used to explain reasoning and prove a point, and 3) patience is needed because sometimes the kids will push you to the edge. She often spoke about trying out mathematical tasks that included a social justice emphasis in her classes and had become acquainted with the idea of teaching mathematics for social justice early in her course requirements in her teacher preparation program. She was very interested in incorporating these tasks in her classes.

Luke Fisher was a White, middle-class Christian man. He described his core beliefs about mathematics, teaching, and students to be 1) mathematics is not memorization but instead is about conceptual learning, 2) students who have not been successful in mathematics need to experience success, and 3) student thinking is the most valuable resource that a teacher has. Luke often spoke about his responsibilities and role as a brother to his two sisters. He would talk about their accomplishments and conveyed stories about when he helped them in different situations. Luke also mentioned early in the first interview that his parents divorced when he was in middle school. Luke's Christian faith was really important to him, which he described when directly asked about his conception of himself. He also made contributions in the study group about Biblical teachings he thought were relevant to the concepts we were discussing. Luke developed some mathematical tasks with social justice contexts and used them in his teaching.

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Josh Wolfe was a White, middle-class Christian man. He described his core beliefs about teaching, mathematics, and students to be that 1) all students are capable of learning mathematics, 2) it is important to teach mathematics using tasks of high-cognitive demand, and 3) it is important for students to have a solid foundation in mathematics to build on. Josh had shown the most resistance to teaching mathematics for social justice in the methods courses in the years before the study group began, but he was eager to participate in the study group. As he was the only teacher in his school that had completed the same teacher preparation program, he often talked about how he enjoyed the study group for the camaraderie with his peers. He became more interested in teaching mathematics for social justice across the study group and asked Chloe and I for different tasks to try in his classroom.

The data collection for this dissertation had three main phases. First, each teacher participated in a one-on-one interview prior to any study group sessions. Second, we met together for four study group sessions. Finally, after all of the study group sessions were completed, I interviewed each teacher one-on-one again. All of the discussions in the interviews and study group sessions were recorded using an audio recorder. Each phase of the data collection is explained here.

I used the same protocol for each interview conducted prior to the study group. Some of the questions were sent to the teachers ahead of time. They were asked to spend no more than a half hour reading through those questions and jotting down some notes. During the interview itself, the teachers were asked questions in three different categories (some of the questions in this interview were taken or adapted from Gonzalez (2008)). The questions on this protocol can be found in Appendix A. First, the teachers were asked five questions related to their identities. Specifically, they were asked about 1) the experiences that led them to be a mathematics teacher,

2) their core beliefs about teaching, mathematics, and students, 3) significant experiences with social or political issues, 4) the insights or passions that led them to participate in the study group, and 5) the ways in which their understanding of who they are as a people influenced their work as teachers.

The second category of questions in the pre-interview was about social justice teaching. The teachers were asked five questions in this category. They were asked to 1) define mathematics, 2) describe what learning and teaching mathematics means, 3) discuss how one might incorporate social or political issues in teaching mathematics, 4) describe the benefits and drawbacks to incorporating social or political issues in the teaching of mathematics, and 5) elaborate on whether or not they were teaching their mathematics classes with any social or political contexts. In the final section of the pre-interview, the teachers were asked two more questions about their identities. Specifically, they were asked to characterize their racial identity and their socioeconomic upbringing and then asked to elaborate on whether or not they felt their racial identity and socioeconomic upbringing plays a role in their mathematics teaching and the reasoning for their answers.

The study group described in this dissertation met four times over seven weeks. Each session was two hours long and included a variety of activities. Every session included time to discuss a section of the book *Reading and Writing the World with Mathematics* (Gutstein, 2006). During this part of the study group, the teachers and I spoke about what we noticed or wondered about the text as we had read prior to the meeting. The teachers, having been in the methods courses together previously, were accustomed to a norm of "noticing" and "wondering" as a way of encouraging non-evaluative discussion of other teachers' practices. The purpose of these book

club discussions was to unpack and understand Gutstein's practices that were represented in the text in order to better understand one teacher's work in teaching mathematics for social justice.

In addition to the book club discussions, each session included some time for the teachers to discuss their upcoming work in classrooms. Although more time had been scheduled for this kind of activity, these discussions were short (the longest one in the four sessions was approximately twenty minutes). This time in the study group was most often used for one or more teachers to state that they had an upcoming task that they were working on to include a social justice or political context and resources were exchanged.

The remainder of each study group session included discussions about aspects of privilege and oppression and/or personal identity. One exception to this was the first study group meeting in which we also looked at a news article (Luhby, 2012) to determine the kind of mathematics tasks that might be developed from its contents. We discussed the kinds of mathematical goals and social justice goals that might be developed from the news article's discussion of race and wealth in the United States. During the first session, we also had a discussion around an artifact we each produced about ourselves. Specifically, each of us took time to reflect on the following categories: 1) Five self-identities that are important to me, 2) Insights, experiences, and strengths I bring to this seminar, 3) What I need to do my best work here, 4) Something surprising or outrageous about me (Melanie Morrison, personal communication, July 10, 2012). Then, we each shared what we were comfortable with from each of the categories.

In the second session, in conjunction with the book club discussions, we focused on examining class privilege in the United States. We did this through two different discussions. In the first discussion, we examined two pictures of a girl (Pittelman & Resource Generation,

2010). One picture had labeled observable characteristics, such as "great smile," "polite," and impressive degree," while the other picture had labeled the possible experiences/privileges that could be linked to the observed characteristics, such as "expensive dental work," "taught upper-class manners," and "family legacy aided admission to exclusive school" (Pittelman & Resource Generation, 2010, p. 221-222). We also watched a video about the inequitable wealth distribution in the United States (politizane, 2012) which used histograms and other pictorial representations to illuminate the distinction between a fair or expected distribution of the country's wealth and the actual distribution of the country's wealth. The inequitable distribution is elaborated on through the content of the video.

In the third session, we discussed lists of privileges and marginalizations with respect to race (McIntosh, 2011) and class (Scalzi, 2005), respectively. For example, the list of White privilege highlighted privileges, such as "I can go shopping alone most of the time, pretty well assured that I will not be followed or harassed" and "I can do well in a challenging situation without being called a credit to my race" (McIntosh, 2011, p. 122-123). In contrast, the list of marginalizations included statements, such as "Being poor is hoping the toothache goes away," "Being poor is having to live with choices you didn't know you made when you were 14 years old," and "Being poor is getting tired of people wanting you to be grateful" (Scalzi, 2005, p. 1-2). In the fourth study group session, we discussed our respective identities in comparison to a list of privileging/oppressing systems. In particular, each of us identified our self as either target or non-target with respect to race, class, age, ability, English-speaking and so on (Visions, Inc., n.d.). We then had a discussion about our characterizations of ourselves and what implications we felt these identifications had for us, individually and collectively.

At the conclusion of the study group sessions, I interviewed each of the teachers individually again. These interviews had some common sections, but also had a section of clarifications and probings in which I asked each teacher different follow-up questions to what each had said in the study group or the pre-interview. This interview had four categories of questions. The full protocols for each teacher can be found in Appendix B (Chloe Ames), Appendix C (Luke Fisher), and Appendix D (Josh Wolfe). The first category consisted of two questions about identity. Each teacher was asked to reflect on the five identities they listed in the first study group session as being important to them and discuss if they would change what they had listed or not. Additionally, each teacher was asked to pick one or two of those identities to talk about how the identity influenced their participation in the study group.

The second category of questions included three or four questions specific to each teacher to better understand things they had said earlier. These questions were in the form, "In session X, you mentioned (or said) _____. Can you tell me a little bit more about what you meant by <some aspect of that contribution>?" These questions were generated after reviewing the field notes for the study group sessions as well as reviewing my initial reactions to the pre-interviews. The third category was mathematics teaching and had only one question in which each teacher was asked to describe why it is important to teach mathematics in school. The final category of questions was reflecting on the study group itself. Specifically, each teacher was asked 1) about how their perception of incorporating social or political issues in their math classes changed, 2) to describe which activities or discussions in the study group were most critical to developing their understanding and perception of teaching mathematics for social justice, 3) whether or not they would continue teaching mathematics for social justice in their classrooms, and 4) how my role in the study group influenced or did not influence their participation.

In summary, there were three phases of data collection: 1) the individual pre-interview, 2) the four two-hour study group sessions, and 3) the individual post-interview. The study group sessions included discussions about the book *Reading and Writing the World with Mathematics* (Gutstein, 2006) as well as other discussions about personal identity and systems of privilege and oppression.

The ability to reflect, to evaluate, to program, to investigate, and to transform is unique to human beings in the world and with the world. Life becomes existence and life support becomes world when the conscience about the world, which also implies conscience of the self, emerges and establishes a dialectical relationship with the world. (Freire, 1997/2007, p. 34)

CHAPTER 2: ATTENDING TO MATHEMATICS TEACHER EDUCATOR

POSITIONALITY: A HEURISTIC

Many scholars have argued that it is important for researchers to be explicit about their positionality, or who they are, in their research so that they are explicit about how their identities shape their work (e.g., Ellis & Bochner, 2000; Fine, Weis, Weseen, & Wong, 2000; Foote & Bartell, 2011; Peshkin, 1988; St. Louis & Calabrese Barton, 2002; Wolcott, 1992). Here I assert that it is also important for mathematics teacher educators to uncover their own positionality in order to illuminate the ways in which identities color, transform, muddle, and shape interactions with mathematics teachers. That is, whether or not a mathematics teacher educator is aware of it or not, what one values, believes, assumes, and knows influences how one interacts with mathematics teachers, which in turn impacts the opportunities for learning and development one can provide to mathematics teachers. By "uncovering one's own positionality," I mean increasing one's own awareness about what these values, beliefs, assumptions, and knowledge are, which in turn can provide an opportunity to (re)evaluate and (re)form these values, beliefs, assumptions, and knowledge in ways that best support the mathematics teachers with whom one works. This paper addresses how to increase attention to one's own positionality in the work of mathematics teacher education by offering a heuristic that illuminates the values, beliefs, knowledge, and assumptions that are associated with one's positionality.

It is true that all teacher educators (regardless of content area or age level) can benefit from examining their own positionality. This paper is particularly relevant to *mathematics*

teacher educators for two reasons. First, mathematics is often seen as culturally neutral or devoid of values, morals, and beliefs (conceptions associated with positionality) (Gutstein & Peterson, 2006); however, mathematics, and the people who use mathematics, are influenced by cultures and communicate values, morals, and beliefs (e.g., Brantlinger, 2007; Borden, 2011; Gutiérrez, 2002; Gutstein, 2006). The second reason this paper is particularly relevant in the context of mathematics teacher education is that mathematics teacher educators have identities they bring to their practice. Mathematics teacher educators are people too (cf. Herbel-Eisenmann, 2010). Although this point is true for all teacher educators, it is important in the context of mathematics teacher education because it is easy to extend the trap of the neutrality of mathematics to mathematics education and mathematics teacher education. This trap can perpetuate the idea that identities are irrelevant in the discipline of mathematics or considering the teaching and learning of mathematics, which is a false claim (e.g., Battey, 2013; Gutiérrez, 2002). This paper shows how identities can influence the work of mathematics teacher educators.

Positionality

One's positionality is defined by both one's identities (e.g., race, class, gender, religion, age) in conjunction with context (e.g., social, cultural, political). Understanding one's own positionality requires illuminating one's values, beliefs, knowledge, assumptions and, fundamentally, what one's identities are and examining them with respect to the larger and smaller contexts in which one acts. Values, beliefs, knowledge, assumptions and identities are related to life experiences as well as to various social, cultural and political factors (St. Louis & Calabrese Barton, 2002). For example, the cultural context in which one is raised in childhood can shape the life experiences one has as well as the values, beliefs, knowledge, assumptions, and identities a person has. That is, one could be raised in a Jewish neighborhood in New York

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City which would lead to particular values, beliefs, knowledge, assumptions, and identities through interactions with others (e.g., life experiences).

A person's positionality, or who one is in a particular context, will "filter, skew, shape, block, construe, and misconstrue" (Peshkin, 1988, p. 17) his or her interactions with others. In other words, a mathematics teacher educator's positionality influences interactions with teachers whether or not one is aware of one's own positionality. Teaching provides many contexts in which to act on beliefs, assumptions, knowledge, and identities that are held by the teacher and, specifically, a mathematics teacher educator. These conceptions, in turn, shape how a teacher educator interprets working with teachers, including what decisions one makes about what learning opportunities to plan for, how to shape teacher learning in the moment, and what to include or not include in a discussion of teaching and learning mathematics.

The majority of this paper explores positionality in the context of mathematics teacher education. In addition, I use two examples from mathematics education, more broadly, to illuminate what I mean by the ways in which one's identities can influence the practice of teaching. First, Borden (2011) discussed her own experiences teaching in a Mi'kmaw community school in Cape Breton, Nova Scotia, in which the indigenous language of her students was verb-based. Borden herself is not Mi'kmaw and periodically her students would say to her, "Miss, you're talking crazy talk again!" (p. 8) because she spoke about mathematics based on the ways in which she herself learned it. Borden stated, "My reflections on the grammatical patterns used in my own classroom have led to me believe that 'talking crazy talk' often meant that I was using too many nouns" (p. 12). That is, her positionality as an outsider to the Mi'kmaw community led her to have assumptions, beliefs, and ways of communicating that were different from what was understood by her students. For her, illuminating these differences helped to shed light on the

ways in which she could modify her language to talk about mathematical ideas in ways that would resonate with her students.

Second, Fennema, Franke, Carpenter, and Carey (1993) shared the story of one teacher across four years of elementary school mathematics instruction in the context of the Cognitively Guided Instruction (CGI) project. Specifically, the researchers observed Ms. J and conducted interviews with her such that they had information about Ms. J's beliefs and practices before, during, and after her contact with the CGI professional development experience. In an interview at the end of her first year teaching CGI, the teacher stated, in part, "One day we were sitting in class...and one kid said, 'Five times 5 is 25, take away 20 is 5,' and my mouth dropped open and I said, 'Oh, they are ready for multiplication.'" (Fennema, Franke, Carpenter, & Carey, 1993, p. 564). Her use of "my mouth dropped open" illuminated how she came to better understand that her assumption that her students were not ready for multiplication was challenged in that moment. That is, her positionality as a teacher for the twelve years prior to the CGI study, in conjunction with her own experiences in schooling, led her to assume that her students would not be able to do multiplication at their young age. For her, this new revelation informed her subsequent instructional decisions as she sought to "find out which kids were ready for it [multiplication]" (Fennema et al., 1993, p. 564) and went on to incorporate problems that required multiplication to solve.

In these examples, the mathematics teachers' beliefs or assumptions are illuminated and are informed by their identities and experiences. It is likely easier to identify others' positionalities because it is possible to see how other people's values, beliefs, knowledge, assumptions, and identities are shaping what they do and say. It is harder to examine one's self to see the same ideas, yet mathematics teachers educators encourage mathematics teachers to do

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that kind of self reflection. Just like mathematics teachers, teacher educators bring values, beliefs, knowledge, assumptions, and identities to the practice of teacher education. How might it be possible to illuminate mathematics teacher educator positionality?

In this paper, I present a heuristic for attending to positionality as mathematics teacher educators. I detail three pairs of questions that teacher educators can use to interrogate their interactions with others in order to illuminate beliefs, knowledge, conceptions, assumptions, and identities that are influencing their teacher education practice. Additionally, I elaborate on the ways in which these questions have revealed aspects of my own positionality in my work with mathematics teachers, particularly in the context of a study group about teaching mathematics for social justice. I use examples from my own work as a mathematics teacher educator to show the range of awareness of my positionality that the heuristic provided so that others may see the ways in which it could be used in the practice of mathematics teacher education. Increasing awareness provides an opportunity for a mathematics teacher educator to understand the ways in which beliefs, assumptions, knowledge, and identities are influencing the work of mathematics teacher education.

The Mathematics Teacher Educator Positionality Heuristic

The following questions can be used to attend to positionality with respect to one's practice as a mathematics teacher educator. Each question is meant to prompt reflection on specific instances of interactions in mathematics teacher education concomitant with all of the individual situational contexts and people involved. What these questions afford is an opportunity for mathematics teacher educators to highlight the moments that are particularly salient in illuminating beliefs, assumptions, knowledge and identities (or one's positionality). I call this set of questions a *heuristic* because I see these questions as a means of approaching the

complicated task of identifying one's own positionality.[8] It should be noted that the words in quotes within the questions come from other authors and have a specified meaning. These definitions will be further explained in the following section.

- What is the discussion/moment that stands out to me the most about today's interactions between myself and the mathematics teachers with whom I work? For what reason(s) is this discussion/moment salient?

- When I am interacting with mathematics teachers, what do they say or do that "disturbs" (Wheatley, 2007) me? What does this tell me about what I believe, assume, or know to be true?

- Considering the mathematics teachers I am working with, what "sticks" (Anderson, 2009) with me about who they are collectively, as individuals, and as mathematics teachers as we have worked together over time? Why are these the ideas that stick with me and how do they shape our continued interactions?

This set of questions is meant to be used collectively to consider one's practice as mathematics teacher educators. Considered as a set, the questions have the capacity to illuminate different aspects of one's own positionality. I describe the range of insights from the use of the questions as a set in a later section of this paper (What Does the Heuristic Reveal About Mathematics Teacher Educator Positionality?).

Developing the Heuristic

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[8] Readers might wish to understand why the set of questions is not considered a *tool*. I draw on Brown's (2009) conception that tools are used to achieve particular well-defined goals. In particular, the success or failure of a tool is easy to assess as the progress towards a well-defined goal is easy to measure. Alternatively, I argue that heuristics are used to achieve ill-defined goals (Spiro & DeSchryver, 2009). The success or failure of a heuristic cannot be assessed as a measured outcome and instead is determined by the ways in which it facilitates a process towards a less specified goal.

In this section, I further elaborate the questions in the heuristic and illustrate the ways in which the heuristic has the capacity to illuminate the beliefs, conceptions, knowledge, assumptions, and identities that might be associated with positionality. Specifically, I ground the specific elements of the heuristic in research (both inside and outside educational research) and provide specific examples of what the questions might uncover by referring to my own practice as a mathematics teacher educator.

What is the discussion/moment that stands out to me the most about today's interactions between myself and the mathematics teachers with whom I work? For what reason(s) is this discussion/moment salient?

Perhaps the first question here is a common way to reflect on interactions as a mathematics teacher educator, but it is often considered with respect to what the mathematics teachers *learned* in any given professional development context or course. Here the intent is to be broader than focusing only on what the mathematics teachers may have learned. These questions, in fact, can help to illuminate the reasons why a mathematics teacher educator provided a group of teachers the opportunity to learn those particular ideas or might illuminate particular aspects of their contributions to discussions. For example, it may stand out to me that the mathematics teachers I am working with are talking about their students using labels, such as "low kids" and "high kids" or they might be approaching their methods class with the stance of a student as opposed to with the mindset of a professional who will be a teacher. Increasing awareness of these kinds of discussions is related to a mathematics teacher educators' positionality because the experiences and learning opportunities that they plan for (or improvise) are reflective of their own assumptions, beliefs, and knowledge about what is most important for teachers to learn.

The kinds of moments that stand out in an interaction between mathematics teachers and mathematics teacher educators might be one of several kinds. Both "great stories" and "bad stories" are the stories that people (e.g., teachers, researchers) tell that represent a small portion of a population or unique characteristics about a small group of people as if that story is 'true' about the larger population (Fine, Weis, Weseen, & Wong, 2000, p. 116-118). These stories almost become sensationalized and can come to be the way in which that population is defined, despite the initial characterization of an anomaly. Additionally, these stories might define experiences (not people) and, therefore, become a way of characterizing events. These kinds of stories might be the ones that would be most salient in an interaction with mathematics teachers.

Reflecting on the second question (i.e., for what reason(s) is the discussion/moment salient) is what increases awareness about one's positionality. For example, I might reflect on a class session in my methods class with prospective mathematics teachers in which we discussed the answers to the question, "Is mathematics a language?" This discussion was the most salient of the day to me because it helped to illuminate the varying perspectives we had in class. That is, it was a "great" story because it created a defining characterization of that group of teachers. The prospective teachers had strong opinions about the "correct" answer to this question and the class was equally divided about the answer being "yes" or "no." One teacher, in particular, had such a strong opinion about the answer to the question that he challenged me on whether or not it was a part of my lesson plan. Ultimately, he tweeted the professor who had taught the previous semester of the methods course to ask for assistance in clarifying the "correct" answer. My own positionality as someone who is not convinced there is *one* way to answer this question led me to provide the teachers with an opportunity to see the ways in which their answer to this question related to the way they thought about their practice as mathematics teachers.

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The other questions in the heuristic could be seen as subsets of this first pair of questions; however, they are included because of the specificity they bring to an analysis of an interaction with mathematics teachers. It might be easy to answer this first question pair alone without really exposing one's own positionality. In contrast, the following pairs help to illuminate particular aspects of a mathematics teacher educator's interactions with teachers that provide deeper and more robust insight into positionality.

When I am interacting with mathematics teachers, what do they say or do that "disturbs" (Wheatley, 2007) me? What does this tell me about what I believe, assume, or know to be true?

This pair of questions developed directly out of a chapter in *Finding Our Way: Leadership for an Uncertain Time* (Wheatley, 2007) called "Willing to Be Disturbed."[9] Wheatley (2007) described that people seek out certainty and prefer jumping to quick decisions despite the idea that, over time, approaching interactions with others in this way can be disorganized. She stated, "In a changing world, certainty doesn't give us stability; it actually creates more chaos" (Wheatley, 2007, p. 211). That is, as long as people feel that they are able to explain their life experiences with "certainty," they are able to feel stability. Furthermore, Wheatley elaborated on how having a mindset of "willingness to be disturbed" (p. 213) can illuminate beliefs and assumptions. A person who listens actively for viewpoints that are different, she argued, can then consider the implications of those beliefs and assumptions for

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[9] Beth Herbel-Eisenmann introduced me to this text and I have found it particularly useful in considering interactions with others, more generally (in addition to using it in my work with mathematics teachers). Specifically, Dr. Herbel-Eisenmann gave it to me as a lens through which to consider my work as a researcher and I found it to be a helpful and clear articulation of the kind of stance needed to do educational research. Additionally, I think it is a useful lens through which to view interactions with others as it increases my attention to how my positionality shapes my interactions with people around me.

understanding one's own beliefs and assumptions. Specifically, Wheatley described the act of listening for what is disturbing, as follows:

> Noticing what surprises and disturbs me has been a very useful way to see invisible beliefs. ... If what you say disturbs me, I must believe something contrary to you. My shock at your position exposes my own position. When I hear myself saying, "How could anyone believe something like that?" a light comes on for me to see my own beliefs. These moments are great gifts. If I can see my beliefs and assumptions, I can decide whether I still value them. (p. 212)

That is, one's own reaction to someone else's words or actions can illuminate one's own beliefs and assumptions, which in turn can provide an opportunity to evaluate those beliefs or assumptions.

Identifying what disturbs me, then, is about listening carefully to the mathematics teachers I work with and considering my reactions to what they say and do. Beyond what I might find surprising about the mathematics teachers' words or actions, being disturbed is about looking for a reaction I have that is visceral or emotional to what has been said or done. For example, I have often heard mathematics teachers say to students, "If you can't behave yourself, then we aren't going to be able to use the manipulatives in this lesson." I am disturbed, bothered or angered when I hear this because I think a teacher might as well be saying, "If you can't behave yourself, then I am going to rob you of a rich opportunity to learn important mathematical ideas." Being disturbed in this moment reveals something important about what I believe to be the utility of manipulatives in mathematics classrooms. Specifically, I believe that, when used appropriately, manipulatives can provide students with opportunities to develop deep conceptual understandings about mathematical ideas. Calling attention to what disturbs me in

this moment gives me a chance to uncover one of my beliefs about mathematics teaching and learning. Knowing that I believe that students can use manipulatives to make sense of problems and develop conceptual understandings necessarily influences the learning opportunities I provide mathematics teachers when we work on using manipulatives in their classrooms. ***Considering the mathematics teachers I am working with, what "sticks" (Anderson, 2009) with me about who they are collectively, as individuals, and as mathematics teachers as we have worked together over time? Why are these the ideas that stick with me and how do they shape our continued interactions?***

When considering these questions, a mathematics teacher educator becomes aware of aspects of mathematics teachers' identities they are focusing on and considers the ways in which these identities are important for preparing future learning opportunities. The conception of identity illuminated here draws from positioning theory (Harré & van Langenhove, 1991; Harré & Moghaddam, 2003; Harré, 1984). People's words and actions shape social structures (Wagner & Herbel-Eisenmann, 2009) and, repeated over time, people begin to develop a sense of identity (Anderson, 2009). These words and actions might communicate identities implicitly or explicitly. Consider the example given by Anderson (2009) on the relationship between an action and spoken words in communicating an identity:

> Somewhere between one action being deemed "failure" and a person being called "*a* failure" lies a discursive process that brings named acts of failing close enough to rub up against the sense of a person as *a* failure—close enough that it sticks. (Anderson, 2009, p. 292)

That is, actions and words repeated over time have the capacity to become a way of identifying someone. It is just as important for mathematics teacher educators to reflect on what sticks with

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them about the mathematics teachers they work with as it is for mathematics teachers to be aware

of how they perceive who their students are (e.g., Ladson-Billings, 2009; Delpit, 1995, 2003,

2006; Delpit & Dowdy, 2002). What sticks about who the mathematics teachers are has

important implications for their status in the professional development or mathematics teacher

education coursework (Featherstone, Crespo, Jilk, Oslund, Parks, & Wood, 2011). Furthermore,

this information can be used to determine what learning opportunities would be important next

steps.

For example, Johnson (in preparation) [Chapter 4] describes the ways in which first-year

teachers learn about becoming critical mathematics teachers who engage students in particular

kinds of mathematical tasks. As such, it is important for the mathematics teachers to see

themselves as a critical mathematics teacher and the mathematics teacher educator must also see

these teachers with the capacity to become this kind of teacher. If a mathematics teacher educator

reflects on a set of professional development sessions (or course meetings) and discovers that

one of the mathematics teachers in the group is resistant to the ideas, the mathematics teacher

educator can use this information about what has stuck about this teacher to shape the trajectory

of sessions. In particular, it might stick with the mathematics teacher educator that the teachers

do not see teaching mathematics for social justice as relevant for *their* students. The mathematics

teacher educator might next provide an opportunity for the mathematics teacher to see, from

other students' perspectives, the value of teaching mathematics in this particular way.

Context for the Use of the Heuristic

I used this heuristic to reflect on the work I did in preparation for, during, and after the

conclusion of a study group with teachers about teaching mathematics for social justice. I took

notes on my reflections during the initial conceptualization of the project and throughout the

various phases of the project. In the examples that follow, I illuminate the range of possible insights into positionality that the heuristic might provide by sharing my analysis of my reflections. In order to provide better access to these examples for the reader, I provide some necessary information about the context of the project.

Me

In this section, I elaborate on aspects of myself in two ways. I first provide a short set of statements about the identities I have found to be particularly relevant to my interactions with others, more generally. This part is necessarily brief but serves to illuminate some of my identities to lay the foundation on which the narratives shared about myself in the rest of the article are built. Specifically, my identities will be illuminated in the remainder of the paper as I discuss the heuristic. This section, then, begins the story about who I am and is elaborated in the rest of the article. The second way I elaborate on aspects of myself is by detailing one example from my own experience that helped me to see the importance of considering positionality as a mathematics teacher educator. This example illuminates how beliefs and assumptions can shape a person's view of the world.

Identities. I am White. I am a woman. I am a member of The Church of Jesus Christ of Latter-day Saints. I am middle-class. I am Hearing. I am a Navy kid. I am an only child. I am heterosexual. I am an ally. I am a mathematics teacher educator. I am a mathematics teacher. I am a Ph.D. candidate. I am a friend. I write my identities this way because separating them shows that each one comes with its own set of beliefs, assumptions, knowledge, and ways of communicating and interacting that I negotiate in every context in which I find myself. Sometimes, a few are more relevant than others; other times more of them are relevant. They are always a part of who I am, influencing my interactions with others in explicit and implicit ways.

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Unfortunately, listing them in such a categorical way can obscure the experiences, beliefs, assumptions, and so on that underlie them. Some identification of my identities is critical, however, to establishing the additional context of the mathematics teacher education work elaborated here.

      Illuminating the importance of positionality, an experience. A few years before I met with the teachers in the study group discussed here, I attended a seminar retreat with colleagues entitled "Understanding Privilege and Oppression" in which we engaged in discussions about three systems of privilege and oppression: racism, sexism, and heterosexism.[10] The seminar provided an opportunity to reflect on our own place in these systems, investigate the role these systems of privilege and oppression play in people's lived experiences, and consider some ways in which we might seek to disrupt the perpetuation of the status quo (particularly with respect to these three systems). At the conclusion of the seminar, we were asked to share something that we learned with the group. As the workshop was held in a house in a wooded location near a river, I described how I had seen a deer swimming across the river the day before saying, "I never knew that deer could swim." Although it was originally meant as a new and very literal observation, it served as a metaphor for what had taken place throughout the weekend. I increased my understanding of racism, sexism, and heterosexism by seeing things I had never seen before about the inequities perpetuated by these systems and the real ways in which they affect people's lives. Had you asked me before this retreat if deer could swim, I would have responded, "What?!? No!! Uh, maybe. I don't really know." Similarly, for example, I came to better understand the ways in which my White privilege shaped the way I interacted with people of

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[10] This seminar retreat spanned two weekends and was led by individuals from the organization Allies for Change (http://www.alliesforchange.org/) and is the same seminar referenced in Chapter 1.

other races and the ways in which I could become an ally who actively worked to dismantle systems of privilege and oppression that serve to unjustly benefit some and marginalize others.

This experience helped to teach me that just because something is invisible to me does not mean that it is not a part of someone's lived experiences. Additionally, seeing that which was once invisible to me can provide me with an opportunity to develop and grow as I (re)evaluate those things that I thought were true. This experience is relevant to my practice as a mathematics teacher educator because it helped me to see how my own positionality constrains my understanding of the world around me, which, in turn, shapes the learning opportunities I consider when I work with teachers.

Context and Other Participants

I draw, primarily, from my experiences preparing for and working with teachers in a study group to provide evidence of how this heuristic can illuminate different aspects of positionality. Therefore, I briefly describe the study group content and the mathematics teachers I worked with in order to provide a context for understanding the subsequent examples.

I planned for, facilitated, and participated in a study group about teaching mathematics for social justice with three first-year secondary mathematics teachers. The group met four times over seven weeks for two-hour sessions. Primarily, we read and discussed *Reading and Writing the World with Mathematics* (Gutstein, 2006) in an effort to make sense of someone else's endeavor to teach mathematics for social justice. Additionally, we examined our own racial privilege and class privilege in order to increase awareness of the ways these systems of privilege and oppression play a role in teaching practice. These activities included watching and discussing a video on the inequitable distribution of wealth in America (politizane, 2012) and

examining lists of privileges and marginalizations associated with race (McIntosh, 2011) and class (Scalzi, 2005), respectively.

I knew all of the teachers for two and a half years, having been one of their course instructors in the last two years of their teacher preparation program. Chloe Ames and Luke Fisher were both teaching in the same urban high school, while Josh Wolfe was teaching in a high school outside another urban area. Chloe Ames described herself as a White, middle-class, woman who decided to become a mathematics teacher after finding herself disappointed that she had placed out of mathematics classes in college due to her Advanced Placement credits. Luke Fisher described himself as a White, middle-class Christian man who emphasized his role as a brother and who decided to become a mathematics teacher after excelling in mathematics in high school and taking the entry level course in the College of Education. Josh Wolfe described himself as a White, middle-class Christian man who became a mathematics teacher after discovering in college calculus that he seemed to be good at the subject whereas others struggled.

What Does the Heuristic Reveal About Mathematics Teacher Educator Positionality?

The heuristic can provide important insight about mathematics teacher educator positionality and, from my own experiences, can illuminate a number of different types of insights, each of which has direct implications for one's ability to support mathematics teacher development. A range of insights is elaborated on here. Specifically, I highlight how the heuristic: a) provided an increased understanding of who (and what) had status and authority in the study group described above, b) helped me to refine my own beliefs, and c) revealed an assumption I made in the study group. For each category, I describe the nature of the insight and the implications of the increased awareness for my practice as a mathematics teacher educator. For some of the insights, the example presented is finished and I am able to draw conclusions

about how the insight was of value. For one of the insights, however, I elaborate on the ways in which it will continue to influence my practice as the insight did not take place until the final interview with one teacher after the conclusion of the study group sessions.

Raising Awareness about Status and Authority

In this section, I describe the ways in which the heuristic increased my awareness about the dynamics in the study group, particularly with respect to who, and what ideas, had status and authority. Particularly, I discuss how the heuristic helped to illuminate how my status as an authority on mathematics teaching and learning shaped our interactions and also how high cognitive demand tasks (Smith & Stein, 1998) had implied status that interrupted the planned-for work of the study group.

As indicated before, I knew all of the mathematics teachers in this study group for the two years prior to their participation in the study group. I had been one of their course instructors across their two years (four semesters) of secondary mathematics methods coursework in their teacher preparation program. I worked collaboratively as an assistant to a professor for three of the semesters, but in the second course in the sequence, I was the lead instructor. I took the lead in the micro-teaching experience part of the course during the first semester.

Reflecting using the questions of the heuristic helped me to see how issues of status and authority from the context of the methods course carried over into the study group. In the beginning, I tried to plan the ways in which I used language to be sure to include the mathematics teachers as co-participants *with* me, more than just participants, or even students, of mine. This was complicated given our history together. Before the study group sessions, I wrote in my journal:

I plan to remember that we have an already established relationship but to really pursue the study group with an open mind about getting to know who my students are. Additionally, I plan to be attentive to the ways in which I am directing the group and how they are being positioned. I was careful to write the email about the first study group session with the idea that we'd be all sharing ideas together. I am already beginning to wonder how to make sure it is clear that they are the facilitators of the second hour in particular, but play a huge role in what it is that we end up discussing about the book.

That is, I wanted to be purposeful in constructing a study group environment that did not carry over the same authority structure as the typical methods class. Reflecting across the study group sessions with the heuristic, a more equitable distribution of authority did not always play out the way I intended. I saw this inequity even as the study group sessions were unfolding but I had difficulty interrupting it, likely because of my own positionality with respect to the study group and its members.

The "second hour" that I reference in this journal referred to the time in the session that I had planned for us to talk about the tasks that they were using in their mathematics classrooms. This activity did not really happen in most sessions because we spent more time talking about other topics and the teachers often did not seem to want to talk about the work in their mathematics classrooms separately from our other discussions. They often brought up their classroom experiences while we discussed the book and other identity activities, but they resisted separating the discussions. Considering the questions on the heuristic, I came to discover a discussion in the final study group session revealed a possible reason for the resistance.

In the methods courses, we talked about the use of tasks of high-cognitive demand as an important tool for teaching mathematics deeply. These discussions in the methods course

elevated the status of these kinds of mathematical tasks and it ended up having implications for the study group. Although I did not intend to be seen this way, I was seen as someone who required teaching mathematics with the use of high-cognitive demand tasks every day. I began to see that this conception of who I am is something that had stuck with the teachers. I became aware of this perception when I asked Luke in the last study group session if there was any lesson that was upcoming for him that he wanted to discuss. He stated:

> I have a confession to make. Forgive me, Kate, for I have sinned. The next unit will be a lot of "I do, we do, you do."

Luke's statement in the discussion was particularly salient because I began to realize my own position as an authority and the status given to the use of high-cognitive demand mathematics tasks. Particularly, the status of the mathematics tasks is seen as a contrast to Luke's stated pedagogical strategy of "I do, we do, you do." My position as an authority is indicated by Luke's use of "Forgive me, Kate, for I have sinned" which was his way of apologizing in the moment.

Furthermore, the heuristic revealed another important aspect of my positionality. My response to Luke's "I do, we do, you do" comment in the group was to immediately back off the stance that high-level mathematics tasks were the top priority on a *daily* basis. Josh countered with an explanation about how he was grateful that Luke had shared the perspective he had because Josh agreed that they should always be striving for better since that is what they learned in the methods course. Reflecting with the questions from the heuristic after the session brought this discussion to my attention because I wondered why I was so quick to redact what we had taught them for two years. My own response disturbed me.

Exploring the response to the question paired with "what disturbs me" in the heuristic, I tried to understand why my response had been to withdraw so much from what we had taught the

teachers in the mathematics methods courses. It was, however, through my reflections on another question in the heuristic that I was able to see that my reaction was not necessarily indicative of my beliefs about mathematics teaching and learning, but instead was related to something that had stuck with me about Luke.

I came to understand that Luke's sensitivity is something that had stuck with me and I did not want the moment to become a situation in which he came down on himself too hard. I knew, also, that he had been struggling against a feeling of burnout. I wrote in my notes on session three (the session right before the one in which he made the comment quoted above):

> I am worried about Luke and burnout during this session. It doesn't seem to affect his participation dramatically until the end of the session where he just looks exhausted. We chatted for a long time after the session ... we did sort of parse out in the after session discussion that part of his issue is that he is carrying around the burdens of his students.

They are under a lot and he is empathetic to the point that it is too heavy for him to carry. What had stuck with me about Luke from the previous session and, over time knowing him, had affected the way I had interacted with him in one moment about mathematical tasks. My response in the moment illuminated for me that I was more concerned about his identity in the moment than his practices as a mathematics teacher. The negotiation of balancing social goals and mathematical goals are not unique to mathematics teaching and learning, but also play out in teacher education. I am not suggesting that this response was either good or bad. Rather, it is important to understand that, by recognizing my own positionality, I was able to see how I affected the learning opportunities for the mathematics teachers with whom I was working (e.g., retracting from what we had taught in the methods courses). Using the heuristic allowed me to see how my empathy for Luke increased my awareness of the status of high cognitive demand

mathematics tasks and my position as someone who was considered an authority about them. As I continue interacting with mathematics teachers, it would be important to pay attention to the ways in which I privilege social goals and goals about mathematics teaching and learning. Over time, continuously privileging a social goal would have significant consequences on mathematics teachers' opportunities to learn.

Clarifying (Personal) Beliefs

Considering the set of questions in the heuristic can also provide an opportunity for mathematics teacher educators to clarify their beliefs about many aspects of the world. Typically the focus is on beliefs about students, mathematics, teaching, teachers, curricula, schools, policies, and so on, but mathematics teacher educators also have beliefs about faith, people, war, guns, parenting, citizenship, character and so on (cf. Pajares, 1992). Beliefs are conceptions that a mathematics teacher educator holds about which they would agree that someone else might have a different belief (Philipp, 2007). In every interaction with mathematics teachers, a mathematics teacher educator has the possibility of having these beliefs illuminated, transformed, or stabilized, which is important to seeing the ways in which the beliefs shape the mathematics teachers' opportunities to learn. In this section, I describe how using the heuristic allowed me to negotiate a better understanding of one of my own religious beliefs through analyses of my interactions with a particular teacher in the study group. I discuss how I tried to better understand how his religious beliefs shaped his practice as a mathematics teacher and intersected with our work in the study group. In an interesting turn, I illuminated my own positionality through trying to understand how Luke's positionality (e.g., as a Christian) influenced his practice.

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In one-on-one interviews with each mathematics teacher before the start of our study group, I asked each teacher to describe how their understanding of who they are as people influenced their practice as teachers. Luke responded to this question by talking about his Christian faith and how he felt this influenced his work as a teacher. He stated,

> My Christian faith is the thing that I hold to the most dearly because I believe that someone has done far more for me than I could ever repay. I believe my life belongs to someone else because it has been redeemed by someone else by no effort of my own. Um, my life after has been paid for and protected and saved.

He continued by describing how he viewed students as "God's kids" and talked about how this influenced what he thought he should do for them. He relayed a story about the principal coming to him and asking if he would be willing to give up his planning hour so that a student could take an independent study in physics in order to graduate on time. Luke stated, "That's a non-question," and went on to elaborate that he agreed to do it.

Based on what had stuck with me about Luke (the importance of his Christian faith to him), this response was not a surprise to me; however, I was suddenly more aware of the ways I had subtly and overtly shown that I would be receptive to this kind of answer. Several weeks before, I ran into Luke in the grocery store on the way home from a church youth activity and told him that this was the reason I was dressed more formally than usual. In the years before, I had once communicated support to one of Luke's friends through a difficult time by saying that I was "praying for him" (knowing that the people in my presence were all Christians). My interactions with Luke may have provided him an opportunity to answer this question with sincerity.

When I transcribed this section of Luke's interview, I wondered about Luke's statement, "I believe my life belongs to someone else because it has been redeemed by someone else by *no effort of my own* [italics added for emphasis]." The phrase at the end disturbed me because it felt at odds with a common scriptural reference when considering salvation in The Church of Jesus Christ of Latter-day Saints. In particular, 2 Nephi 25:23 reads, in part, "for we know that it is by grace that we are saved *after all we can do* [italics added for emphasis]." If Luke's identification as Christian with these particular concomitant beliefs are a part of Luke's conception of his practice as a mathematics teacher (as it was how he responded to the explicit question), it was important for me to consider: Did Luke and I use "grace" in the same way or in different ways? Furthermore, what *is* the relationship between salvation and grace? The answers to these questions became more significant as I continued with the transcription of the interview because Luke used the word "grace" to describe different aspects of his relationships with his students. For example, he stated:

> We should treat each other with respect, I should treat you [a student] with respect. But I am the adult, I am the one who can say, "You know what? There is a line here, but I can extend some grace to you, because my self-worth is not contingent upon your perception of me."

I wondered whether or not Luke and I agreed because fully understanding how he was using the word "grace" would help me to better understand how he perceived his own students. To better understand what Luke meant in these situations, I needed to clarify my understanding of the word "grace" from the perspective of The Church of Jesus Christ of Latter-day Saints so that I could see the relationship between Luke's use of the word and my own understanding of the word to further unpack how he described the relationship he had with his students.

To help the reader better understand my resolution between our definitions of grace and how that information shaped my understanding of how Luke viewed his students, I describe a bit about my own exploration into this topic. I certainly do not know all of the aspects of the teachings of The Church that I belong to, but I do enjoy regularly studying deeply about what Church leaders and the scriptures have said about a particular topic to gain a better understanding of it for myself. Until Luke's pre-interview, I had understood the important parts of the intersection between salvation and grace to be: 1) do all that I can (e.g., "after all we can do" (2 Nephi 25:23)), 2) God gives all that He can, and 3) Jesus Christ is who mediates the discussion between God and I when we talk about our respective offerings (e.g., "it is by grace that we are saved" (2 Nephi 25:23)).[11] During one of the intervening weeks that the study group met, I was tasked at church with teaching the Young Women (age 12 to 18 girls) a lesson on the topic of grace and I learned two things. First, the Church teaches that grace is an "enabling power" (grace, 2013) or a force that provides us with the ability to do more than we would be able without it (e.g., face and endure trials, serve others, and so on). Second, the Church teaches that the grace of Jesus Christ has already taken care of people's eternities (in the same way that Luke references it) but that Christ asks us to do something in return. Wilcox (2011) explained this last point through the analogy, "Fulfilling Christ's requirements is like ... making deposits in a savings account instead of paying off debt. You still have to hand it over every month, but it is for a totally different reason" (p. 2).

During the study group sessions themselves, Luke mentioned new understandings of Biblical teachings. These contributions raised new issues for me because they were moments that

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[11] The scripture 2 Nephi 25:23 is certainly not the only scripture in The Church of Jesus Christ of Latter-day Saints that discusses grace and/or salvation. Rather, it is used here as an illustration of my thinking at the time.

were particularly salient for me for personal/faith-based reasons but they ran contrary to the norms expected for engaging in discussions in a public school (e.g., when is it appropriate to talk about religion in school?). In a one-on-one interview after the study group ended, I asked Luke to talk a little bit about the relationship he saw between his Christian beliefs and the nature of teaching mathematics for social justice. In his response to this question, he used the word "grace" directly as the reason he received something to which he was not "entitled." I asked him a follow-up question and inquired directly about what the word "grace" meant to him. He responded, in part, by saying:

> In religions outside of the Christian faith, the order is I obey and therefore I will be accepted by the deity or ... whoever is the subject of your worship. In the Christian faith, the order has been reversed. That is, I have already been accepted and therefore, not only am I willing but that acceptance empowers me to obey the law which I'm incapable of following otherwise, and still fall short on daily. ... Grace is getting what I don't deserve.

In other words, Luke's conception of grace was not that far from my new understandings of what the word meant. What was particularly salient about this discussion, though, is the link back to the ways in which Luke described his own relationship with his students. If "grace is getting what I don't deserve," then it is important to know that Luke treats his students with respect (as indicated in the earlier quote) regardless of whether or not he thinks their behavior has warranted it. This kind of classroom environment has implications for the kind of work in which he can engage his students. It also has implications for the kind of work we can do together in continuing professional development. Specifically, if I were to continue working with Luke in the context of teaching mathematics for social justice, I might ask him to consider the ways in which his conception of "grace" is related to what is revealed through the use of mathematical

tasks that focus on social issues. Pressing Luke to reflect on this relationship would provide him an opportunity to see why he might choose particular mathematics tasks with his students and, therefore, is shaping the learning of his students.

In my outlined notes for this manuscript, I labeled the example elaborated on in this subsection, "You keep using that word, I do not think it means what you think it means" from the movie, *The Princess Bride* (Scheinman, Reiner & Reiner, 1987). In other contexts, I have had a similar reaction about other beliefs. For example, early in my doctoral studies I was the university supervisor for a number of student teachers in secondary mathematics classrooms. One mentor teacher continually used "cooperative learning" to describe her classroom. In the beginning, I assumed the teacher and I had a shared meaning of this pedagogical practice; however, over time and several interactions with her, I came to understand that she meant "putting the students in pairs and having them check each other's answers to procedural problems" when she said, "cooperative learning." Although I had not yet begun a careful consideration of my interactions with others through the lens of what I find "disturbing," I was quite bothered by this use of the phrase "cooperative learning." After further investigation and a conversation with a supervisor, I realized that my conception of "cooperative learning" involved a more robust inter-dependence among students. Ultimately, this belief and my awareness of it shaped my continued work with the student teacher that was placed with this mentor teacher. For example, we regularly had discussions about what kinds of mathematical tasks were best used with groups of students (e.g., tasks of high cognitive demand, group-worthy tasks) and why.

Identifying Assumptions

The heuristic presented here can also illuminate what assumptions one has. The distinction between beliefs (as discussed in the previous section) and assumptions (discussed in

this section) is about how each is formed. I draw on Kitcher's (1984) conception of "a priori knowledge" (p. 15) to characterize what I mean by assumptions. Assumptions are a special kind of beliefs and/or knowledge that one considers true because the assumptions are believed to be true. Assumptions are not necessarily derived from experience (hence the relation to a priori knowledge), while beliefs are derived primarily from experiences.

In this section, I elaborate on my own assumption about what it means to be an "activist." Particularly, I discuss how the heuristic shaped my early written notes about what it means to be an activist. I continue by elaborating how the heuristic sharpened my awareness that this is an assumption I hold and is not necessarily an assumption held by others. Particularly, I came to realize how this assumption has implications for my practice in future contexts with mathematics teachers.

Early on in my preparations for the study group, I read Gonzalez's (2008) dissertation study about a teacher study group related to teaching mathematics for social justice. Gonzalez characterized the mathematics teacher identities of the teachers in her study group as well as their identities as "agents of change." As I pondered her study, I began to realize that I was "disturbed" by the ways in which "agents of change" was often mapped to activities outside the classroom in which the teachers engaged in fighting against inequitable social issues (this was evidenced in the teachers' discussions, and at times, I felt by Gonzalez herself). Although she noted a development towards understanding the act of teaching as political in nature, I still reacted to the text of the dissertation by writing down this note:

> Activism is not only about joining a bunch of organizations that fight injustice. It is about standing up for what is right in every given moment.

I continued by listing three examples that came to my mind from my experiences as a high school mathematics teacher of when students used derogatory words. That is, reading Gonzalez's (2008) dissertation study in preparation for my role as a mathematics teacher educator in this study group, with the lens of what "disturbed" me, prompted me to articulate an assumption that I held about what it means to be an activist. Although I was able to state that it was an assumption I held, I did not fully understand the ways in which it shaped my work as a mathematics teacher educator and as a researcher until several other disturbing moments happened during the study group.

Several months later at the Association of Mathematics Teacher Educators (AMTE) conference, I engaged in a discussion with a colleague about Rico Gutstein's plenary talk and also had the opportunity to reflect on my own participation at the conference during the Learn and Reflect discussion session focused on equity. The two experiences disturbed me because I began to question whether or not I was sufficiently knowledgeable to engage in teaching mathematics for social justice, or even the act of teaching, because I was not an "activist." Upon returning home from the conference, I reflected on these discussions and wrote the following in my journal:

> Work in classrooms is work on social issues. If that is true, which I believe strongly that it is, then it should not matter that I don't have experiences standing in picket lines. My picket line is just more abstract and harder to see.

In other words, my "picket line" is evidenced (or not) during every act I choose to make inside a classroom or during my work with teachers. Again, my assumption was stated, but I did not fully understand what was specifically important about it until an interview with Luke after the conclusion of all the study group meetings.

During Luke's post-study group interview, it became clear to me that my assumption about the political nature of the act of teaching was not an assumption I shared with at least Luke, and upon further reflection, also Josh and possibly Chloe. This was raised for me as I pondered the last question in the heuristic, in particular, about what stood out to me from my interview with Luke. When asked about what activities he found most critical to influencing his understanding and perception of teaching mathematics for social justice, Luke elaborated on an activity in session four in which each of us in the study group identified our position as non-target (benefitting from privilege) or target (a member of a group that has been oppressed) along a variety of systems of privilege and oppression (e.g., race, class, gender, ability, age, and so on) (Visions, Inc., n.d.). Luke talked about his position in nearly all of the groups that benefit from privilege and linked this to a responsibility to seek social change. His concluding remark from his contribution and what I said is as follows:

> **Luke**: Yeah, I feel more and more pressured to become more politically engaged despite how sick to my stomach politics makes me feel. To note, eye-roll, there's an eye-roll right there [*Luke is speaking directly to the audio-recorder*]. It's a big eye-roll right there. I hate politics. I hate politicians.
>
> **Kate**: I think it sort of goes back to what is your definition of political, right? And I think - something I've come to better understand through the conversations that we've had and a conversation I had with somebody at a conference in January. ...[*I provided the context about the conference, already provided in this paper above.*] At the very beginning of his [Gutstein's] talk he talked all about himself and he talked a lot about his own political and social activism. Standing on a picket line, telling people all the stuff that he did in the '70s essentially, right? That's part of these huge political movements, right? And to me,

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it's like, made me think about what are the things that I can do that are political, right?

And so you're eye-rolling because I hate politics. But every decision you make in a class

is political in some way, right? You're either affording somebody an opportunity to make

their life better or trying to perpetuate the status quo. And so if you think about the fact

that literally everything you do can be a political act, then it shapes the way you think

about what you have the power to do or not do. And what it means to be an activist,

essentially.

This quote was pulled from the transcribed post-interview with Luke because on the day of the

interview, I was reflecting on what was particularly important to me in the interaction that Luke

and I had had that day (e.g., question one on the heuristic). It struck me as particularly important

because I realized that I had never communicated this assumption so clearly and explicitly to the

teachers in my study group. It made me realize that expanding their notion of what it means to be

an activist might be critical to developing their identities as teachers who teach mathematics in

ways that either promote awareness of social justice or provide a more equitable learning

environment, generally. Furthermore, I used a rhetorical structure in my contribution that implied

that Luke should agree with me, by repeatedly adding "right?" to the end of my sentences. It was

as if I did not leave any room for alternative assumptions. This lack of interactional space could

be problematic if Luke did not actually agree with me. This is particularly true, given my

realizations about my authority in the group articulated earlier in this chapter.

As described before, the power of the heuristic often comes when the questions are

considered as a set. Considering what disturbed me in a variety of contexts raised for me a

repeated stating of the assumption that I held; however, it was the further reflection on what

stood out to me in the post-interview with Luke that illuminated for me the ways in which the

assumption shaped the way I approached facilitating the study group. That is, I assumed that the teachers shared my conception of activism and, therefore, I did not give them opportunities to explore the ways in which they might be activists. Not providing this opportunity likely shaped how they were able to see (or not see) themselves as critical mathematics educators (which is important for teaching mathematics for social justice) (cf. Johnson, in preparation [Chapter 4]). My increased awareness about this assumption will shape my future activities as a teacher educator. I better understand that not everyone has this assumption about what it means to be an activist/socially active. In particular, Johnson (in preparation) [Chapter 4] and Gonzalez's (2008) dissertation study illustrate the idea that many people do not have a conception of social activism that includes the act of teaching. In the future, I will plan for explicit opportunities to raise this as a discussion point with mathematics teachers in order to illuminate the range of possible actions that might be associated with activism.

Discussion

Attending to the one's own positionality in mathematics teacher education is important for increasing awareness about what is shaping one's practice (e.g., what learning opportunities are provided for mathematics teachers, how decisions are made in the moment about which discussions to pursue). Engaging in this kind of self-reflection, while critical, can be extremely challenging. The use of the heuristic presented in this article can lessen the burden of trying to decide how to reflect on one's own practice in a way that illuminates positionality. As was shown through the examples presented here, the heuristic can help to uncover a mathematics teacher educator's positionality. In particular, it is possible to gain further insights into beliefs, assumptions, and the ways in which authority and status affect interactions in the context of mathematics teacher education.

An important point to make here is the ways in which *time* can play a role in illuminating aspects of positionality. It might be noted that in each of the examples given, reflecting carefully, consistently, and repeatedly about my interactions with teachers helped to draw attention to my positionality. Reflecting with the heuristic over time can develop and deepen one's understanding of one's positionality as a mathematics teacher educator.

It is worth noting that these questions can be used along the continuum of mathematics teacher education (e.g., prospective teacher methods courses, professional development, and so on). For example, during my practice as a mathematics teacher educator, I can listen carefully to what mathematics teachers say and consider when I am disturbed. If, in a single interaction with a mathematics teacher or group of mathematics teachers, I can consider salient or disturbing moments, these will reveal opportunities for me to (re)consider and (re)evaluate my practice as a mathematics teacher educator. Alternatively, for multiple interactions with the same group of teachers over time, I can generate field notes after a session in which I am considering what learning opportunities are needed subsequently at the same time as generating initial tools for analysis. Over multiple interactions, I can also reflect on what sticks about the teachers to better understand our developing relationship. That is, I can reflect on who I have come to know the mathematics teachers to be as individuals and as mathematics teachers in order to see how that shapes the learning opportunities I choose while working with them.

This paper gave some attention to my identity as a member of The Church of Jesus Christ of Latter-day Saints. As noted earlier, mathematics teacher educators are people who bring a set of identities with them to their practice. These identities include particular beliefs, knowledge, assumptions, and ways of communicating and interacting that can and do affect the way mathematics teacher educators interact with teachers. The example provided here showed how

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careful attention to Luke's discussion of his faith and how he described his students allowed me to refine my own beliefs and understandings of an important (to me) religious principle. It was important to me because of my religious identity, in addition to being important to my practice as a mathematics teacher educator and understanding how Luke viewed his students. Luke's elaboration on his Christian faith was complicated (particularly in the context of the study group sessions with the other teachers) because I struggled with the balance of providing Luke an opportunity to discuss something important to him and the notion that religious discussion is supposed to be kept out of public schooling.

For me, at this time, in this context, I was able to see how my religious identity was constructed and shaped by an interaction I had with a mathematics teacher. This increased awareness about my religious identity also allowed me to see the ways in which I shaped the learning opportunities for Luke, in particular, and possibly other teachers in the study group. In the final interview with Luke, I pressed him to articulate a relationship between his Christian faith and teaching mathematics for social justice precisely because I had come to see that his positionality might be shaping his students' opportunities to learn mathematics. This question was another opportunity for Luke himself to learn more about teaching and learning mathematics by revealing to him his own values, beliefs, knowledge, and assumptions. Although, in this case, it was my religious identity that primarily surfaced, for others (or myself in a different context or time), other identities are likely to undergo (re)formation or stabilization which then inform the practice of mathematics teacher education. For example, mathematics teacher educators might be able to deepen their understanding of their Whiteness (cf. Battey, 2013), their understanding of standardized testing as a system of oppression, their stance towards developing conceptual or

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procedural knowledge, or their sexual orientation and how these identities afford and constrain the learning opportunities they provide teachers.

As was discussed earlier, the perceived neutrality of mathematics as a discipline is part of why the exploration of positionality is particularly important for mathematics teacher educators. Illuminating the beliefs, knowledge, assumptions, values, and so on that are informing, constraining, and skewing the choices mathematics teacher educators make about learning opportunities is an important consideration. These learning opportunities might include decisions like what books to read, what videos to watch, what questions to ask, what sources to find mathematical tasks in, how mathematics learning is defined, and how to interact with students. It is in seeing how these decisions are affected by one's own positionality that one deepens understanding of how mathematics is not a neutral discipline devoid of values, morals, and cultural influence. Instead, mathematics teacher educators can come to better see how they are the cultural agents who shape mathematics and mathematics teaching and learning.

Using the heuristic provides an opportunity to be explicit about what beliefs, assumptions, knowledge, and identities are shaping the work of mathematics teacher education so that those beliefs, assumptions, knowledge, and identities can be (re)evaluated and (re)formed. Considering one's self in this way will help to make visible the reasons why interactions with mathematics teachers proceed in the ways that they do and offer an opportunity to (re)consider these patterns in ways that might be productive for both the mathematics teacher and the mathematics teacher educator. Furthermore, engaging in a thoughtful consideration of one's practice as a mathematics teacher educator can lead to deeper and richer understandings of the mathematics teachers one works with in order to provide more equitable learning opportunities for teachers, which may then lead to more equitable learning opportunities for students.

The more subjected and less able to dream of freedom they are, the less able will concrete human beings be to face their challenges. The more of a sombering present there is, one in which the future is drowned, the less hope there will be for the oppressed and the more peace there will be for the oppressors. Thus, education in the service of domination cannot cause critical and dialectic thinking; rather it stimulates naive thinking about the world. (Freire, 1997/2007, p. 44)

CHAPTER 3: ILLUMINATING ENDURING POSITIONS CONSTRUED IN d/DISCOURSES

To prepare to study and facilitate a study group with high school mathematics teachers on teaching mathematics for social justice, I read literature about developing an anti-racist perspective and different orientations towards White privilege (e.g., Carter, 1995; Helms, 1990; Howard, 2006; Tatum, 1992) in order to consider how the teachers might react when we talked about race and socioeconomic class. Before convening for our first study group session, I interviewed each teacher, asking toward the end of each interview, "Do you think your race plays a role in your mathematics teaching? Why or why not?" The two White, middle-class men in the study group answered, as follows:

Luke: I don't think my race plays a role in my teaching. Um, the melanin in my skin does not affect my cognition about mathematics. But the--, but there are subtle ways in which I'm sure my perception of life has, is influenced ... I am ignorant about what I am ignorant. There are subtle things, nuances, that have to do with the color of my skin and the color of skin of people I see around me and what they are doing and what I am doing that affect how I see the world in ways that I can't even perceive.

Josh: I don't think my race plays a role. I think if you linked my race to my background, to how I grew up and the class I was in then it might. Just in a sense that I feel like I can kind of see, in a broad sense, how things are and what my students should strive for and

how they should kind of go above and beyond, how they should value education more

than they do. I don't know if that's really a race thing that plays that or just more of a,

I've had more experiences going to college and seeing what education can do for you.

Each teacher began his response with "I don't think my race plays a role" and yet, what followed

felt different somehow. One teacher said he was "ignorant" and the other said he was able to

"see...how things are." These contributions did not feel out of place for each of the teachers

individually, but side-by-side they raised questions for me. I began to wonder: What *was*

different about their discourse? Furthermore, how did the discourse seem to construe (or not) the

categories I had read about in the literature? Considering answers to these questions might

provide insight into how researchers might empirically study the relationship between identity

and discourse. One way to think about this relationship is to be able to characterize whom people

are through a study of what they say.

In this paper, I analyze data from the study group to provide a potential answer these

questions. I first establish a theory of identity on which this study draws in order to show how

discourse is related to identity. I elaborate on this relationship between discourse and identity to

show how systems of privilege and oppression interact with individual people such that people's

actions and discourses perpetuate systems. Additionally, systems of privilege and oppression can

influence people's individual actions and discourse. I also discuss the importance of attending to

socioeconomic class privilege and racial privilege in order to show why it is particularly

important that these systems are attended to in the context of schooling. Specifically, this paper

examines and describes how two White middle-class male mathematics teachers' discourses

illuminate their identities, particularly with respect to race and class. Their awareness of their

privilege can be revealed in their use of different discourses which has important implications for

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how they interact with others, but particularly the students in their mathematics classes. The differences noted in the introduction are elaborated on in a systematic way to characterize how the teachers contributed to the study group both over time and in moment-to-moment interactions with one another. That is, in this paper, I discuss how their discourses over time revealed their identities.

Identities: Enduring Positions

There are many ways to characterize the identities of teachers and students (e.g., Agee, 2004; Bishop, 2012; Calabrese Barton et al., 2012; Johnson, in preparation [Chapter 4]; Sfard & Prusak, 2005). In this article, I examine identity from the perspective of positioning theory (Harré & van Langenhove, 1991; Harré & Moghaddam, 2003; Harré, 1984). This perspective assumes that people's actions and words shape social structures (Wagner & Herbel-Eisenmann, 2009). Traditionally, positioning theory attends primarily to moment-to-moment interactions to describe identities; however, I also draw on Anderson's (2009) argument that over time these moment-to-moment interactions begin to accumulate and a person can become defined by them. Through repeated interactions with others over time, people come to habituate certain stable ways in which they identify themselves, which I refer to as *enduring positions* (cf. Anderson, 2009; Holland, et al., 1998; Holland & Lave, 2001; Wortham, 2003). These might be enduring positions people seek out or ones that they unintentionally enact.

Consider some of the ways in which "mother" might become an enduring position. A mother's interaction with her child over the course of the child's life can begin to have an influence on how she positions herself in other contexts, even when her child is not present. For example, when another child is in danger, she might jump into action to help the child, enacting a caretaker role in that moment, much as she might with her own child. Alternatively, she might

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see a peer having difficulty with a task and step in to direct the work herself. Her friend could react negatively to this assertion of authority as she positions herself as an adult care-taker. This example shows how her interactions with her own child may have created an enduring position for her that might then affect her participation with others in other contexts.

Enduring positions can influence people's interactions with others, regardless of the context. Interactions with other people are influenced by the repeated patterns of interaction that develop into enduring positions (cf. Anderson, 2009; Holland et al., 1998; Holland & Lave, 2001; Wortham, 2003). People's positions over time influence unintentionally and intentionally the interpretation of the current range of positions in a given context by themselves and others (cf. Holland et al., 1998). The positions that are well-established and enduring are more likely to have an influence on a person's negotiation of position in any context.

Enduring positions "are lived as they are concretely realized, as they rudely or routinely intrude, or as they are appropriated into local social practice" (Holland & Lave, 2001). That is, individual interactions with others in the present are continuously informed by the enduring positions developed in previous interactions with others.

One way to characterize enduring positions is through Gee's definition of identity as Discourses (Gee, 1996, 2001). Gee (2001) states, "Being recognized as a certain 'kind of person,' in a given context, is what I mean here by 'identity'" (p. 99). As people interact with one another, they are engaging in d/Discourses, which identify who they are in that context. Gee (1996) defines discourses to be language-in-use from moment to moment. However, people come to be identified by their Discourses, which are:

> ways of behaving, interacting, valuing, thinking, believing, speaking, and often reading and writing that are accepted as instantiations of particular roles (or 'types of people') by

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specific *groups of people*, whether families of a certain sort, lawyers of a certain sort,

bikers of a certain sort, business people of a certain sort, church members of a certain

sort, African-Americans of a certain sort, women or men of a certain sort, and so on

through a very long list. (Gee, 1996, p. viii)

That is, Discourses are more than ways of speaking, but are ways of being an identifiable type of

person, recognizable to others. They are one way in which people make known what enduring

positions they consider relevant (or not) in their local interactions with others.

Discourses shape discourses just as discourses shape Discourses. As was mentioned,

discourse is the language-in-use from moment to moment (Gee, 1999/2005) or the language

exchanged at each point of interaction. The choices people make in any given local exchange

and, therefore, the subsequent language used, are informed by their participation in Discourses.

Anderson (2009) used the notion of a failing student to make a similar point. Students who have

been labeled "*a* failure" by teachers or peers or themselves come to see a limited set of choices

as possible actions, instead of all the actions or language that might be available to them

(Anderson, 2009). For example, confronted with a problem that they find difficult, they might

automatically choose to withdraw from participation because they "know they will just fail

anyways." In this way, Discourses or enduring positions can shape how people act in moment-to-

moment interactions.

Conversely, enduring positions are reified through regular interactions of discourse,

which constitute Discourses (in conjunction with other ways of being). In discourse, there is

evidence of the Discourses in use. For example, a conservative politician might paraphrase a

Biblical teaching as a part of a speech she is giving because she knows that certain listeners will

pick up on the reference and might be inclined to vote for her as a result. In that moment of

interaction between the speaker and the listeners, the politician has said something like, "The world was not *created* in a day, we must be ready for the long fight ahead;" however, this kind of discourse is indicative of the Discourses of Christians, a particular enduring position, as it references the Christian teaching that the world was created by God.

Enduring positions are identified through people's use of Discourses which can be seen in their interactions with others over time in addition to in their moment-to-moment discourse. This paper discusses both the discourses and Discourses of two White middle-class male mathematics teachers. Although identities are shaped in the way described here, through local interactions repeated over time, people are influenced by the cultures and contexts that they live in as well. For that reason, in the next section, I discuss how race and class are socially constructed contexts that serve to privilege some and oppress others. As systems, race and class influence people's individual d/Discourses.

Systems of Privilege and Oppression: Race and Class

In this section, I describe how other researchers have articulated the relationship between race and class as contexts and particular individuals in these contexts in order to show the ways in which the current paper aligns with and departs from previous work. I also elaborate on the ways enduring positions can be affected by these systems to show how individuals' d/Discourses are shaped and impacted by the privileging and oppressing systems of race and class. Finally, I describe the need for attention to both racial and economic privilege in the context of schooling.

Researchers have explored the impact of race on individuals' identities and discourses (e.g., Chubbuck, 2004; Haviland, 2008) as well as the impact of class of individuals' identities and discourses (e.g., Bialostok, 2002, 2004; Reay, 1997). For example, Haviland (2008) has characterized White ways of interacting, particularly in educational contexts and Bialostok

(2002, 2004) has shown the ways in which middle-class ways of being play a role in people's interactions with those around them. That is, these researchers have begun to illuminate the role that the systems of race and class play in individuals' actions. This influence is sometimes described through Bourdieu's construct of *habitus*. Harker (1984), building off Bourdieu's work and critiquing it, defined habitus as "the way a culture is embodied in the individual" (p. 118). This paper assumes that race and class can unknowingly influence a person's d/Discourses because the cultural contexts are shaping their d/Discourses (habitus).

Both race and class can serve as systems in society that privilege some people and oppress others. Racism and classism can operate at a variety of levels, including individual, institutional, and civilizational (Scheurich & Young, 1997). It is possible for individuals to see these privileges and marginalizations because they manifest themselves as lived experiences. For example, McIntosh (2011) characterized the privileges that White people are afforded with statements, such as "I am never asked to speak for all of the people of my racial group" and "I can be sure that if I need legal or medical help, my race will not work against me" (p. 123). Privileges, in particular, can be difficult to see because they are woven into the fabric of how people interact regularly with one another. Different people who benefit from privilege in any system that privileges or oppresses (e.g., racial privilege and economic security, but also Christian privilege, heterosexual privilege, male privilege, and so on) have different levels of awareness with respect to how these systems influence the experiences of individuals. Howard (2006) and other authors (e.g., Carter, 1995; Tatum, 1992) have described these variations particularly with respect to White privilege. This paper builds on the work of these authors to describe the role awareness plays in the d/Discourses of two White middle-class teachers.

A person who benefits from privilege will enact different Discourses based on their awareness about their own privilege (and the privilege of others). These Discourses will be able to be heard in the individual moments of interaction as well through discourse. That is, teachers with differing awareness of their privilege will have different enduring positions with respect to their privilege. The example that begins this paper is one way these enduring positions are evident. The first teacher, who identified that he was "ignorant," might be suggesting that he is sometimes unable to see the influence of race on his lived experiences because of the role of habitus or because racial privilege is hard to see. The second teacher, who was able to "see...how things are" might be speaking from a place of privilege in which he believed his ways of knowing are right. (The ways in which these distinctions can be seen is further elaborated on in the analysis section of this paper.)

Racial privilege and economic privilege are elaborated on in this section because the two teachers themselves benefit from racial and economic privilege. Racial and economic privilege were chosen as foci (in lieu of other privilege and oppression systems) for two main reasons. First, two systems were chosen in order to emphasize the multiplicity of peoples' identities and how these varying identities might impact how they make sense of the world around them. Secondly, even though schools are often populated with students who benefit from other privileges, such as heterosexual privilege and Christian privilege, both racial and economic privilege contribute to the ways in which schools are differentiated. Some schools might be dominated by racial privilege, for example, while others are not.[12] Attending to teachers'

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[12] Societal phenomena, such as White flight to the suburbs or choosing to buy a house in one area or another, contribute to this differentiation, since school districting is still primarily done with respect to geographic location.

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awareness of their own privileges has important implications for the effectiveness of their own instruction.

Research has been done to examine the effect of raising White teachers' awareness of racial issues and the affect this increased awareness has on providing equitable instruction in multicultural classrooms (e.g., Ladson-Billings, 2009; Delpit, 1995, 2003, 2006; Delpit & Dowdy, 2002). There is little research, though, into how increasing awareness of racial issues affects White teachers' practices in classrooms dominated by White students (a notable exception is Borsheim-Black, 2012). However, United States citizens live in a diverse world, so there is need for raised awareness of the privileging and oppressing structures and individuals' roles in these systems. That is, raising awareness for all people can instigate necessary social change.

I have described how enduring positions can be seen in discourses through attending to moment-to-moment interactions because these interactions, repeated over time, construe the Discourses that characterize enduring positions. I have also elaborated on the role systems of privilege and oppression, particularly race and class, have in shaping individuals' d/Discourses. Particularly, a person who benefits from privilege may have a different enduring position depending on his level of awareness of the privilege. These enduring positions can be seen both over time (Discourses) and in the moment-to-moment discourse of interaction. In the context of a study group about teaching mathematics for social justice, I take up the following questions for further examination in this paper:

- What do the enduring positions with respect to race and class seem to be for the two White middle-class male teachers in the study group?
- How do the enduring positions compare in moment-to-moment discourse between these two teachers?

Methods

Participants and Context

The two participants discussed in this paper were selected from the three participating teachers in a study group about teaching mathematics for social justice. They were selected to be the subjects of the closer analysis in this study because there were noticeable differences in their discourses which could be important to illuminating their enduring positions with respect to race and class. Josh Wolfe taught at Walnut Knoll High School in a suburban community outside a large Midwestern city, while Luke Fisher taught in Hamlet High School, located in a different Midwestern city. Both teachers were White Christian men from middle-class backgrounds. Both teachers were in their first year of teaching and had completed the same teacher preparation program in the year before the study group. Both Luke and Josh expressed interest in teaching mathematics for social justice in their classrooms; however, Josh sometimes questioned whether or not mathematics class was actually the place for mathematical tasks examining and confronting social issues.

I facilitated and participated in the study group and had been their course instructor in the last two years of their teacher preparation program. I am a White, middle-class, Mormon woman finishing a doctoral program in Curriculum, Instruction, and Teacher Education. Throughout my life, I have been very interested in attending to my own (and other people's) Whiteness and how it shapes, skews, and alters our lived experiences. I am committed to being an ally with people of color[13] to interrupt my own unearned White privilege in ways that promote equity for all races. I

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[13] I use "people of color" to mean people who are African American, Latino/Latina, Korean, Chinese, and so on despite potential issues that can be raised with its use. I choose not to use a phrase such as, "non-White people" or "people who do not benefit from White privilege" for the ways in which they tend to focus on Whiteness with implicit "othering" of people who are not White.

have spent less time exploring socioeconomic class and the way it shapes lived experiences. The selection of a dual focus in the study group on race and class was intentional as it provided both me and the participating teachers with an opportunity to examine multiple systems of privilege and oppression.

The study group had four two-hour sessions over a seven week time period. In each session, we discussed chapters from *Reading and Writing the World with Mathematics* (Gutstein, 2006). We also engaged in other activities specifically designed to increase awareness of our own identities and concomitant privileges. For example, we watched a video about the inequitable distribution of wealth in America (politizane, 2012) and examined lists of privileges, including McIntosh's (2011) "White Privilege: Unpacking the Invisible Knapsack" and Scalzi's (2005) "Being Poor—Whatever." We also identified the relationship between outward characteristics and associated life experiences by discussing two corresponding drawings of a girl (Pittelman & Resource Generation, 2010) (this activity is elaborated on in a later section). These discussions were meant to highlight the ways in which identities might obscure an ability to see specific privileges and to provide us with an opportunity to consider what we might do as a result of increased awareness.

Data Collection

Before the study group began, I conducted an individual pre-interview with each teacher in which they were asked questions about their identities, their experiences with/conceptions of teaching mathematics for social justice, and their perceptions of their students (see Appendix A for a list of the pre-interview questions). For example, teachers were asked to list three beliefs about teaching, mathematics and students and to explain how their conception of who they are as a person influenced their work as teachers. Additionally, they were asked questions about how

they define mathematics, how they envisioned incorporating social and political issues into their

mathematics teaching, and how they perceived their students, their students' families, and their

students' communities.

The study group sessions were audio-recorded and I then generated field notes as I

listened to the sessions after they occurred. In the field notes, I recorded the activities of the

study group, paraphrasing descriptions of each topic of discussion as well as some individual

contributions people made. I also documented, when appropriate, notes to make referents clear

(from my memory of the session which had taken place shortly before) when the audio recording

was unlikely to be sufficient. I simultaneously recorded initial impressions and thoughts that

arose while I was documenting the activities of the study group, both from my perspective as the

teacher educator facilitating and participating in the group and from my perspective as a

researcher considering the research questions I began the study with. These impressions and

thoughts were recorded in brackets with italics to differentiate from the notes that reported the

study group activities and discussions.

Each teacher was also asked questions in individual post-interviews when all of the study

group sessions had been completed. These interviews were semi-structured such that all of the

teachers were asked questions about their identities, specifically, and their experiences in the

study group; however, different probing and clarifying questions were asked of each teacher in

an effort to further understand discussions in the study group (see Appendix C and Appendix D

for a list of the post-interview questions for Luke Fisher and Josh Wolfe, respectively).[14] For

example, teachers were asked if they would modify their previously listed set of identities they

felt were important (an activity in session 1) and if there were particularly critical discussions we

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[14] Some of the questions are similar to the method used by Marx (2004) in which she asked her
participants to reflect on their contributions to a discussion.

had had in the study group. The "clarifications and probings" section of the interview included questions of the general form, "In session X, you mentioned (or said) _____. Can you tell me a little more about what you meant by <some aspect of that contribution>?"

The pre-interview and post-interview were transcribed in their entirety. Although the study group sessions were not transcribed in their entirety, the detailed field notes were used as an initial artifact to selecting specific discussion for analysis (these methods are further elaborated on in the next subsection).

Data Analysis

As indicated at the opening of this paper, data analysis began almost immediately at the start of the study, particularly with the reading of frameworks about developing an anti-racist perspective (e.g., Carter, 1995; Helms, 1990; Howard, 2006; Tatum, 1992). As I facilitated and participated in the study group, I developed a sense of the enduring positions that Luke and Josh construed in their d/Discourses and at the conclusion of the study group began the more serious inquiry of what exactly characterized the differences I had noted. At that time, I selected and organized components of the data that had been collected in order to help answer the research questions.

I draw primarily on Howard's (2006) articulation of an anti-racist White identity development to explain *possible* enduring positions that might occur in a teacher study group. Howard (2006) described three White identity orientations, *fundamentalist*, *integrationist*, and *transformationist*. The identity orientations that Howard described could be possible enduring positions for teachers in a study group. Each enduring position varies with respect to the Discourses that are associated with it. In the *fundamentalist* enduring position, White people might believe that their Whiteness does not play a role in the privileges that they have and,

therefore, people either openly or unconsciously perpetuate White dominance through acts of racism (Howard, 2006). In the *integrationist* enduring position, White people might understand how race factors into people's experiences historically, but would be less inclined to believe that race shapes the way people interact currently (Howard, 2006). White integrationists are more likely to be interested in learning *about* other cultures than in developing collaborative relationships across cultures (Howard, 2006). White integrationist teachers, however, usually discuss racial diversity by incorporating special programs or activities in which students explore cultural differences (Howard, 2006). In the *transformationist* perspective, White people "enjoy learning *from* and *with* other cultures" (Howard, 2006, p. 111). They are more likely to be actively engaged in unseating the systems that perpetuate privilege (Howard, 2006) because they see the ways in which the systems serve to privilege some and not others. White transformationist teachers provide equitable learning opportunities for all students that respect multiple ways of knowing (Howard, 2006).

Howard (2006) summarized the Discourses associated with the enduring positions of fundamentalist, integrationist, and transformationist in his book (see p. 104 of his book for the full table). In particular, with respect to what he called "thinking," "feeling," and "acting," Howard described how these verbs might manifest themselves in different enduring positions. For example, with respect to "thinking" and in conjunction with a consideration of a category, "construction of truth," Howard listed short phrases to characterize each of fundamentalist (e.g., "literal and fixed," "single-dimensional truth," "Western-centric"), integrationist (e.g., "acknowledge diverse perspectives," "interest in broader truths," "continued defense of Western superiority") and transformationist (e.g., "legitimacy of diverse perspectives," "truth as dynamic/changing," "actively seeking divergent truths"). This kind of elaboration is detailed

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across the three verbs for three categories each (other categories include labels, such as "level of self-awareness," "emotional response to discussions of racism," and "approach to teaching differences").

Although Howard (2006) used the three verbs, "thinking," "feeling," and "acting," to show the distinctions between these enduring positions, I assert that these are one way of capturing what Gee (1996) described as Discourses (e.g., "ways of behaving, interacting, valuing, thinking, believing, speaking, and often reading and writing" (p. viii)). For example, "behaving" and "interacting" are parts of what Howard (2006) called "acting." Therefore, I used Howard's (2006) articulation of ways of being and acting to consider the discourse and, ultimately, make claims about the Discourses of the teachers in the study group (this process will be elaborated in the next subsection).

Also, it is important to note that the interconnectedness between race and class can make it complicated to make specific claims about enduring positions with respect to race or class. For example, if a White person said, "The people who live in the projects just need to get a job to improve their life situations. I made a better life for myself than my parents provided," it would be hard to distinguish this as a fundamentalist enduring position with respect to race or class because high percentages of people of color are often the people living in the housing projects in this country. The statement can be located as being from the fundamentalist perspective, in part, because it does not acknowledge the role of systems of privilege and oppression which constrain people's opportunities. This paper, therefore, does not make an effort to illuminate a distinction between enduring positions of transformationist, integrationist, and fundamentalist with respect to race or class. Rather, this paper characterizes the teachers with the enduring positions with respect to race *and* class. This means I also modified the Howard framework when appropriate to

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match the language that would reflect both race and class. For example, one characterization in Howard's (2006) framework says, "Reinforcing White superiority" (p. 104). When using this framework, I would read this as "Reinforcing White and/or class superiority."

Overview of analysis for both teachers. To answer the research questions in this study, I selected data in the following manner and for the following reasons. Each piece of data was selected and organized by person (Luke Fisher or Josh Wolfe).

Data from the pre-interview were selected from each of the categories that participants were asked questions. That is, the responses to certain questions were selected for closer analysis because they were the ones in which the teachers were most likely to represent their Discourses because they primarily talked about their own identities or their students' identities. Particularly, responses to questions about their experiences with social and political issues, what led them to participate in the study group, their understanding of who they are, and the role their racial and socioeconomic status play in their mathematics teaching were selected from the identity category. Their current conception of incorporating social and political topics in mathematics teaching with its benefits and drawbacks were selected and organized. Finally, all of the questions about their perspectives on their students were selected. .

I then read the field notes and re-listened to data from the activities that were not discussions of the book. These discussions were those that focused on understanding personal identity or understanding race and class as systems of privilege and oppression. These discussions were selected for closer analysis because they were the discussions in which the teachers were most likely to talk directly about their own identity or that of their students. Data from the recorded study group sessions were further identified as relevant to answering these research questions if one of three things happened: 1) the teacher directly talked about his

identity using language, such as "White," "middle class," "Christian," and so on, 2) the teacher directly talked about his students' identities using language, such as "Black," "middle class," "poor," "White," and so on, or 3) the teacher directly stated that his contribution was from a particular perspective related to his identity, such as "on a religious note...." All of the interactions around these instances were transcribed in order to capture the full topic of discussion. These excerpts ranged from one to five minutes. I expected these instances to be rich sites for analyses because they included the most direct markers of talk about privilege, power, and individual identity.

All data from the post-interview responses to the questions in the categories of "identity" and "clarifications and probings" were selected. Also, the responses to the first three questions in the category of "study group reflections" were selected.

After I selected and organized the data, I analyzed each teacher's selected data with a similar strategy. First, the organized data set for Luke Fisher was read as a unit. Second, Luke's data were read again and initial codes were identified. Codes were developed by considering the following questions while reading, "What is he saying?" "What is the main point or larger topic he is discussing?" "In what ways is it connected to what else he said across the data set?" Third, codes were articulated and descriptions of each main topic were listed. Fourth, Luke's data were coded as a full set again using the codes and definitions. Fifth, the data for Luke was read for disconfirming evidence for any of the codes. I repeated these five steps for Josh Wolfe.

Thirteen codes were generated for Luke Fisher, and ten codes were generated for Josh Wolfe (the full set of codes is listed in Appendix E). For example, when Luke talked about the importance of building a relationship with students, the code was called "relating to students." Josh would talk about how his life was different that the life his students' experience, which was

coded as "my life is different than the students." Codes were not meant to be mutually exclusive and some sentences were coded with multiple codes. Coding was primarily at the level of the sentence, but sometimes one code was encapsulated in a string of three to five sentences or sometimes occurred within a particular phrase.

After the data was coded, I returned to Howard's (2006) table (p. 104 in his text and summarized above) and considered each segment of coded data with respect to the Discourses indicated on the table. I then mapped these Discourses onto the coded data to determine which enduring position each teacher construed through their discourse over multiple interactions in the pre- and post-interviews and study group sessions. It was noted that each teacher fell into multiple columns on this chart. As was discussed earlier, systemic ways of being and individuals interact in complicated ways that are not always consistent. The varied enduring positions and how they were construed by d/Discourses in the study group will be reported on for each teacher in the results section in order to answer the first research question (What do the enduring positions with respect to race and class seem to be for the two White male teachers in the study group?).

Cross teacher analysis. In addition to analyzing the data to characterize the enduring positions of the teachers, the interactions between the teachers were analyzed to reveal the ways in which the Discourses were construed in the moment-to-moment discourse in the study group.

It was noted while the data was being organized around each teacher's d/Discourse, four session discussions and one post-interview comment had substantive overlap between the two teachers. That is, these overlapping excerpts were primarily when the two teachers engaged in interactions on the *same topic* with one another and illuminated differing perspectives. In one unique example, Josh Wolfe's post-interview comment was considered to be overlapping as he

provided a response speaking directly "as an adult" which mirrored a stem used by Luke Fisher in the fourth study group session. These two contributions were arranged side-by-side for this analysis, in addition to the study group interactions, which already presented the discourse side-by-side.

Each of the excerpts was analyzed using a discourse analysis (Gee, 1999/2005). Specifically, the transcribed text was interrogated with the following set of questions:

- What are the situated meanings of some of the words and phrases that seem important in the situation? (Gee, 1999/2005, p. 110)

- What institutions and/or Discourses are being (re-produced) in this situation and how are they being stabilized or transformed in the act? (Gee, 1999/2005, p. 111)

- What identities (roles, positions), with their concomitant personal, social, and cultural knowledge and beliefs (cognition), feelings (affect), and values, seem to be relevant to, taken for granted in, and under construction in the situation? (Gee, 1999/2005, p. 111)

- What sorts of social relationships seem to be relevant to, taken for granted in, or under construction in the situation? (Gee, 1999/2005, p. 111)

- What social goods (e.g., status, power, aspects of gender, race, and class, or more narrowly defined social networks and identities) are relevant (and irrelevant) in this situation? How are they made relevant (and irrelevant), and in what ways? (Gee, 1999/2005, p. 112)

These questions were chosen to highlight the ways in which words and phrases can illuminate larger social structures, relationships, and, ultimately, enduring positions. Specifically, a consideration of the first question helped to illuminate which words seemed particularly salient in a given interaction. These words and phrases were then selected for closer attention. How the

teacher elaborated what he meant and what implications these had for the enduring positions of each teacher were then attended to. Words and phrases point to the Discourses associated with a particular enduring position, the focus of this article. Therefore, as the answers to the questions converge as they are used to interrogate the excerpts of the study group, the enduring positions are further characterized.

Results

The results of the analysis showed that Luke Fisher and Josh Wolfe demonstrated differences in their discourse that indicated participation in different Discourses. Specifically, Luke used Discourses primarily compatible with the enduring position of transformationist with respect to the primary privileging and oppressing systems discussed in the study group (namely, racial privilege and economic security). He also used Discourses characteristic of an integrationist enduring position. Josh indicated Discourses compatible with the enduring positions of fundamentalist and integrationist with respect to racial privilege and economic security.

The results first report on Luke's d/Discourse and then Josh's d/Discourse in order to give a portrait of each of the teachers. The final section of the results articulates two vignettes to illuminate in what specific ways Luke's and Josh's discourse construed different Discourses.

Luke Fisher

In this section, through the use of some of Luke's own words, I show how Luke was primarily demonstrating an identity of transformationist with respect to race and class. This section is meant to provide a portrait of Luke to familiarize the reader with who he is and the ways in which he regularly talks about privilege, power, and his own identities. By providing this portrait, I show how Luke's d/Discourses reveal an enduring position that it is not neatly

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categorized by Howard's (2006) articulation and, therefore, show how it is important to attend to how individuals are using d/Discourses over time to consider what educational opportunities are appropriate. The section illuminates the themes found in the analysis of Luke's discourse and links them to the articulation of enduring positions by Howard (2006). It is not necessarily an exhaustive representation of all the themes but is a portrait across the contributions Luke made in the interviews and study group.

Luke acknowledged his race and class and linked these identities to a particular level of ignorance or a lack of awareness. This kind of acknowledgment and accompanying self-reflection are indicative of a transformationist enduring position because Luke highlighted his attention to how he is implicated as a participant in systems of privilege and oppression and because he was "honest" or direct about his participation (Howard, 2006). For example, when asked in the pre-interview about benefits and drawbacks to incorporating social and political issues in mathematics classes, Luke described that a drawback is trying to negotiate discussions about sensitive issues. He stated:

> Someone is going to say something that is ignorant. And so, now it's (up) to me to delicately but in no uncertain terms... talk about the issue. And try to revoice what was said inserting some more correct terminology and being more, trying, trying, 'cause I am, I am White middle class male who's dad is still paying his car insurance. I mean, there's just some things I just don't get.[15]

In this quote, Luke explained how a drawback to incorporating social or political issues in mathematics class would be trying to facilitate discussion about issues of race, in which someone

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[15] Transcripts presented here have been modified for ease of reading. When possible (or when it doesn't change the meaning), false starts have been omitted and words/phrases that repeat previously stated ideas have been omitted. When large portions of text are removed, I have summarized the intervening discussion in brackets with italics.

in the class might say something that would be "ignorant." He described how he would approach

handling this circumstance, but then turned to describe what was complicated for him about

trying to navigate the discussion. His statement "I am White middle class male" is an

acknowledgement of his race and class (and gender). His use of "I mean" linked the sentence

"there's just some things I just don't get" to this acknowledgement. In this contribution (and in

others), Luke described himself as white and middle class and then connected these identities to

a status of "ignorance" or lack of awareness.

Luke talked many times about the ways in which he related to students but also the ways

in which he went beyond just relating to the students to also consider their perspectives. This

discourse also revealed an enduring position of transformationist by showing the value Luke

placed on seeing the students' perspectives (e.g., "truth as dynamic/changing," "learning from

other cultures" (Howard, 2006, p. 104)). For example, in response to what particular insights and

passions led him to participate in the study group during the pre-interview, Luke stated:

> Whatever it takes to connect with one more kid, to buy in and start trying and start
>
> achieving and motivating themselves and being productive on their own.

This is an example of how Luke described how he might try to build a relationship with his

students. Beyond that, Luke also elaborated on how he specifically attended to the students'

perspectives. For example, during session two, the study group examined two drawings of a girl

(Pittelman & Resource Generation, 2010). The first drawing was labeled with observable

characteristics of the girl, such as "great smile," "polite", and "impressive degree" (Pittelman &

Resource Generation, 2010, p. 221). The second drawing was of the same girl and linked those

observable characteristics to possible experiences/privileges that the girl may have had, such as

"expensive dental work," "taught upper-class manners," and "family legacy aided admission to

exclusive school" (Pittelman & Resource Generation, 2010, p. 222). Luke's reaction to this final

privilege is an example of how he considered the perspectives of his students. He stated:

> I notice that I don't like--, I start to not like this girl when I read number nine. "Family
>
> legacy aided admission to exclusive school." I went to a great school, weren't no family
>
> legacy that got me in though. Certainly, we didn't, it didn't even though both of my
>
> sisters and I went there, we didn't get any bulk discounts either. ... (*omitted talk is Chloe*
>
> *speaking about what counts as "family legacy" to get into the university they both*
>
> *attended*) ... And I wonder if that's the small piece of what my students feel sometimes,
>
> when they look at me (*shows the first picture to the group*), or somebody else, if they
>
> look at this picture, and then they start to fill in these things (*shows the second picture to*
>
> *the group*) for themselves and they feel, (*makes noise 'pfft', pause*) slighted.

In this quote, Luke observed his own reaction to one characteristic depicted on the picture we

were examining and then elaborated on how he felt this was related to his students. He went

beyond talking about how he might develop a relationship with students by focusing on what

perspectives they might have. In other examples, he went one step further to describe how he

might use those perspectives to establish stronger relationships with the students or in other ways

in his practices as a teacher.

Luke described the identities through which he had access to many unearned privileges

(as was already noted with White, middle class) but also went on to connect this position of

power as coming with greater responsibility to seek social change. It is less clear whether this

discourse can be characterized as an enduring position of integrationist or transformationist

because Luke often said he thought "change" was his responsibility but he did not say what that

change would look like for him. For example, one activity in the fourth study group session

asked each teacher to identify themselves in the target or non-target group along many different privilege/oppression structures, such as race, class, age, ability, and English-speaking (Visions, Inc., n.d.). I asked the group whether or not there were final comments after we had talked about different aspects of lists we had each generated. An exchange with Luke was, as follows:

Luke: U.S. born, English speaking, literate, non-transgendered, college degree, young adult, Christian, weight, appearance. ... No disabilities, heterosexual, men, middle-class, white. Just totally in a place of power. It feels like more responsibility that way. I feel more responsibility that way because of that.

Kate: Responsibility for what?

Luke: For what I do with my life. Because of where I've been placed. Socially.

Kate: So ... you feel responsible to do what?

Luke: Make a difference.

Kate: Okay.

Luke: Make change for the better. Because, frankly, if someone with all of this (*circles whole non-target column*) can't, it's like who the heck are we waiting on? You know, I'm not going to get any taller but eventually I am going to get out of this young adult thing and then everything is going to be circled.

Kate: Right.

In this exchange, Luke described his identities and then explicitly stated that they motivated him to seek social change. Although it is not clear what he means specifically to be the result of this change, he certainly articulated how it is his responsibility because of his social position as a person in power to do something about the injustices in the world. The ambiguity of what he meant, though, pointed to an integrationist enduring position if interpreted as the kind of change

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associated with "missionary zeal" (Howard, 2006, p. 104). Interpreted another way, these kinds

of discourse might suggest an enduring position of transformationist because he was

acknowledging his "responsibility without guilt" (Howard, 2006, p. 104).

Luke typically revealed an enduring position of transformationist with respect to race and

class in the interviews and study group. That is, Luke's Discourses were primarily consistent

with an enduring position of transformationist; however, as described before, other factors such

as personal development or growth or habitus can influence a person's d/Discourses.

Josh Wolfe

In this section, I demonstrate in a pattern similar to Luke Fisher's section, how Josh

Wolfe used Discourses consistent with both the enduring positions of fundamentalist and

integrationist with respect to race and class. Specifically, I show how Josh talked about issues of

privilege, power, and identity to illuminate a perspective that is different than Luke's (a closer

analysis of how these differences play out in moment-to-moment interactions is the subject of the

analysis presented in the next subsection). This section discusses the themes found in the

analysis of Josh's discourse during the pre-interview, study group sessions, and post-interview

and links these themes to the articulation of enduring positions by Howard (2006).

Josh regularly spoke about a need to open his students' eyes (and not necessarily his

own) to the realities of the world around them. That is, Josh's conception of his students revealed

that he considered his perspectives to be right and what his students should strive for. These are

analogous to fundamentalist enduring position Discourses of "single-dimensional truth," "my

perspective is right—the only one," and "judgment" (Howard, 2006, p. 104). He described that

he felt he played an important role in doing this for his students through discussions. He often

attributed his age and experiences as reasons he was able to teach his students about the ways of

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the world. One example of Josh's discourse that shows how he sought to increase his students' awareness was a response in the pre-interview to an inquiry on the passions and insights that led him to participate in the study group. He began by saying, "my students." He then described two of the teaching mathematics for social justice tasks that he had experienced in the methods courses in the two preceding years. He continued:

> So, I thought that was a really cool idea and definitely it could be used anywhere. More specifically in my school there are just one of the stereotypes that not many kids go to college and a lot of kids get stuck in the same area and you know my kids say that their school is ghetto and just stuff like that that I think that it's important to help shed a light on social issues that are there. And open my students' eyes to, not just their community but including outside of that and some of these stereotypes are, you know, being forced by their actions and how that affects them, you know, anywhere from their community and how they are treated, to how colleges look at their ACT scores because of the school they go to, things like that.

In this quote, Josh talked about some of the social issues he saw as influencing the lives of his students. One interpretation of this quote is that Josh saw stereotyping and a lack of social mobility as problems facing his students and saw himself as someone who could increase his students' awareness of these systems. Another interpretation of the quote is that Josh saw increasing the students' awareness of the stereotypes as a way to instigate change in the students as opposed to seeing the stereotypes as problematic artifacts of larger systems of privilege and oppression.

In addition to talking about his role with students, Josh also talked extensively about his students and their lives, often comparing their lives with his own. By doing so, Josh engaged in

Discourses consistent with an enduring position of fundamentalist with respect to race and class because he communicated implicitly that his "self-esteem [was] linked to supremacy" (Howard, 2006, p. 104), described the superiority of his ways of living, and thought an assimilationist perspective was appropriate (Howard, 2006). The example presented here is taken from the pre-interview when he was asked directly to describe his students but it is reflective of the themes noticed across all of his data. He was asked to describe his students and their families and communities and he responded by saying how students all over have the same personalities. He elaborated on what makes them different from one another, by saying:

> They do the same things that other kids do but I think their background is what makes them different. And their families, and their upbringing and where they come from. So, I think being in Walnut Knoll, it's a very tight knit community so they do kind of have that "I've got your back" type mentality. But at the same time they kind of stick to what they know and for some of them education is not valued as much. So, I have a lot of students who will go home at lunch because their parents want them to babysit or I have a student who was moving, who-- so every day they had to go home and clean the house so that when people came to look at the house it was clean. So, I think when education isn't really there for all my kids and for that reason a very different situation than when I grew up where I learned how to study, my homework habits. I got pressure on me to do well. Where my students don't know how to study. They don't expect to have do home work every night. And half of them their parents don't even know their grades. So in that, that's very different, difficult to instill those values when everything around them is telling them, nah, we don't need to that, we'll be fine. So, it is a tight knit community and they have a lot of good things and support but the value on education isn't quite there.

Josh described his students' families and the Walnut Knoll community as "very tight knit" and elaborated that they "stick to what they know." Josh saw this as having consequences for what his students do and the choices they make, particularly with respect to schooling. He explained how different these choices are from the ones he made in his own life based on his parents' expectations and what his community valued. In this example, Josh again reiterated his role in trying to support students when he stated that it is "difficult to instill those values" such that students see the importance of education. Statements, such as "Where my students don't know how to study. They don't expect to have do home work every night. And half of them their parents don't even know their grades" indicated a deficit framing of his students and was influenced by their socioeconomic class (cf. Lareau, 1989). Josh also referred to his students' lack of cultural capital (i.e., as described by Bourdieu, 1973) implicitly but since he does not recognize the systemic problems that have led to his students' experiences, he did not identify a lack of cultural capital as part of the problem his students were facing.

At times, Josh did not only describe his role in increasing his students' awareness but went on to explain how students themselves might change their social position. That is, he suggested that he played a role in increasing their awareness and providing them with some ideas on how to change their behaviors, but their futures were dependent on the students (themselves) changing their behavior. This discourse revealed a fundamentalist enduring position because it aligned with Howard's (2006) articulation of Discourses including an assimilationist perspective that perpetuates the dominant culture. Josh was asked in the pre-interview to describe what he sees as his students' futures. He began by recounting a discussion he had with students about the ACT. He described the tension between what the students envision for themselves and their lived experiences.

So, in reality, I think, some of them can get there (to college) if they are willing to, you

know, be self-disciplined, and willing to put aside their distractions and, you know, the

things in high school and focus on their education and so you can kind of see those

seniors that have done that, and who are pushing to get out (of their neighborhood) and,

you know, be successful and not have to live in Walnut Knoll any more, you know, not

that they don't have to but you can see some of them want a better life than they currently

have and that might mean having to move out of Walnut Knoll so. There are those that do

that and then those that say they are going to do that but then the support system is not

there at every level to help them get there.

Josh described a pattern of self-discipline and focused work as keys to furthering one's

education. Taken together with a quote presented earlier in which Josh talked about the

difference between his life and his students' lives, there is an implicit communication of

education as valuable. He also described that he thinks students should want to have a "better

life" and that the only way to do this is to leave Walnut Knoll. Josh's use of "better life" pointed

to a belief that all people can do better for themselves if they just work hard enough.

During the sessions, Josh often stated that he did not know something that we were

discussing or that his eyes had really been opened. This awareness is characteristic of the kind of

growth that Howard (2006) described between a fundamentalist enduring position and a

transformationist enduring position. Although many of Josh's contributions illuminate a

fundamentalist enduring position, this "beginning awareness" (Howard, 2006, p. 104) is a part of

the Discourses of an integrationist enduring position. In three of the five session excerpts,

specifically for Josh, he explicitly stated that he had not known about a particular social

issue/inequity until we discussed it. He also talked about his increased awareness of how social

structures shape privileges. During the post-interview he had additional reflections on having his eyes opened during the sessions. The example presented here to illuminate the kind of instance in which he described not knowing something until we discussed it took place in the context of the examination of the two pictures of the girl, previously described in Luke's section (Pittelman & Resource Generation, 2010). Some of Josh's contribution to the discussion of these pictures was as follows:

> I think that you think about the things in the second one (the second picture with the privileges/experiences), like, as a whole, and you kind of imagine that could be one of my students and that could be why grades in general or performance in school in general might be lower than somebody else, but when you take a look at each individual thing, and each thing from the first one (the first picture with the attributes/characteristics), it's kind of thinking about it in a way I've never thought about it before. Like, every single one of these things is a direct correlation to some experience or some privilege that this person has had.

In this quote, Josh talked about how the correlation between experiences and unearned privileges and outward attributes of a person was a new revelation for him. This kind of discourse indicated, at least in several moments in the study group, that Josh was beginning to see privilege and oppression in ways he had not before. This increased awareness would have the potential to shift Josh's Discourses more into alignment with an integrationist enduring position, but only if his beginning awareness started to change other aspects of Discourses, such as "ways of behaving, interacting, [and] valuing" (Gee, 1996, p. viii).

Cross Teacher Analysis

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The purpose of this section is to illuminate the ways in which Luke's transformationist Discourses compared to Josh's integrationist Discourses in the moment-to-moment discourse of the study group. In this section, I use two vignettes taken from the identified overlapping set of interactions in the data to highlight the differences in discourse used. These vignettes show how the discourses in the moment-to-moment interactions would, if repeated over time, construe the Discourses of the enduring positions. The purpose of these vignettes is to describe the major themes represented across the entire set of overlapping data between the two teachers and are not necessarily exhaustive of all of the nuances found in the analysis of the full set.

Vignette 1. One difference in the moment-to-moment discourse between Luke and Josh is how each conceptualized his responsibility as a person who benefited from privilege with respect to race and class. Particularly, Luke felt it was his responsibility, as someone who was in a non-target group, to speak and act against injustices when he identified them, while Josh wondered how he might know that it was his responsibility to speak against injustices. The vignette presented here captured an exchange between Luke and Josh that illuminated these differing perspectives on the role and responsibility of people who benefit from privilege.

During the discussion of the inequitable distribution of wealth in America video (politizane, 2012), the topic shifted to what we, as a society and individuals, might do to counter the injustice represented in the video. I relayed a story that happened to me a few weeks earlier when I was sitting on an airplane and the two people next me had a conversation about how women are not good at math. In the moment, I chose not to pursue confronting my fellow passengers but, later, upon reflection I was able to think about the role my position as a target group member (a woman) played in not speaking out. I told the study group teachers this story and then, as a way of clarifying what was salient in the story for me, I conjectured on what my

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reaction would have been had my seatmates said, "Black people can't do math." I determined that I would have used my position of privilege as a White person to challenge the prejudicial comments but that it was much harder to do that as someone who does not benefit from male privilege in the moment of the interaction that actually happened on the airplane. After my story and Chloe telling her own story about the lack of support for women in the field of mathematics, the dialogue continued as follows:

> **Luke**: You have more power to voice an injustice if you are defending someone else as opposed to your own group. So, if a man, a man might have a little more power to voice women's rights because--, not because men are better, but just because he can't be perceived as whiny and combative.
>
> (*Chloe agreed and Josh asked if I would have changed my actions in the moment. I talked about how I do not know if I would have, given the other constraints of a three hour flight in a confined space and not knowing the people on the airplane.*)
>
> **Josh**: I guess, it seems, I mean, so I guess I kind of disagree. Like I understand the situation, I understand the point that you are making that the group of power has more influence maybe. But if no one ever speaks up in an oppressed group, then how are you going to--, not you guys specifically, but how are you going to expect someone to speak up for you? ... (*There was a glitch in the technology so Josh's contribution was interrupted, but he continued with what was missed when we were temporarily disconnected.*)[16] You would hope that somebody else would speak up for you, but if you don't speak up for yourself then why is anyone going to change the way things are or

---

[16] Josh participated in the study group through video conferencing.

decide to speak up for you if they don't even know that that's something that you are

passionate about, you care for, you stand for, etc.

(*Luke wondered about the socioeconomic class of the filmmaker. He doubted the*

filmmaker was in the poorest group.)

Josh: So then would you say it's inappropriate for someone in the poorest end to have

made that video?

Luke: No. But—

Josh: Even though they're not in a place of power, and they don't have that much

influence.

Luke: Well, what would catch your eye more? If someone--, someone who is in a

position to lose from shifting the power is heard more clearly than someone who has the

potential to gain by a shift in power.

Josh: I would agree. Now, I mean, in terms of the video, I would say that it's a

completely different situation than Kate sitting on the plane for the next two hours with

the person she's argued with versus the video where you have no idea what that person

looks like, their status, their class, their anything. So, yeah, I do understand there's

definitely a difference in that situation. Um, but it just seemed like you guys were saying,

oh, don't say anything—

Luke: Oh, no!

Chloe: I mean it's just its easier to say something if you are not--, if you are in the group

that has privilege.

Josh: Right.

During this exchange, Luke and Josh both indicated their interpretations of their responsibilities as people who benefit from privilege. I show here how each used different words and phrases to describe his perspective and I also discuss the identities, social relationships, social goods, and Discourses implicated based on the discourse analysis (Gee, 1999/2005).

I chose to focus on two stretches of discourse in particular in this exchange that illuminated each of Josh's and Luke's perspectives, respectively. These chosen instances are used as the primary discourse for highlighting the varying perspectives but are indicative of the kinds of discourse used throughout the exchange. For Luke, I chose the stretch of discourse when he stated, "Someone who is in a position to lose from shifting the power is heard more clearly than someone who has the potential to gain by a shift in power." In this discourse, Luke described how a person in power ("someone who is in a position to lose from shifting the power") is positioned as someone who can speak on behalf of others ("is heard more clearly"). Luke's statement also positioned people who do not benefit from privilege ("someone who has the potential to gain by a shift in power") as people who profit from someone else speaking on their behalf.

For Josh, I chose the stretch of discourse when he stated, "You would hope that somebody else would speak up for you, but if you don't speak up for yourself then why is anyone going to change the way things are or decide to speak up for you if they don't even know that that's something that you are passionate about, you care for, you stand for, etc." Josh's discourse positioned people who benefit from privilege as unaware of a need to speak up for someone else without being told ("why is anyone going...to speak up for you if they don't even know"). Josh also positioned marginalized people as having the responsibility to speak for themselves.

The moment-to-moment interaction between Luke and Josh presented here revealed a transformationist enduring position for Luke because his discourse mirrored the description of Discourses by Howard (2006) for this enduring position. Specifically, Luke's statement, "You have more power to voice an injustice if you are defending someone else as opposed to your own group" communicated a position of "social action/active engagement" (Howard, 2006, p. 104). Also, implicit in Luke's contributions here were that a person in power (or a person with privilege) would be aware of the inequity without having to be told. This is primarily evident with the contrast that Josh offered of the person in power needing to be told what the inequity was in any given situation. For Luke, this revealed Discourses, such as "acknowledgment/empathy" and "enlightened aversion to oppression" (Howard, 2006, p. 104) which are characteristic of the transformationist enduring position.

In contrast, Josh's discourse in this interaction construed an integrationist enduring position because it aligned with the Discourses articulated by Howard (2006) for this enduring position. Specifically, Josh's posed the rhetorical question, "But if no one ever speaks up in an oppressed group, then how are you going to--, not you guys specifically, but how are you going to expect someone to speak up for you?" he was engaging in Discourses in which issues of inequity are "externalized as someone else's problem" (Howard, 2006, p. 104). Additionally, Josh's perspective on the situation depended on individuals speaking up and did not acknowledge the role of the systemic oppression that might serve to restrict an individual's capacity to do this. This kind of perspective is characterized by Howard (2006) as "personal rather than institutional critique of dominance" (p. 104). In this interaction, Josh construed an integrationist enduring perspective through the discourse he used to communicate his perspectives.

The analysis of this exchange among the members of the study group illuminated the ways in which the moment-to-moment discourses construed different Discourses for Luke and Josh, in particular. How each described the responsibility of people who benefit from privilege showed a transformationist enduring position for Luke and integrationist enduring position for Josh.

Vignette 2. Another way in which differences were noted in the moment-to-moment interactions between Luke and Josh was in their verb use and how this communicated their relationship with their students. Specifically, Luke positioned his students as people from whom collaborative work and learning could occur, while Josh often talked about his students as people whom he could impart knowledge to. The vignette presented here provides the larger context for a closer analysis of two particular phrases. During the reading of this vignette, the reader should note Luke's use of "bestow" and Josh's use of "instill." These will be central to the distinctions made in the analysis elaborated below.

In the discussion of the list of marginalizations with respect to low socioeconomic status (Scalzi, 2005), Josh wondered what he might do if one of his students had a life that could be characterized by the list. Luke responded during the following exchange:

Josh: So, what--, I don't really know of--, what (do) I (do to) encourage this student? What does this student want? Obviously, it's not a blanket statement across the board, but, that's somewhere where I feel uncomfortable and have very little knowledge of what to do.

Luke: I think the top thing that they want is for you, or for us, to bestow upon them dignity. [*Chloe:* Um-hmm.] They want dignity. I wanted to be treated like a human being. Not something second class or something, or someone that is lacking something. Not

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someone who is in need of something. You want to treat them like a human being that

brings something to the table when they come to class. They have something to

contribute to your day, to your class.

Josh: Okay. So--

Luke: Because they are so used to, if they are used to being in need, and feeling like they

have to ask, or like they can't ask or steal or, you know, [*Chloe, Kate:* Um-hmm] I don't

know, I'm grasping at straws I feel like.

Josh: So, say I have a student who identifies with some of these things and you know

come(s) into my class feeling valued and feeling like they are comfortable in my room, I

feel like I am, you know, instilling values like working hard and taking pride in your

work and things like that that a teacher would kind of expect out of a student. You know,

what motivation beyond just to get good grades do I have to give this student? 'Cause for

me it was, okay, you gotta get to college. Get the good grades. [*Chloe:* Right.] Well,

college leads to this. It leads to living in this home, this area, to get this job, to make this

much money and that was enough motivation right there.

During this exchange, Luke and Josh both speak about the relationship they have with

their students and the responsibilities they identify associated with this relationship. I point out

here the uses of two different verbs in describing this relationship and discuss the identities,

social relationships, social goods, and Discourses implicated based on the discourse analysis

(Gee, 1999/2005).

When Josh first posed the question about what he ought to do if he had a student whose

lived experiences were characterized by the list of marginalizations, Luke first stated, "I think the

top thing that they want is for you, or for us, to bestow upon them dignity." In Luke's sentence

the action he suggested taking is "bestow[ing]...dignity." The actor in this sentence is the teacher. This statement positioned the teacher as someone who has the power to give dignity to the students and positioned the students as people who need to have dignity given to them. Luke defined what he meant by "dignity" in his contributions as well. Luke stated, "I wanted to be treated like a human being. Not something second class or something, or someone that is lacking something." Luke's use of the pronoun "I" in this sentence as he began to clarify his use of "dignity" positioned him as empathetic to the situations of the student he described. He suggested that "human beings" ought to be positioned such that they are acknowledged as complete ("not...someone that is lacking something") and as able to be productive ("a human being that brings something to the table when they come to class"), particularly in the context of school. For Luke, students who experience the marginalization characterized by Scalzi (2005) were people to whom "dignity" should be given by positioning them as people who bring something worthwhile to class.

Josh continued after Luke's contribution by talking about how he characterized how he ought to work with students whose lived experiences match the list of marginalizations. Particularly, Josh stated, "I am, you know, instilling values like working hard and taking pride in your work and things like that that a teacher would kind of expect out of a student."
The actor in this statement, like in Luke's statement, is the teacher. This statement positioned the teacher as someone who imparts values to people who receive them. The students were positioned as the receiver of these values and people who would need to conform to the expectations of "working hard" and "taking pride in your work." These expectations, coupled with "motivation" are the values that Josh believed were the responsibility of the teacher to provide. He continued by unpacking what purposes he thought these values would serve (e.g.,

attain an education which is important). For Josh, schooling is of central importance because it leads to personal achievements later in life ("College leads...to living in this home, this area, to get this job, to make this much money..."). For Josh, students who have lives characterized by the list of marginalizations (Scalzi, 2005) were people positioned as receivers of values imparted by the teacher.

Both Luke's and Josh's discourses imply a power relationship between the teacher and the students. In each of their discourses, the teacher was positioned as having the authority to do the action. In Luke's discourse, he increased the status of the students by elaborating on what he meant by "dignity" and how students should be treated. Josh, in contrast, did not increase the status of the students as his further elaboration continued to perpetuate the students' positionings as subordinate to the teacher.

For both Luke and Josh, this discourse pointed to their previously identified enduring positions of transformationist and integrationist, respectively. Luke's discourse of "bestow[ing]...dignity" in conjunction with the way he further positioned the students construed a transformationist Discourse because he indicated that he was acknowledging and empathizing (Howard, 2006) with the students who live in poverty. Additionally, Luke's discourse showed that he considered engaging with students in a way that respected what they could teach him (Howard, 2006) was an important aspect of working with these students. These characteristics, as discussed before, constitute the kinds of Discourses associated with the enduring position of transformationist. Luke's positioning of the teacher as someone in power though showed the ways integrationist Discourses were also construed in Luke's discourse.

Josh's discourse of "instilling values" and his further elaboration construed an integrationist Discourse because he indicated a patronizing (Howard, 2006) view of his students.

Additionally, Josh's question and his continued persistence to try to determine a way to engage the marginalized students also indicated an integrationist enduring position because he showed a desire to help these students (e.g., "missionary zeal" (Howard, 2006, p.104)). Similar to how Luke's positioning of the teacher as someone in power added nuance to a characterization of transformationist, so does Josh's description of what values should be instilled in students. Josh's discussion of what values the students should take up depicted a more fundamentalist enduring position because the discourse highlighted a perspective that his values are the "right" values (Howard, 2006).

The analysis of this exchange between Luke and Josh highlighted the ways in which, in moment-to-moment interactions, their discourses varied in ways that construed different Discourses. Specifically, attending to the use of two different verbs and what they suggested about the relationship between teachers and students who live in poverty illuminated a predominantly transformationist enduring position for Luke and a predominantly integrationist enduring position for Josh. The additional nuance added with the statements that did not fit neatly into the originally characterized enduring position reaffirmed the role "habitus" plays at the individual level (Harker, 1984) or suggested possible personal development and growth with respect to privilege and oppression.

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Discussion

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In this paper, I have shown the ways in which two White middle-class male mathematics teachers' demonstrated their enduring positions through d/Discourses. Luke Fisher revealed Discourses characteristic of an integrationist and a transformationist with respect to race and class, while Josh Wolfe used Discourses consistent with a fundamentalist and integrationist enduring position with respect to race and class. These Discourses were apparent in the discourse

across the study group and interviews as well as in the moment-to-moment interactions between these two teachers.

This study builds on previous literature describing Discourses of particular races and classes to illuminate the role of awareness of privilege in shaping an individual's d/Discourse. In particular, this study builds on Howard (2006) to show how the Discourses he characterized are evident in moment-to-moment interactions. Analysis at this level is important both for research in teacher education and the practice of teacher education. With respect to research, this analysis is important because it shows how a person's d/Discourses are being influenced by their awareness of their privilege in conjunction with the Discourses associated with their cultural contexts. For example, Bialostok (2002) characterized the metaphors White, middle-class parents invoke around literacy instruction to make claims about the ways of being or Discourses associated with White, middle-class people in the context of schooling. Perhaps these Discourses are evidence of particular levels of privilege too, which is not attended to by Bialostok. In other words, understanding how privilege plays a role in shaping people's lived experiences can influence the d/Discourses they use. Researchers should be cautious in making claims about habitus, particularly when they are working with people who benefit from privilege, because their awareness of privilege can interrupt and shape their d/Discourses so that they are not in alignment with the cultural ways of being.

With respect to the practice of teacher education, this study illuminates the importance of thinking about how teachers communicate with one another around conceptions of privilege, power, and identity. In the two vignettes provided, Luke and Josh had discussions related to the same topic but had very distinct interpretations of those topics. At one point, they even agreed that they were agreeing, when the discourse analysis revealed important differences. Teacher

educators need to consider the ways in which teachers engage in d/Discourses that reveal their enduring positions to consider what kinds of opportunities should be made available to continue a consideration of privilege and identity. For example, a teacher educator working with Josh might consider the ways to further raise his awareness of social issues and then press Josh to consider what he might do with this increased awareness. Although it was apparent in the study group that he was learning new things with his repeated declarations of "I did not know that," it was not always clear that this new awareness led to any new discourse, which over time could have led to new Discourses.

Of note is that both teachers wanted to use mathematical tasks in their classrooms, which engaged students in discussions about social justice. This is important because it suggested that people do not have to have the enduring position of transformationist in order to desire to engage in social activism in their classrooms. This desire, however, also raises some questions. For example, what might the discussions in each of Luke Fisher's and Josh Wolfe's classrooms look and sound like? What kinds of conceptions might be taken up for discussion in each of these classes? What influence might each have on students' developing enduring positions with respect to race and class? What role does the race and class of their students have in how these discussions are shaped? It could be speculated that in Josh's class, for example, his fundamentalist enduring position in a White suburban context (where he was teaching) could perpetuate and reinforce some of his students' beliefs that their ways of knowing and living are correct. They would, in turn, continue to hold an enduring position of fundamentalist, which reifies inequitable social structures.

This paper described how enduring positions can be seen in teachers' discourses and Discourses. It is particularly important to illuminate how teachers who benefit from systemic

privilege engage in d/Discourses when discussing privilege, power, oppression, and identity. They construe their identities through the very act of repeating their discourses. In time, discourses become Discourses, which continue to shape their ways of interacting with others. As teachers work in a context in which they are continually interacting with students, it is important to consider the ways in which every moment of discourse might serve to perpetuate the status quo or provide an opportunity to change it.

In being in favor of something or someone, I am necessarily against someone. Thus, it is necessary to ask: "With whom am I? Against what and whom am I?" To think about my homeland when asking these questions and without answering them, would lead me to pure idealizations that are removed from reality. The lack of clarity with respect to the problems involved in these inquiries and the lack of interest toward these problems makes us complicit with the violent oppressors and with the (dis)order that benefits them. (Freire, 1997/2007, p. 40)

CHAPTER 4: LAMINATING POSSIBLE SELVES AS A WAY TO ENVISION TEACHING MATHEMATICS FOR SOCIAL JUSTICE

Teaching mathematics for social justice requires developing both mathematical proficiency and social awareness (Bartell, 2013; Gutstein, 2006). Effectively engaging students in mathematical work that highlights social, political, and environmental injustices requires novice teachers to adopt a particular stance towards their teaching practices and, really, the world in which they live (Bartell, 2013). That is, learning to teach mathematics in this way requires becoming a critical mathematics teacher (or one that uses mathematics as a tool to illuminate inequity). The path to becoming this kind of teacher is not easy or direct as teachers engage in teacher preparation programs or professional development (e.g., Bartell, 2013; Kelly & Brandes, 2001; McDonald, 2005).

Sociocultural theories describe learning as a process of becoming a particular type of person (Moschovich, 2002; Esmonde, 2009; Gee, 1999/2005). Therefore, learning is determined to be evident when people's patterns of interacting have changed and might be analyzed through how people participate with others around them (e.g., Kazemi & Franke, 2004). Learning can be seen through people's actions and words with those with whom they interact.

In this paper, I investigate how first year teachers learn to become a critical mathematics teacher by examining how they discuss *Reading and Writing the World with Mathematics* (Gutstein, 2006). To provide background for the reader, I first describe what I mean by teaching

mathematics for social justice and critical mathematics teacher and describe the professional development in which this study is situated. I then articulate a theory of identity and extend this theory to include the identity construction of novice teachers in order to elaborate on how novice teachers weave together a variety of ideas, conceptions, and identities to establish themselves as teachers. I also describe the ways in which identities are seen in particular types of discourse before explaining the methods of data collection and analysis for this paper. The findings of this paper report on the different identities explored by the teachers in the study group as they learned about becoming a critical mathematics teacher. I conclude with how this study contributes to mathematics education research and mathematics teacher education.

Teaching Mathematics for Social Justice and Professional Development

To elaborate on the content for the study group and its relevance to mathematics teachers, I describe what is meant by *teaching mathematics for social justice* and *critical mathematics teacher*. I then explain the type of professional development that might be used to prepare teachers to teach in this way.

Teaching Mathematics for Social Justice

Fundamentally, teaching mathematics for social justice is teaching the content of mathematics in such a way that students[17] use mathematics to understand the world around them ("read the world") and to facilitate an opportunity for them to bring about change in the world ("write the world") (Gutstein, 2006). Teaching mathematics for social justice is a perspective on mathematics teaching and learning that is grounded in critical theory or critical pedagogy (Stinson & Wager, 2012). Specifically, teaching mathematics for social justice or TMfSJ (Gau,

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[17] I refer to "students" as those engaged in the learner's role while discussing teaching mathematics for social justice; however, as life-long learners, teachers, particularly those involved in a professional development, are also the students I refer to here.

2005) is teaching mathematics such that social and political issues are illuminated and confronted. These issues are highlighted through tasks developed out of collaboration between students and teachers. Ideally, TMfSJ tasks teach rigorous mathematical content as well as provide insight to a particular social or political issue (reading the world) for the purpose of instigating social change (writing the world) (Gutstein, 2006). For example, students can investigate the accessibility of their school buildings (Renner, 2006) or the amount of time in school uninterrupted by announcements and corresponding instructional time (Berkman, 2006)— examples of "reading the world". This increased awareness will hopefully prompt them to "write the world" by, for instance, authoring letters or campaigning for better accessibility and more uninterrupted school time. These tasks also address important mathematical concepts, such as the Pythagorean Theorem or proportional reasoning.

In this paper, I use *critical mathematics teacher* to mean someone who is TMfSJ in her classroom. Although critical mathematics teacher is often used more broadly by other scholars (e.g., Skovsmose, 1985; Frankenstein, 1983), critical teachers are concerned with teaching and learning so that oppressors and the oppressed are liberated from their roles in societal structures (Freire, 1970/2000; Powell, 2012; Stinson & Wager, 2012). Specifically, Gates and Jorgensen (Zevenbergen) (2009) described different variations of TMfSJ that ranged from "moderate" to "liberal" to "radical" (p. 166-7). People in these variations differ in their beliefs about whether or not systemic inequity is actually possible to change (Gates & Jorgensen (Zevenbergen), 2009). Regardless of the variation of TMfSJ, the critical perspective of learning and teaching is important to TMfSJ. For this reason, I use critical mathematics teacher as synonymous with a teacher who is TMfSJ.

Ernest (2007) articulated a list of reasons he thought might compel people to be oriented towards a critical perspective in their classrooms. People might empathize with members of another group because of a targeted group they belong to (Ernest, 2007). A person's life-history might include injustices that would prompt empathy with others (Ernest, 2007). Alternatively, Ernest (2007) suggested that a person might approach social justice on an abstract level through the development of a "ethical/social justice political perspective" (p. 3). These reasons are a subset of those given by Ernest that he speculated motivates people towards a critical perspective of teaching.

Professional Development

The reasons articulated by Ernest (2007) are possibilities for developing as a critical mathematics teacher but are unlikely to be sufficient, given the demands of TMfSJ (Bartell, 2013; Gutstein, 2006). In order to become a critical mathematics teacher, educational opportunities should be available to support teachers in developing practices to TMfSJ (Bartell, 2013; Gutstein, 2006; Gates & Jorgensen (Zevenbergen), 2009; Nolan, 2009). Practice-based professional development is one way that this support might be provided. In practice-based professional development, teachers have opportunities to think carefully about artifacts from the practice of teaching, such as video or written excerpts of their own classroom practice or someone else's and student work (Steele & Hillen, 2012; Wilson & Berne, 1999). Particularly, a study group or book club can support teachers in learning (or becoming a certain kind of teacher) through practice-based materials (Arbaugh, 2003; Loucks-Horsley, Stiles, Mundry, Love, & Hewson, 2009).

The use of a book club as a context for the study group in this paper will be described in a later section. I will first elaborate on the theory of identity on which this study relies to show

how the type of discussion in this kind of professional development can be illuminating of teachers' identities.

Developing Teacher Identities

As described earlier, this study draws on a sociocultural theory of learning and sees learning as becoming a particular type of person (Moschovich, 2002; Esmonde, 2009; Gee, 1999/2005). There are a variety of ways to mobilize specific theories and analyses to consider the identities of teachers based on previous work on both students' and teachers' identities (e.g., Agee, 2004; Bishop, 2012; Calabrese Barton et al., 2013; Juzwik, 2006; McCarthy & Moje, 2002; Martin, 2006; Ronfeldt & Grossman, 2008; Sfard & Prusak, 2005; Sumara & Luce-Kapler, 1996; Tan & Calabrese Barton, 2007). This study explores how people's interactions with others, both people physically present and represented in a written text, provide them an opportunity to see identities. In this section of the paper, I first elaborate on how examining local interactions can help researchers identify individuals as being a particular kind of person in that context (Gee, Allen, & Clinton, 2001; Gee, 1999/2005), which might be referred to as *identities-in-practice* (Holland, Lachicotte, Skinner, & Cain, 1998). Specifically, this paper examines how mathematics teachers' identities-in-practice develop over time as they discuss a book about TMfSJ. Next, I articulate how early career teachers negotiate and develop their mathematics teaching identities-in-practice because this study examines the identities-in-practice of first year teachers. Finally, I describe how specific ways of making sense of text provide an opportunity for the mathematics teachers to reveal their identities-in-practice. The literature described here will establish that mathematics teachers reveal their identities-in-practice by discussing excerpts of the text and comparing and contrasting themselves with these excerpts.

Identities-In-Practice

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The definition of identity described here begins with positioning theory (Harré & van Langenhove, 1991; Harré & Moghaddam, 2003; Harré, 1984). In mathematics education research, positioning has been described as "the ways in which people use action and speech to arrange social structures" (Wagner & Herbel-Eisenmann, 2009, p. 2). That is, people's words and actions indicate to others (and themselves) information about who they are, what their role is, how they should interact with others, and what concepts are valued. Holland, Lachicotte, Skinner, and Cain (1998) draw on the theory of positioning to articulate a definition of identity (called identity-in-practice), which they see as constantly undergoing change when people interact with others. This paper, then, assumes that a person's *identity-in-practice* is constructed, modified, and expanded through interactions with others (Holland, Lachicotte, Skinner, & Cain, 1998).

As social beings that interact with others in a variety of contexts, people develop many identities-in-practice that are shaped, modified, and under transformation in these varied contexts through interaction. This paper focuses on one identity-in-practice of the teachers in the study group. In particular, I examine the teachers' developing identities-in-practice as mathematics teachers. I, therefore, use *mathematics teacher identity-in-practice* to indicate a novice teachers' developing sense of self as a mathematics teacher. As a result, not all positionings (or identities-in-practice under transformation) are considered. I only attend to the positionings that are a part of the teachers' developing identities as mathematics teachers and not, for example, their positionings as White people or how they position the content of mathematics because the analysis in this paper focuses on their learning to become a critical mathematics teacher.

Developing Mathematics Teachers' Identities-In-Practice

People come to the profession of teaching with some conception of what it means to be a teacher. This conception is formed from a person's experiences in schooling as a student (Lortie, 1975), with media and other public images that portray schooling, and from teacher preparation programs. Teachers, particularly those early in their career, experiment with a range of *possible selves* (or imagined or enacted identities) in their practices as novice teachers (Markus & Nurius, 1986; Ronfeldt & Grossman, 2008). Possible selves (or provisional selves) include specific ways of valuing, interacting, and being in a professional context (Ronfeldt & Grossman, 2008; Markus & Nurius, 1986; Ibarra, 1999).

Markus and Nurius (1986) describe possible selves by saying, "possible selves are individualized or personalized, but they are also distinctly social" (p. 954). That is, each person's imagined possible self is unique, but each possible self develops as a result of socialization (in this case, the socialization of new teachers). Each possible self acts as a context for a person's developing identity-in-practice and can be grafted together with other possible selves to shape one's future self (Markus & Nurius, 1986).

I draw on the metaphor of *lamination* described by Holland and Leander (2004) to characterize how possible selves are linked to a mathematics teacher's identity-in-practice. Early career teachers, like others who are experimenting with a multitude of possible selves, may find themselves layering practices, beliefs, and identities such that they are all overlapping. "Episodes of positioning create what we might think of as a laminate. They leave memories laced through feelings, bodily reactions, and the worlds and glances of others" (Holland & Leander, 2004, p. 131). That is, as early career teachers interact with others over time, they begin to develop who they are as a mathematics teacher. This stability only develops over time, interacting daily with students, participating in professional development and engaging in other practices in the context

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of teaching. Lamination is the process by which the exploration of possible selves develops the mathematics teachers' identities-in-practice.

Possible selves are layered to develop, extend, and complicate a person's mathematics teaching identity-in-practice. Early career teachers experiment with many, many possible selves until they begin to "thicken" (Holland & Leander, 2004, p. 131) over time with experiences in the classroom and as a part of professional development to a more stable way of conceptualizing themselves as mathematics teachers.

Seeing Identities-In-Practice in Discourse

As was mentioned previously, the context for this study group was a book club about TMfSJ. Therefore, this section of the paper first describes one way to evidence possible selves under exploration in the context of a book club. Then, I justify the use of the text *Reading and Writing the World with Mathematics* (Gutstein, 2006).

Markus and Nurius (1986) state, "possible selves are the direct result of previous social comparisons in which the individual's own thoughts, feelings, characteristics, and behaviors have been contrasted to those of salient others" (p. 954). One of the "salient others" described here could be a respected colleague or might be a teacher represented in the text of a book or other practice-based artifact of teaching, such as a video or written narrative of a lesson.

I argue that teachers can experiment with an array of possible selves over time through their discussion of a "salient other" in a text; in this case the text is *Reading and Writing the World with Mathematics* (Gutstein, 2006). The "salient other" represented in this text is the author (Gutstein) whose classroom practice is represented in the text. My argument about experimenting with selves is not unique (e.g., Beach, 2000; Blackburn, 2002/2003; Thein, Beach, & Parks, 2007). Teachers explore their possible selves by discussing their own "thoughts,

feelings, characteristics, and behaviors" (Markus & Nurius, 1986, p. 954) with respect to the salient other represented in the text. This kind of discussion would be seen through what Wortham (1995) characterizes as *participant examples*. A participant example is a stretch of discussion in which an actual or hypothetical event is described and also "*includes* at least one person also participating in the ... conversation" (Wortham, 1995, p. 69).

In participant examples, people express their own positioning by comparing or contrasting themselves with another person or group of people represented in a text (Wortham, 1994, 1995, 2003). In these particular stretches of discussions, participants can position themselves as a particular kind of person in the current situated context by explicitly denoting (or otherwise indicating) that they are similar to or different from a particular salient other. This is one way a teacher can be exploring a possible self as a way to develop, complicate, or extend her identity-in-practice. In an example from an interaction between a teacher and students in a social studies classroom, Wortham (2003) explains the idea of participant examples by showing how a classroom teacher denotes himself as Caesar and denotes a particular student, whom he has had a difficult relationship with all year, as Cicero, who betrayed Caesar. The teacher does this by saying, "Suppose this dictator, me. There was a plot going on, and you found out about it..." (Wortham, 2003, p. 195). As the classroom teacher enacts the role of Caesar, he positions himself both as the angry tyrant Caesar who is betrayed by Cicero but also as the teacher who is angered by the student's actions. Therefore, the teacher has both denoted himself and positioned himself as a tyrannical leader in these interactions with this student in the classroom. In the case of a novice teacher experimenting with possible selves, a possible self would be indicated when a teacher discusses their own practice in comparison or contrast with another's practice. Participant examples can be used to identify teachers' possible selves and provide a window into

how their identities-in-practice are developing and transforming. The use of participant examples is prominent in contexts in which people have the opportunity to compare or contrast themselves with a salient other. I describe the type of professional development context investigated in this study in the following section to show the type of context that supports teachers in using participant examples.

Book Club

Book clubs are one type of study group and have been explored as a form of professional development (e.g., Flood & Lapp, 1994; Florio-Ruane, 2001; Kooy, 2006). A book club has been shown to provide space for teachers to have discussions about complex ideas (e.g., Clark, 2001; Florio-Ruane, 2006; Herbel-Eisenmann, Drake, & Cirillo, 2009; Males, Otten, & Herbel-Eisenmann, 2010; Wortham, 1995). In particular, a book club around an autobiographical text allows teachers to tell stories from their own histories that mirror or contrast with the narrator of the autobiography (Florio-Ruane, 2001). Teachers are able to tell stories from their own experiences that allow them to "illustrate the text" (Wortham, 1995, p. 68) and simultaneously, "experience the text" (Wortham, 1995, p. 72). This duality will be explained in greater detail in the data analysis section of this paper.

Although the text explored in the study reported here, Gutstein's (2006) *Reading and Writing the World with Mathematics*, is not an autobiographical text in the same way as the texts used by Florio-Ruane (2001), there are characteristics that are similar. Gutstein (2006) weaves stories from his classroom together with literature on teaching and mathematics education to build a cohesive text about what it means to TMfSJ from his own experiences. Gutstein's portrayal of his own work is a representation of a "salient other" (Markus & Nurius, 1986, p. 954) who is a critical mathematics teacher that other teachers can position themselves with or

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against. Therefore, in a book club about *Reading and Writing the World with Mathematics*, teachers can use participant examples to reveal the possible selves under experimentation in their developing identities-in-practice as mathematics teachers.

Given that the process of becoming a critical mathematics teacher is not an easy and direct path, it is important to understand what possible selves teachers negotiate as they experiment with the idea of what it means to become a critical mathematics teacher. Revealing the possible selves that arise through a discussion of a book about TMfSJ can provide teacher educators with information to better know what kinds of opportunities to learn are needed to support developing a particular sense of self as a critical mathematics teacher. This paper addresses the question: What possible selves emerge in a book club as three mathematics teachers and a mathematics teacher educator discuss Gutstein's *Reading and Writing the World with Mathematics,* which focuses on teaching mathematics for social justice?

In the following section, I move into my research methods by providing more information about the teachers and the context of this study. Then, I provide participant examples to show possible selves apparent in teachers' discussions of Gutstein's (2006) *Reading and Writing the World with Mathematics*. As teachers explored their 'critical mathematics teacher' possible self, tensions developed to interrupt their experimentation and inhibit the teachers' ability to see themselves as critical mathematics teachers. Ultimately, these tensions were tempered as other possible selves were illuminated in the book club.

Methods

Participants and Context

Three high school mathematics teachers participated in a study group about teaching mathematics for social justice. All of them were in their first year of teaching and had completed

the same teacher preparation program in the year before the study group began. Chloe Ames and Luke Fisher were teaching in the same urban high school (Hamlet High School), while Josh Wolfe was teaching in a suburban community outside a different urban district at Walnut Knoll High School. All three teachers had some experience teaching tasks in secondary classrooms that could facilitate opportunities for students to read and write the world with mathematics. They tried these tasks out during their supervised teaching experiences in the methods courses during their teacher preparation program and also used some tasks in their own classrooms as first year teachers. All three teachers were White and from middle-class backgrounds. Luke and Josh were men who described their Christian faith as important to whom they are, individually. Chloe, at times during the study group, talked about the ways in which her experiences were shaped by being a woman who had studied and taught mathematics.

I organized, facilitated, and participated in this study group and had been one of the course instructors for their teacher preparation program. I am a White, middle-class, Mormon woman finishing my doctoral studies in Curriculum, Instruction, and Teacher Education with emphases in mathematics education and teacher education. I am particularly compelled to immerse myself in raising my own awareness of systems of privilege and oppression. The constant exposure provides me an opportunity to consider and re-consider the ways in which I am serving as an ally from my positions of privilege and the other ways in which I can disrupt and dismantle systems of privilege and oppression. (This motivation is elaborated on in Chapter 1 of this dissertation.)

The study group met four times over the course of seven weeks. During each two-hour session, at least forty-five minutes was spent discussing different sections of the book *Reading and Writing the World with Mathematics* (Gutstein, 2006). The remaining time was filled with

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activities focused on increasing participants' awareness of some aspect of their identities and the associated privileging and oppressing systems, since their awareness is needed to support developing a capacity to TMfSJ (Bartell, 2013). For example, we watched a video on the inequitable wealth distribution in America (politizane, 2012), considered the relationship between outward appearance and socioeconomic status, and discussed lists meant to illustrate privileges (McIntosh, 2011; Scalzi, 2005). I selected these activities because I thought they offered a way of thinking about the world that might be different from what participants were used to (because it's hard to see one's own privilege (McIntosh, 2011) in order to equip them to see opportunities to read and write the world with mathematics with their particular students. Each session also included some time for the teachers to speak directly about upcoming or past experiences with TMfSJ lessons and solicit feedback or advice from the group about planning these lessons.

Focus of discussion. The book club parts of the discussion in the study group focused on Gutstein's (2006) *Reading and Writing the World with Mathematics*. Gutstein (2006) intermingled theory with a narrative explanation of how he engaged in the work of TMfSJ with his students. The first few chapters described the theoretical underpinnings of his work. Then he wrote about the affordances of *Mathematics in Context* (NCRMSE & FI, 1997-8) as the primary curriculum in his class and its ability to support an environment with explicit social justice pedagogical goals. He also described his students' learning with respect to both mathematical goals and social justice goals. He continued with a description of how the students also sought to write the world with mathematics by describing the ways he supported the students' development of social agency. Two more chapters described the perspectives of his students and their parents on teaching mathematics in this way. The final chapter articulated first steps for the

future and how it is possible to seek social change through teaching mathematics. This book in its entirety is one representation of Gutstein's beliefs, practices, and identities as a mathematics teacher whose work is positioned in a critical perspective.

Data Collection and Analysis

All of the study group sessions were audio recorded. After each session, I generated field notes by listening to the audio recordings and making notes about what was being said and initial thoughts and reactions for analysis. The primary data sources for this paper were those discussions in which aspects of the teachers' contributions to the study group were likely to be participant examples (Wortham, 2003). These were discussions in which the narrator positions herself by comparing or contrasting herself with a salient other represented in the text. How these discussions were specifically located and how the discourse was analyzed is presented in following section.

Participant examples. The teachers' possible selves as a part of their developing mathematics teaching identities-in-practice were evident in the study group through the teachers' use of participant examples. As described earlier, a participant example is indicated when a person denotes oneself or others with specific positions such that the person is positioned in the denoted speech as well as through the interaction with others in the local context. In Wortham's (2003) example about Caesar and Cicero described earlier, it is the act of the teacher denoting himself as Caesar and denoting the student as Cicero as well as the conversational turns they take in an imagined interaction between Caesar and Cicero that constitute the participant example. Bringing others into participation in the interaction leads to participants being positioned on two levels—the one in which they are specifically denoted by the narrative (denotational) and the one in which they are situated with respect to the others in the local context (interactional).

Participants are indicated through *denotational* interaction via the content of the speech act. The narrator might denote a position for herself, such as "suppose I was the teacher in this example" or may denote a position for another, "suppose you were my students." Alternatively, the narrator might assume this position more subtly, by saying, "I would definitely make that same decision (as the teacher in the example) in *my* classroom."

People are also positioned by the discourses in the local context, or *interactionally*. For example, in schools, teachers come to enact certain and distinct positions. There are also positions for the students, which could be distinct from one another (e.g., the class clown, the smart mathematician). Another example in the context of schooling is a teacher study group. The participants in the group interact to illuminate what kind of teacher they are and how they see themselves (and the others) in the group. That is, they reveal a possible self or set of possible selves and act in ways to construct their identity-in-practice in the particular local context of the study group.

Wortham (1995, 2003) primarily described how people position themselves *with* text by using a participant example. It was noted in this study group, however, that teachers sometimes used participant examples as a way to position themselves *against* or in tension with the ideas or the author of the book. These contrasting possible selves have to be mediated by the speaker in some way in order to become part of the laminated set that develop, complicate, and transform the identity-in-practice. The contrasting possible selves and mediating possible selves are described in further detail in the results section of this paper.

Operationalizing the theory of participant examples. Although I also had data from individual pre-interviews and post-interviews, I only used data from the study group sessions themselves to address the research questions of this paper because the teachers were not asked to

draw directly from the book during their interviews. Therefore, to locate participant examples in our study group sessions, I examined the field notes to determine each of the discussions in which the teachers talked about the book. The book club discussions in which the teachers were asked directly to talk about the book were selected for closer analysis. There were four total discussions, one from each session. When I examined the field notes, I found two other activities in which the teachers were asked to make connections to the book's text and, therefore, also chose these two discussions for closer analysis. I then listened to these recorded discussions again and noted the times during which the participants referenced both the text *and* compared or contrasted their practices, beliefs, or identities with Gutstein's described practices, beliefs, or identities. These segments of the selected discussions were transcribed.

Transcribed segments were then further segmented by examining language use to identify participant examples. These were segments of the transcribed discussion in which teachers discussed a specific section of the book's text (e.g., a direct quote or specified example) and used deictics (words whose referent depends on the context to understand, such as he, she, we, they, here, now, then, there). In these contributions, the narrator stepped into a fictionalized position, envisioned a future position for him/herself, or described a previous experience to elaborate a point. These were the optimal discussion segments through which to answer the research question because the teacher was positioning him/herself as a particular kind of teacher by using a participant example. Ten participant examples were found.

Once participant examples had been identified, maps were constructed to represent the relationships between and among ideas, concepts, and words in the book, in the denotational text, and in the interactional text. These maps were constructed by combining a modification of the map analysis in Wortham (1992, 2001, 2003, 2008) and the thematic mappings described by

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Lemke (1990) and Herbel-Eisenmann and Otten (2011). Specifically, each participant example I identified was investigated using the following set of questions:

- (*book text*) What semantic structures does the text use?

- (*book text*) What might a semantic relations map show about how the concepts/words/ideas are related in the text excerpt?

- (*denotational text*) How is the participant connecting his/her (counter)example to the text?

- (*denotational text*) In what ways are these structures mirrored in the participant example?

- (*denotational text*) What are the concepts/words/ideas that are mirrored?

- (*interactional text*) What are possible positionings based on the current interaction?

- (*interactional text*) Does the current interaction implicate positionings for all members of the study group or just a few or just an individual?

An example of one of the maps (the first reported result) is depicted in Appendix F with the transcribed participant example and a brief description of how the specific map was generated using the procedures articulated here.

After the maps were made, they were examined as a set. I noted that the only participant examples utilized in the first session were those that indicated alignment between the denotational text and the book text. In later sessions, however, I found a mix of participant examples. Some contrasted the denotational text and the book text, while others were in alignment with the book text. Participant examples after the first session were grouped according to whether the denotational text was aligned to or contrasted with the book text. I then grouped together the participant examples that were about the same apparent topic as evidence of a particular possible self.

Transcription. Audio recordings were transcribed using the procedures explained here. Each utterance of a word or sound (e.g., "um," "hmm," etc.) was transcribed. Parentheses were used to clarify referents. Parentheses containing italicized text indicated actions or extra information important to understanding the contribution. Overlapping speech is indicated in brackets with the speaker identified in italics and their words indicated in regular text. The speaker and what they said are included for instances overlapping speech. Transcripts in the form described here were subjected to the analyses already described.

For the purposes of the results section of this paper, discussion that is irrelevant to illustrating the participant examples has been eliminated from the excerpts. Also, when necessary, false starts have been eliminated so that the meaning is clear in the remaining excerpt.

Results

In the first session, there was evidence that the participants grappled with the possible self of "critical mathematics teacher" that was represented in the text we read in the study group. Over time, however, two other possible selves emerged to interrupt fully imagining the possible self of critical mathematics teacher. Specifically, the teachers questioned in what ways they were (not) socially active enough to understand what it meant to write the world with mathematics ("How Am I an Activist?" possible self) and they wondered how they might establish norms in their classrooms to support TMfSJ ("How Do I Set Norms to Support TMfSJ?" possible self). As these contrasting possible selves emerged, other possible selves emerged to mediate the tension. Specifically, the teachers used additional participant examples to further explore the possible self of critical mathematics teacher, even in light of the complications from the contrasting possible selves. I structure the reporting of these results by presenting an excerpt from a (or the entire)

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participant example and subsequently, highlighting the book text, the denotational text, and interactional text, respectively.

We Are Critical Mathematics Teachers

Two participant examples from the first session establish a possible self of critical mathematics teacher for the participants in the study group. Although it may seem obvious that critical mathematics teacher is a possible self under exploration given the focus of the study group, it is notable because the teachers did initially envision critical mathematics teacher as a possible self instead of rejecting the possibility. The participant examples that highlight how critical mathematics teacher was a possible self under exploration are discussed in the next subsections.

Participant example 1. In the first participant example I describe here, Luke positioned himself and the others in the group as teachers who supported a critical perspective to teaching mathematics. This participant example occurred during the first study group session and early on in the discussion about the text, *Reading and Writing the World with Mathematics* (Gutstein, 2006). Luke began by locating a text excerpt he had highlighted and was interested in discussing. He then read a text excerpt from the book and continued with an explanation of how he made sense of the text, using a participant example. Luke stated:

> Page six, about half way down, he (Gutstein) quotes Apple, citing Lankshear and Lawler, "contrasted a domesticating, functional literacy designed to make 'less powerful groups...more moral, more obedient, more effective and efficient workers' versus a critical literacy that would 'be part of larger social movements for a more democratic culture, economy, and polity.'" ... So, it's interesting because when we--, public schools we're very heavily affected by the industrial revolution way of thinking. Input, students,

output, productive workers. Compliant, and skilled enough to get the work done, but not necessarily critically thinking. Which just perpetuates the status quo, which the author clearly, and we (*gestured to the present group*) obviously ... we are against. [*Chloe & Kate:* Right.] We are not trying to propagate anything status quo. What we are trying to do is put out students that are, you know, they know what respect is, they know what, they know how to behave themselves, obviously, but they are not just subordinate to everyone, take everything at face value, listen to everything that, and you know what, honestly, the kids that we have, I mean, they're already like that. They won't take anything at face value. And they do want to question everything that you do.

Book text. The text excerpt draws a comparison between "domesticating, functional literacy" and "critical literacy." Both are characterized by particular desired outcomes for the institution of schooling. Specifically, "domesticating, functional literacy" is seen as a pedagogical strategy designed to produce students who live by a particular set of morals, are obedient to authority, and are able to work in the job market where they are needed. In an earlier section of the text, Gutstein described "functional literacy" as the understanding of the "competencies needed to function appropriately within a society" (p. 5). That is, a functional literacy leads to the perpetuation of the status quo (Gutstein, 2006). In the United States, these competencies will vary between individuals since a capitalistic society requires people who work in positions requiring basic skills and people who work in more advanced positions.

In the text excerpt, "critical literacy" is given as an opposing ideal to "domesticating, functional literacy," communicated in the text through the use of the word "versus." Then, "critical literacy" is described as a pedagogical strategy designed to engage students in social activism for the purposes of seeking a more equitable societal system. In earlier text, Gutstein

described critical literacy as meaning "to approach knowledge critically and skeptically, see relationships between ideas, look for underlying explanations for phenomena, and question whose interests are served and who benefits" (p. 5). That is, critical literacy is about understanding the sociopolitical and cultural contexts influencing society and the individuals in it and then seeking ways to disrupt the perpetuation of the status quo (Gutstein, 2006).

Denotational text. Luke's language mirrored the dichotomy presented in the text; however, he added a layer of complexity. Luke's analogue to "domesticating, functional literacy" is that the public schools had an "Industrial Revolution way of thinking." He elaborated on this connection by stating that this kind of thinking constructs schools whose primary purpose is to create employees and employers to fit within the existing societal structure. Similarly, Luke described an analogue to "critical literacy" which focused on the purposes for education with which each member of the study group identified: "we are not trying to propagate anything status quo." His description of this pedagogical approach, however, did not only include facets from "critical literacy." Instead, he complicated the comparison by acknowledging the role that morality and obedience have for students while also supporting the development of more resistance-oriented behaviors.

Interactional text. Luke aligned himself and the rest of us in the study group as teachers who support teaching from a more critical perspective. That is, Luke identified "critical mathematics teacher" as a possible self under exploration for all of us in the study group. Specifically, Luke stated, "Which just perpetuates the status quo, which the author clearly, and we obviously ... we are against. [*Chloe & Kate:* Right.] We are not trying to propagate anything status quo." The use of the word "against" and the phrase "not trying to propagate anything status quo" are what support characterizing the possible self of critical mathematics teacher.

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Luke was also positioning all of the study group members as these same kinds of teachers by using the word "we" repeatedly in conjunction with these statements. Chloe and I, of note, take up this positioning in some way by agreeing with Luke vocally. It is interesting that Josh does not also chime in to align himself immediately with this position. There might be a number of explanations for his silence, including agreement, disagreement but lacking the space to communicate, and so on. Additionally, Luke used "we" in two different ways in the contribution. He used it to mean the members of the study group, as was just described and he also used it to mean "the public school" with his words, "...we--, public schools we're..." This dual use of the word "we" might have implications as Luke could see the camaraderie in the group as a way to collectively combat the return to status quo ways of teaching characterized by Agee (2004).

Also, although Luke's explanation communicated a position in alignment with critical literacy, he did so by constructing a variation of this pedagogical approach that likely felt more comfortable to him. Instead of the bold alignment with "social movements" described in the text excerpt, Luke's contributions of "know[ing] what respect is" and "know[ing] how to behave themselves" add a layer to a critical approach that allowed him to more easily see critical pedagogy as a part of who he is as a mathematics teacher. It is important to note though that the words "respect" and "know how to behave" might be construed as components of the "functional literacy" that Gutstein (2006) described (depending on their implied meanings); however, Luke used them in contrast to his own definition of "functional literacy" which included subordination and taking things at face value.

Participant example 2. The second participant example supporting the identification of critical mathematics teacher as a possible self under exploration happens roughly fifteen minutes after the first participant example and in the first session of the study group. During a lull in

conversation, I redirected us to consider text from the book in which Gutstein (2006) articulated a particular conception of the purpose of mathematics education. Before the session I had planned to read this section of the text and ask the questions posed here. I chose this particular moment during the session since the excerpt referenced ideas similar to those under discussion in the session with Luke's (previously described) highlighting of the earlier text. I read aloud from the text, which prompted the participant example here:

> **Kate**: (*reading from page 11*) "A reconceptualization of the purpose of mathematics education is needed—one that includes envisioning mathematical literacy as critical literacy for the purpose of transforming society, in its entirety, from the bottom up toward equity and justice, for all students whether from dominant or oppressed groups." What purposes do you think math education has now? And/or what purposes is Rico[18] suggesting?
>
> ...
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> **Luke**: I have always thought of math as, you know being, how will it be used in your job? 'cause that's all the students want to know. [*Kate & Chloe:* Uh-huh.] "When are we going to need this?" I always think about it in the context of a job, 'cause that's how we answer it. Well, this job uses it. This job uses it like this, this job uses it like this. You know, there's no place, no job that you can get that you don't need math. And we say that, and we try to convince them of that with tasks, or examples or what have you, but, you know, maybe, but it seems, he's suggesting, and I would agree that it's more than just do you use it in your job or not. It certainly is. Can you look at some of these

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[18] Eric Gutstein, the author of *Reading and Writing the World with Mathematics*, goes by the name of Rico. During the first session of the study group, we collectively decided to call him Rico when we were referring to him directly.

statistics and gather from them some information about the world you are living in and become critical of that world and ask some questions, "Why is that?" "What can we do about it?" "What's the problem with that?" There are some situations, I mentioned to you, Kate, that we were talking about...

Luke continued by recounting a specific example from his class in which his students were learning procedures related to decimals and percents.[19] He used numbers about unemployment rates by counties in the state and some students expressed confusion over how certain counties could have unemployment rates higher than the state average. After explaining how he tried to resolve the students' confusion, Luke closed the participant example by saying:

Luke: (I asked the students) 'Do you understand that?' 'Does it make sense to you why that is possible?' 'Cause that (the answers to these questions) says something completely different (than answering the question 'how will it be used in a job?').

Kate: And that's not necessarily something they are going to use in a job, right?

Luke: No, but you should know that.

Book text. The text excerpt described Gutstein's notion for a change in the purposes for mathematics education. Gutstein equated "mathematical literacy" *as* "critical literacy." As was noted earlier, "critical literacy" was defined in the text as considering knowledge with a perspective that seeks to understand the role of sociocultural context and question the status quo (Gutstein, 2006). Gutstein elaborated on the motivation for defining mathematical literacy as critical literacy by stating, "transform society...toward equity and justice, for all students whether from dominant or oppressed groups." That is, the motivating factor is for the purposes of

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[19] This section of the excerpt is abbreviated because this part of Luke's story about his classroom activity does not have an explicit connection to the text (as was found in the construction of the maps used for analysis).

providing more equitable opportunities for all students whether they have historically benefited from systemic privileges or not.

Denotational text. Luke described a duality of purposes for mathematics education (e.g., mathematics for jobs or mathematics for increasing awareness), in contrast with Gutstein's one articulated purpose: transforming society. In doing so, Luke articulated that his thinking was shifting as a result of reading and discussing the text. Luke stated, "I have always thought of math as...being how will it be used in your job?" His use of "always" here indicated that he had previously thought about mathematical literacy in the context of preparation for employment. He later stated, "It's more than just do you use it in your job or not." He elaborated this alternative purpose, which aligned with Gutstein's stated purposes. Luke said, "Can you look at some of these statistics and gather from them some information about the world you are living in and become critical of that world and ask some questions..." Luke's use of "critical" here is analogous to Gutstein's description. Although Luke expressed it slightly differently, Luke also mirrored Gutstein's text about the reasoning for the purposes of mathematics education being about critical literacy. Luke stated that students "should know that [how to become critical of the world]." His use of the modal verb "should" indicated his emphasis on the necessity of this mindset.

Interactional text. Luke is again positioned as a critical mathematics teacher in this participant example. In this excerpt, the emphasis is on the development of critical perspectives in students. This is evident when he said "and I would agree" when describing what Gutstein wrote. Luke is able to envision himself as a critical mathematics teacher, in part, because he has experiences teaching in this way already, which he described in more detail in this participant example. It is not possible to discern from this particular example how the possible self of

critical mathematics teacher is taken up by the other participants in the study group but the previous example is evidence that it is a possible self under exploration by the group.[20]

These two participant examples, taken together, show that critical mathematics teacher is a possible self under exploration in the study group. That is, early on (in session one), the teachers experimented with the possible self of critical mathematics teacher as a part of their developing mathematics teaching identities-in-practice. In the examples that follow, I provide evidence of other possible selves that seemed to interrupt the possible self of critical mathematics teacher.

How Am I an Activist? Possible Self

In this section, I discuss two participant examples that reveal a contrasting possible self to the possible self of critical mathematics teacher that was previously identified. I elaborate on one specific participant example from the second study group session. I also draw on parts of a participant example from session three. These two participant examples together illustrate the exploration of contrasting self as "How Am I an Activist?" Josh Wolfe, in particular, raised concerns about how he might engage students in the way that Gutstein does in his text.

Participant examples. During the discussion of the video in the second session, Josh brought up his own enactment of the World Wealth task (adapted from Gutstein, 2006). In this task, the class is divided proportionally according to population in different world areas. Then, the world wealth is distributed among the groups of students across world regions (using cookies to represent the actual world wealth). The task illuminates the inequitable wealth distribution across world regions. Josh explained a bit about how his students asked to be put in particular

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[20] I use "group" here to mean the teachers and myself collectively. This is not to suggest that each one of us individually were exploring the possible self of critical mathematics teacher but that was the possible self being discussed and experimented with in the initial session.

world regions during the task and then he shifted to referencing the book directly. We had read chapters three and four prior to this session ("Reading the World with Mathematics: Developing Sociopolitical Consciousness" and "Writing the World with Mathematics: Developing a Sense of Social Agency," respectively). Josh stated:

Reading the two sections of the book. I can read the mathematics. I can see a situation and use mathematics. I can get it. But, then, I would be in the same boat with my students, what am I supposed to do now? You just showed me that graph. So, me as a math teacher in Walnut Knoll, what does that have to do with me? And for my students, I think it's even more further removed, well, what are we supposed to do. Yeah, we get it, Africa, you split a cookie and get crumbs. America, you get six cookies, but what does that mean for us? So I think that's just, the writing of the mathematics, and getting them to kind of wanting to take a stand, or even just knowing what they could do, or what reaction they should have, or might have, um, where I personally struggle and I know my students do too.

In addition to this contribution, Josh used another participant example to describe a contrasting possible self to the possible self as a critical mathematics teacher. In session three, Josh described his reaction to the text by saying:

I guess, you know, reading this section, kind of put a lot of the previous chapters into place and how Rico was so in tune with the building projects and like coming and developing some of these houses for a lot more. ... I don't feel like I'm that connected to the city or to my community or to the students or the parents yet. Obviously I am only a first year teacher. Just by reading this it just seemed that Rico was so in tune with his community, with parents, with students. He was feeling and wanting to write the world

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with mathematics so his students say, "Yeah, you've got a point. We should do something about this. We should go to the city council meetings. We should take a stand." And so, to have that vested interest, or that identity for him, he was really a part of that community. That part of him really played a role in his classroom. His students can see it. We (as readers) can see it. That was just really interesting because the things (stories, experiences, and identities) I shared with you guys, I am sure that Rico would've shared those with us too, but they really, really came out in his classroom. I just wonder, what can I use of my personality to really come out in my classroom to get them to really see these social justice issues too?

Book text. In both of these examples, the text excerpt was less specified than in the first two examples presented in the possible self as critical mathematics teacher section; however, in both of these examples Josh explicitly mentioned ideas from the text. In the first, Josh referenced specific "reading" and "writing" the world with mathematics and linked the use of these words to the text with his explicit statement, "reading the two sections of the book." In the second example, Josh referenced ideas about Gutstein's identity that were apparent in the book. Specifically, Josh noted that Gutstein is invested in the community and that this closeness to community comes out in Gutstein's practice.

"Reading the (world with) mathematics" was defined by the text in the way that Josh explained when he said, "I can see a situation and use mathematics." Reading the world with mathematics is about using mathematics to illuminate social, political, or environmental injustices or inequities. "Writing of the (world with) mathematics" was defined by the text when Josh stated, "getting them (students) to kind of wanting to take a stand, or even just knowing what they could do." Writing the world with mathematics is about taking action after an injustice

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or inequity is illuminated and, primarily, using mathematics to construct the argument against the injustice.

Denotational text. The denotational text in this example was closely linked to the book text of this participant example since Josh's entire turns toggled back and forth between book text and denotational text. For example, in the first example, he stated, "I can read the mathematics," which was explicitly the text from the book, but his use of "I" also makes it denotational text. Similarly, in the second example, Josh described the text that discussed Gutstein's projects and then stated, in contrast, "I don't feel like I am that connected to the city or to my community or to the students or the parents yet." This is a contrast because of the use of the word "don't" to illustrate how he is not like Gutstein. Specifically, Josh highlighted that as a first year teacher, it is difficult to have intimate knowledge of the community (something he could grow in over time). Josh also highlighted that he did not feel like he had sufficient interest in being the kind of activist that would encourage his students to write the world with mathematics in the way that Gutstein did.

Interactional text. Josh has positioned himself in the interactional text as someone who has a hard time envisioning himself as an activist or as someone who knows how to write the world. This possible self was in contrast to what he perceived as needed to successfully TMfSJ. The reasons given in the denotational text about being a first year teacher and being interested in writing the world with mathematics are a part of what interrupt the possible self of critical mathematics teacher for Josh. That is, Josh visualized himself enacting tasks to read the world with mathematics but he struggled to identify steps to take action towards writing the world. Importantly, Josh used the word "yet" in the statement, "I don't feel like I'm that connected to the city or to my community or to the students or the parents yet." This suggested that he saw a

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possibility to grow in his awareness over time and also pointed to why he felt constrained in his ability to TMfSJ as a first year teacher.

Additionally, TMfSJ tasks themselves are positioned in Josh's participant examples. Specifically, Josh highlighted the World Wealth task and commented on how he felt it was disconnected from his students' (and his own) experiences. This might be because of the scope of the task (at the level of world inequity) in comparison to what his students may feel like influence their reality. At another point in the study group, Josh drew on his experience enacting this task and said that his students reacted by saying, "Oh, so, they got more cookies, and we didn't, so, let's just be from the United States. Oh, wait! We are already there, so we're okay." This kind of disconnection for his students is another positioning that influenced the possible self of "How Am I an Activist?" for Josh in particular.

The possible self of critical mathematics teacher was complicated by the emergence of the question about activism. The "How Am I an Activist?" possible self interrupted Josh's ability to envision himself as a critical mathematics teacher.

How Do I Set Norms to Support TMfSJ? Possible Self

In addition to the previous contrasting possible self (How Am I an Activist?), another contrasting possible self emerged. In this contrasting possible self, the participants raised the idea of setting norms to support the work of TMfSJ in a classroom. Specifically, they wondered about how a teacher establishes norms or scaffolds the work of the students in such a way that they produce the kinds of responses that are illustrated in the book. Participants raising this question, coupled with how they described their answer in conjunction with their own practices, revealed this contrasting possible self.

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Participant example. The participant example here is one in which all participants contributed, but primarily on which Chloe Ames and Josh Wolfe extended and elaborated. The entire text of the participant example is presented (despite its length) so that the possible self identified here can be illuminated in the full context of the exchange. Chloe began this line of thinking after I prompted the group, more generally, about whether there were comments or questions raised for the teachers as they read Chapters 3 and 4 ("Reading the World with Mathematics: Developing Sociopolitical Consciousness" and "Writing the World with Mathematics: Developing a Sense of Social Agency," respectively).

> **Chloe**: I really liked on page forty-one, right at the beginning of the reading, the activity that he did with his kids about racism and housing data. The only thing, the thing that I thought was so interesting was how his questions are so, like, I was trying to picture giving these questions to my kids and I just, I am interested in the scaffolding work he did to get them to the point where he could give them a question that's like, "How would you use mathematics to answer this question?" And then they could answer it in a meaningful way. Because I feel like my kids that they would be like, "I'd add some stuff." I'd be like, "That is not what I meant at all. At all."
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> **Kate**: Back to the drawing board.
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> **Chloe**: There are lots of right answers. That is not one of them. Well, they wouldn't be well thought out answers that my kids would respond with. And some would, some would have really great answers. I am just picturing my classes as a whole.
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> Luke: Just because there is an infinite number of answers, does not mean that yours is one of them. Congratulations on missing a target that is infinitely large.

Chloe: And so, like, maybe later he will talk about how he got his classroom to the point where he could just give them like, or maybe the school he's at the school is more prepared, I know he also said he had the kids for two years, there's probably a lot of work that leads up to this moment in time. 'Cause I am like I want to do this, but then I am like, I don't know if I can give my kids a question like, "How would you use mathematics?" and they would respond appropriately.

Josh: I relate this a lot with like high level tasks and like reading and articles we did in ...(our methods) class, oh, okay, is this really a real classroom, do the kids really respond like that, is that how they really answer the questions? Because we go and try it in student teaching, and it's like, "yeah, that did not work. Yeah, that was okay but my kids can't handle that yet." I feel like with that at least, I can sit there and I can try it, I know what I am doing, I know the math, I know the content, and if it falls through, I can try it again next year, and I can fall back on the math and still teach the concepts I was trying to get across. And then, I was going to say the same thing as Chloe said, It's just you see some of these things and you wonder how much he drilled. He said there was like two weeks for that one activity. How could I spend two weeks, how could I just keep drilling them, how could I ask them for essays over and over and over, and I am not going to get good responses, and then at that point, it's almost like, hey, you know what, let's scrap this, let's move on, but I don't have something to fall back on. It's not like I can just say oh, hey by the way, this is what you should've gotten out of it. Here was the formulas, here's how you do a problem, and now go do your homework. It's like hey, I wanted you to see these deeper meanings and you know read the world with mathematics and I got nothing. I didn't succeed in anyway. You guys did the work, but you didn't see the point.

Chloe: Right.

Kate: When you say didn't see the point, do you mean with respect to the mathematical goals or the social justice goals or both?

Josh: I guess, both. The social justice goals specifically. You know, you read some of these excerpts and its great things that they are saying especially when they talk about the students coming back and saying how the class changed them or five or seven years down the road how things have changed or affect how they see the world. It's powerful, but then you have to step back and think how did he get there? It's not like he just went in with the world wealth task took it into his class and said, here, let's go. Obviously, we've all tried some of these tasks and it's frustrating to try to get them to see the math, the social justice, anything, so, just wondering what it takes, how long it took, and you know, it's not like math where you can fall back and teach it with a lecture. I mean, how do you teach social justice for math, or using math, in a different way than he's presenting? Does that make sense?

Kate: Um-hmm.

Book text. The book text appears at least four different times in this participant example. Chloe mentioned the specific problems from which Gutstein reported student work. She described the activity on racism and housing data. Chloe also mentioned that Gutstein had had the students for two years and the specific prompt Gutstein used with his students. She called attention to the prompt, "How would you use mathematics to answer this question?" which Gutstein used with his students in the activity she described. Josh also mentioned the book text in his conversational turns by stating that Gutstein spent two weeks on the one activity.

Denotational text. Chloe began the participant example here and contrasted her own students and practices with Gutstein's. She stated, "I was trying to picture giving these questions to my kids." Chloe's use of "trying to picture" flagged that she had not previously seen the kinds of student responses that Gutstein reported on in his book. She elaborated on this by stating more specifically that her students would not (as a whole) be able to respond to the question, "How would you use mathematics to answer this question?" This elaboration is tightly connected to the book text as she is directly quoting it and then comparing her own experiences with the ones that Gutstein wrote about. It is, however, a counterexample since she does not see her students as capable of answering the posed question in the way the Gutstein's students do.

Chloe continued to draw on the text to hypothesize answers to the concern she raised about how to support students in engaging in social justice mathematical tasks. She wondered whether or not the fact that Gutstein had his students for two years played a role in establishing the kind of norms needed to elicit the kind of student responses he did.

Josh further elaborated on the participant example that Chloe began by contributing his own experiences. Josh stated, "I was going to say the same thing that Chloe said. It's just you see some of these things and you wonder how much he drilled."[21] With this contribution, Josh is referencing the aspects of the text that Chloe did as well when she is speculating on the possible activities that Gutstein engaged his students in. He also referenced a related point in the text himself. Specifically, when Josh talked about the "two week" and "drilling them" and "how could I ask them for essays over and over and over," he is referencing specific instances in the

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[21] The use of "drill" here by Josh is meant to be about the need for repeated exposure to opportunities to learn about social issues through mathematics. This is differentiated from other teachers' use of the word "drill" in other contexts when the context is repeated exposure to procedure-oriented tasks.

text. They are also a participant example because Josh made himself an actor in the situation with the use of the pronoun "I."

As Josh continued to build the example with his own experiences, he raised the additional concerns that he saw with envisioning himself engaging in these practices in his own classroom. Specifically, he related the examples in the text (already described) to how he made sense of the course material in his teacher preparation program. Josh contrasted the lessons he learned there in which he would still be able to "fall back on the math and still teach the concepts I was trying to get across" with what he envisioned when using social justice mathematics tasks. This was clear when he said, as if speaking to students, "Hey, I wanted you to see these deeper meanings and you know read the world with mathematics and I got nothing. I didn't succeed in any way. You guys did the work but you didn't see the point." His use of "didn't succeed," "got nothing," and "didn't see the point" help to illuminate the ways in which he saw his own practices as in tension with those in Gutstein's text. These points are reiterated in Josh's final contribution after I ask him to elaborate on whether or not he means social justice goals or mathematics goals when he suggested that his students didn't see the point. Specifically, he references the text again with the example of the world wealth task. He speculated, like Chloe did, about "what it takes" and "how long it took" to establish the learning environment that would support students learning about social justice through mathematics.

Interactional text. In the interactional text, Chloe and Josh, in particular, have positioned themselves against TMfSJ by raising the concern that they are unable to see how they might get students to respond in the way that Gutstein does. That is, they envision a contrasting possible self related to establishing norms to support the work of TMfSJ in their own classrooms. This is particularly vivid in Josh's quote, "so, just wondering what it takes, how long it took, and you

know, it's not like math where you can fall back and teach it with a lecture." In this quote, there are a few implications. One is that Josh saw lecture as a valid method of instruction for teaching mathematical ideas when other methods (such as those he learned in his teacher preparation program) failed. It is unclear how Josh determined the success or failure of such a lesson. There is some small indication of what "failure" is for a social justice lesson when he stated, "You didn't see the point." Another implication of Josh's quote is the question that is described by this possible self. Namely, through the use of "just wondering what it takes, how long it took," Josh indicated a possible self about establishing norms that was in tension with the previously described possible self of critical mathematics teacher.

It is clear that Josh and Chloe have this same concern and are deliberating this possible self in contrast to the possible self of critical mathematics teacher, but it is not clear from this exchange that Luke had the same concern. In the next section, I will show that Luke might have had this same concern but instead of leaving it as a raised and unresolved issue, he offered another possible self. He used another participant example to redirect the discussion towards a consideration of the possible self of critical mathematics teacher.

Could We Be Critical Mathematics Teachers? Two Examples

After the teachers described the contrasting possible selves, two possible selves emerged that may have offered a way to mediate the tension created between the contrasting possible selves and the possible self of critical mathematics teacher. Specifically, Luke offered a response to the possible self just described (Am I Capable of Setting Norms for TMfSJ?) and Chloe offered a response in favor of being a critical mathematics teacher. Together, these two examples of tempering possible selves can show how the teachers are trying to laminate their envisioned possible selves onto their previous beliefs, identities, and conceptions. I use the word

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"tempering" for this category of possible selves to align with the metaphor evoked by the concept of lamination. It should be noted that these are not the only examples that I found. Rather, they are illustrative examples of the themes I found across those examples in the category of tempering the contrasting possible selves.

Tempering contrasting possible selves, example 1. The participant example described here immediately followed the previously described exchange that was identified as being a possible self related to capacity to set norms for TMfSJ. It was identified as a new participant example (instead of just being subsumed by the previous example) because Luke re-directed us to a new section of text that he read aloud and then he used a participant example to make sense of that text:

> Here's his conclusion on page seventy. "I do not want to imply that students easily came to read the world with mathematics. What happened in my classes was a beginning, and it was not always a smooth road. There were factors that facilitated the journey and those that made it difficult, and I stumbled at times and felt my way along at other times. Overall, however, I saw growth in students' capacity to understand complex aspects of society. Sometimes they did so without using mathematics, and sometimes they learned mathematics without reading the world. At other times, though, they used mathematics to make sense of social reality, and they grew over time, with experience in their capability to do so. Their mathematical analysis may not always have been that complicated, but I argue that one should not assess how well students understand society with mathematics by the complexity of the mathematics. The point is that mathematics became a necessary and powerful analytical tool that students used to study their sociopolitical existence." So, I think he echoes that what we have experienced, even if we weren't doing a social

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justice task, like, our higher, you know, goals that we are going for when we were interns (the final year of the teacher preparation program) and now still, is we want problem-solving, we want open-ended tasks, we want them thinking, collaborating, explaining their work, explaining their thinking, questioning each other's thinking, we've got all these things we want them to do. Sometimes that happens and sometimes it doesn't. Sometimes we get really a lot of math and really deep and rich, sometimes we get very little and maybe we just practice can we stay in our seats when its group work, we've seen that, and I think it's important that even though he highlights the high points to make his case and explain how these lessons would ideally look, what kinds of things we hope our students get, he recognizes here and admits to us that sometimes it went well, and sometimes it didn't. Sometimes we were heavy in the math and low on social justice, and sometimes it went the other way. You know. But I highlighted "The point is that mathematics became a necessary and powerful analytical tool that students used to study their sociopolitical existence."

Book text. Luke read aloud the text Gutstein used to caution readers about oversimplifying or romanticizing the work of TMfSJ. In this text, Gutstein used a few metaphors, such as "not always a smooth road," "stumbled at times" and "felt my way along at others." These metaphors help the reader to understand that TMfSJ can be difficult. Gutstein also described the many ways mathematics and social justice interacted. Sometimes there was more mathematics than others. Throughout the text, Gutstein continued to assert that although it was more complicated than it appeared in the book, students did develop an ability to use mathematics to read the world. He made this point by repeating it in the paragraph when he

stated that students "came to read the world with mathematics," "I saw growth...," and "they grew overtime." Each of these repeated phrases solidified Gutstein's point.

Denotational text. Luke's discussion of the text mirrored the content of Gutstein's excerpt and Luke connected his own experiences as a teacher (and those he assumed he shared with the rest of us in the group, note his consistent use of the word "we") to the text that Gutstein wrote. Specifically, Luke compared the ideas he learned and tried out during his experiences in teacher preparation coursework to connect to the struggle that Gutstein described. He connected his own experiences by stating, "Sometimes that happens and sometimes it doesn't. Sometimes we get really a lot of math and really deep and rich, sometimes we get very little..." Luke used the same pattern of contrasting ideas that Gutstein did to illustrate that teaching mathematics is difficult. Luke related it back to the text when he talked about social justice by stating Gutstein's point in his own words, "Sometimes we were heavy in the math and low on social justice, and sometimes it went the other way."

Interactional text. Two primary positions emerged in Luke's participant example. The first is the kind of mathematics teacher that Luke thought he should be. Luke stated that the "goals we are going for when we were interns and now" include a list of specific things that students should be doing with one another. His use of "goals" indicated that these are purposes for learning mathematics. He asserted that the whole group was positioned as the kind of mathematics teacher that would strive for these student-centered activities by using the pronoun "we" repeatedly through his contribution. It is interesting to note that this contrasted with the point that Josh made earlier about the role of lecture as a secondary plan to engaging students. Luke did not attempt to state what the teacher does in the event of the failed planned activity.

Luke instead focused on what the students did do, particularly when he described that some times what was accomplished was that students stayed in their seats.

Another positioning that was evident in this participant example was a movement towards the possible self of critical mathematics teacher again. As noted earlier, this participant example immediately followed the interaction between Chloe and Josh about setting norms in the class to support students in social justice mathematics tasks. Luke offered an alternative to thinking that a critical mathematics teacher must look exactly like what Gutstein described. Highlighting the text that Gutstein used to prevent the reader from oversimplifying the work of TMfSJ, Luke was able to suggest that being a critical mathematics teacher is not only about the high points Gutstein reported on in his text.

Tempering the contrasting possible selves, example 2. The last participant example elaborated on here is another example of tempering the contrasting possible selves to the possible self of critical mathematics teacher. Specifically, Chloe mediated the tension created by the previously mentioned contrasting possible selves by describing how the chapter written from the students' perspective helped to shed new light on the benefits of TMfSJ. When I opened the floor for questions or comments based on what had been read prior to the fourth (and final) session, Chloe began with this contribution:

> **Chloe**: I thought in chapter seven, I really enjoyed the students' perspectives, and I really
> liked (*pauses looking for text in the book*), um, I thought it was really interesting to hear
> the kids kind of echo that I feel like I see with my kids. Like today, we are starting
> quadratics, and we didn't really talk about quadratics at all, but we were doing this
> graphing activity where they're seeing how, we've talked about what a quadratic is and
> the square and stuff but we haven't talked about a quadratic equation and, like what the *a*

does, what the *b* does, and so we are doing an exploratory activity with that. And today,

I've gotten a lot of 'how do you expect us to know this? How do we do this? I don't get

it. How is this gonna help me? How am I supposed to do— How is this going to help me

on the test? Like, can you just tell us the answer? [*Kate:* Uh-hmm.] So it was nice to kind

of see kids be like, 'I thought this was stupid, I didn't really like it, but then I appreciated

it.' [*Kate:* Right.] It made me feel better 'cause—

Kate: 'Cause you feel like maybe your students feel that way too?

Chloe: Maybe one day they'll appreciate it.

Kate: Right.

Chloe: And if they don't, well, you can't win them all.

Book text. The book text in this participant example is Chloe's reference to chapter seven

as the explicit content that she is drawing on coupled with her paraphrasing of what the students

said. Although she appeared to look for some specific text, she gave up relatively quickly. This

might be because Josh and Luke did not have their books to follow along, so she relied on her

own statement of the students' perspectives instead. Some of the students (in the book text)

wrote about their changing perspectives on TMfSJ. Chloe paraphrased their perspectives by

making clear that the students first react negatively towards the work but then came to see a

value in it.

Denotational text. Chloe linked her own students' perspectives to those presented in the

book text. The story that Chloe relayed about her lesson directly mirrored the first perspective in

the Gutstein chapter with the student perspectives. Specifically, Chloe stated that her students

were asking questions such as, "How do you expect us to know this? How do we do this? I don't

get it. How is this gonna help me? How am I supposed to do— How is this going to help me on

the test? Like, can you just tell us the answer?" These questions mirror the perspectives that she articulated in her paraphrasing of Gutstein's students, when they said, "I thought this was stupid, I didn't really like it." In Chloe's story, the analogue to the second part of the students' perspective, "but then I appreciated it" had not happened yet. Chloe posited, however, that reading the students' perspectives about TMfSJ in Gutstein's text made her feel that her students would shift their thinking at some point as well.

Interactional text. Chloe's highlighting of the students' perspectives in the chapter position critical mathematics teacher as the possible self under consideration again. Chloe did not directly state, but implied, that understanding the student perspective gave her additional confidence to proceed. Chloe's contribution seemed to only implicate her as someone who was negotiating these student perspectives as a part of how she was envisioning her own identity as a mathematics teacher.

Discussion

In this paper, I have illuminated the possible selves that emerged through teachers' discussion of TMfSJ, particularly in the context of a book club focused on *Reading and Writing the World with Mathematics*. Some of the teachers in this study group initially positioned themselves as critical mathematics teachers. As the study group continued, however, the possible self of critical mathematics teacher became complicated as contrasting possible selves emerged. Ultimately, the teachers envisioned ways to laminate these contrasting possible selves together with their notions of what it means to become someone who can TMfSJ. That is, these possible selves were laminated together to develop the mathematics teachers' identities-in-practice.

Across the professional development as these possible selves emerged, the teachers were continuing to develop their conception of what it means to be a mathematics teacher. As

described earlier, Ernest (2007) generated a list of reasons that might motivate people to become critical teachers. These factors are mostly rationales that would develop a person's abilities to see the world from a critical perspective. This kind of worldview, in turn, would influence their practices as teachers. For example, someone with a personal life-history that included injustice might prompt her to feel empathetic towards students who might have similar personal life-histories (Ernest, 2007). Comparing Ernest's list with the identified themes in this paper, it is clear that the practices of teaching raise tensions undefined in the current educational research (cf. Herbel-Eisenmann, Drake, & Cirillo, 2009). There are possible selves that need to be negotiated that are directly connected to the teachers' practices that might stand in the way of the teachers envisioning themselves as someone who can enact TMfSJ. That is, Ernest's academic conjecturing described the identities that one may develop as a person that would facilitate opportunities to work towards a socially just classroom, whereas this paper described how the practicalities of teaching complicated what it means to become a critical mathematics teacher. The possible selves here that the teachers negotiated were directly related to their practices, responsibilities, and roles as mathematics teachers and not necessarily related to their life-histories or personal experiences external to the classroom, as Ernest's article suggests. In each of the participant examples, the teachers connected their experiences as teachers to consider possible selves as teachers. Perhaps the work of TMfSJ then requires both some of the characteristics/experiences that Ernest outlines, and also experiences exploring the work of a critical mathematics teacher in practice.

In this study group, the teachers were willing to experiment with the possible self of critical mathematics teacher even in light of contrasting possible selves. This was evident with the emergence of the possible selves that seemed to mediate the tension raised by the contrasting

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selves. These tempering possible selves provided the teachers with an opportunity to consider how they might incorporate the possible self of critical mathematics teacher in their developing mathematics teacher identities-in-practice.

This study informs practices in teacher education, particularly related to preparing teachers to TMfSJ. Specifically, it would be important for teacher educators using practice-based materials to carefully listen to the participant examples that teachers are employing to consider whether or not they position themselves with or against a teacher's conceptions/beliefs/practices presented in a course (be it TMfSJ or other pedagogical approaches). Hearing how a teacher aligns herself or not with a salient other reveals important information about how the teacher sees herself as becoming a particular kind of teacher. A teacher educator could use her observations of the participant example to inform her decisions about what to grapple with and discuss next. For example, a consideration of how the students' perspectives played a role in shifting Chloe to considering TMfSJ in a new light could inform my future interactions with other novice teachers. If the teachers struggle to envision themselves as a critical mathematics teacher, I might be able to highlight student perspectives as a motivator for encouraging them to consider the critical perspective. Furthermore, these participant examples can illuminate what kinds of opportunities to read and write the world with mathematics might be important for the teachers. For example, some of Josh's participant examples point to a need to engage him in more tasks that would provide him with an opportunity to write the world with mathematics. These kinds of opportunities might be critical for Josh seeing the possible self of critical mathematics teacher as a part of his developing identity-in-practice.

It is worth noting that the teachers were interested in using TMfSJ tasks as they talked in the study group about enacting them in their own classes and discussed in the post-interview that

they wanted to continue to implement these tasks. Their interest in implementing these tasks further suggested that exploring the possible self of critical mathematics teacher was more complicated than just desiring to use these tasks. For Josh, the issue of task and its relevance (or not) to students was particularly important in interrupting the possible self of critical mathematics teacher. When Josh said, "I think it's even more further removed, well, what are we supposed to do," he described the pitfalls of using TMfSJ tasks that were not grounded in the students' lived experiences. Other scholars who have engaged in TMfSJ have described a need to develop the tasks in collaboration with the students (e.g., Gau, 2005; Gonzalez, 2008; Gutstein, 2006); however, this is not the typical format for professional development with teachers or coursework in teacher preparation classes. This discrepancy has implications for how teachers will ultimately enact TMfSJ in their own classrooms.

Attending to the issue of relevance of TMfSJ tasks in the context of mathematics teacher education raises two important issues. First, if teacher educators do not model the collaborative aspects of TMfSJ, then the teachers might not see the value in developing the tasks in this way, which might have consequences for work with students. Specifically, developing tasks separate from students' experiences can lead them to feel disconnected and they might not want to participate because they have a hard time seeing the rationale (e.g., Josh's students talking about how they were "okay" because they lived in the United States during the world wealth task). Second, the issue of relevance raises the question, "In what ways must the TMfSJ task be linked to the students' lived experiences?" It could be argued that all (or at least most) tasks that are grounded in social justice contexts affect the lives of the students, regardless of whether or not they are in the privileged group or the oppressed group. The students may not already see the inequity and, therefore, might struggle with how it affects their lived experiences, but it can still

be argued that it is important for people with privilege to see the ways in which individuals act within systems to perpetuate these privileges or can act to disrupt them.

Learning to become the kind of teacher who can support students in developing their capacities to read and write the world with mathematics requires a negotiation of possible selves. A book club using a text that provides a salient other with whom to compare and contrast oneself can play a role in developing a sense of which possible selves will become a part of one's developing mathematics teacher identity-in-practice. Together, with a number of possible selves, the possible self of critical mathematics teacher can become a part of the developing mathematics teacher identity-in-practice so that the teacher's practices are shaped by a critical perspective. In this way, teachers can serve to interrupt the perpetuation of the status quo by empowering their students to seek social change through the tool of mathematics.

Although a progressive educator, I must not reduce my instructional practice to the sole teaching of technique or content, leaving untouched the exercise of a critical understanding of reality. In speaking about hunger, I must not be satisfied with defining it as "urgent need for food, big appetite, lack of nourishment, deprivation from, or scarcity of food." The critical intelligence of something implies the apprehension of its reason for being. Stopping at the description of the object or twisting its reasons for being are mind-narrowing processes. My comprehension of hunger is not dictionary: once recognizing the meaning of the word, I must recognize the reasons for the phenomenon. If I cannot be indifferent to the pain of those who go hungry, I cannot suggest to them either that their situation is the result of God's will. That is a lie. (Freire, 1997/2007, p. 44-45)

CHAPTER 5: CONCLUDING THOUGHTS

For this chapter, I have generated a set of five questions to respond to that cut across the articles in this dissertation. In my responses to the first two questions, it will be clear how this collection of manuscripts contribute to mathematics education research and research on identity. In responding to the third question, I return to the ideas on positionality in order to describe how my own identities influence my work as an educational researcher. Additionally, I elaborate on what findings were particularly important for mathematics teacher educators, more broadly, from this set of manuscripts. In response to the final question, I generalize from my experiences in this particular dissertation to describe what I have learned as an educational researcher. I conclude with some thoughts about how I intend to move forward from this work.

I generated these questions through a consideration of issues raised by my dissertation committee and others, as I have given presentations about my work. These are questions I anticipate having to address as my work continues to progress and I move forward from the dissertation. It is, therefore, important that I consider each of them carefully to be able to make clear to others how my work is situated in the fields of mathematics education research and research on identity.

Question 1: About Mathematics Education Research

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This section addresses the question: **What might an editor of a <u>mathematics</u> education research journal ask me about my work? How would I respond?** This pair of questions provides me with an opportunity to elaborate on the ways in which I see my work as relevant to *mathematics* education research. An editor or reviewer of a mathematics education research journal (such as *Journal for Research in Mathematics Education*) would likely have a few questions about my work. Each is listed here as the title of a subsection with the corresponding text about how I might respond to these questions.

Why is Mathematics a Relevant Context?

Perhaps, more specifically, a person might ask, "What does this work have to do with the mathematics in mathematics education?" in order to understand more fully what role mathematics has in this work. Mathematics is a relevant context in this dissertation study and is not just an incidental part of the lives of the teachers with whom I worked. Considering how to develop their students' mathematical understandings was an important component to the ideas the teachers discussed in the study group, even though I was not always sure we were balancing mathematical discussions and social justice discussions evenly. (I elaborate on this idea in a subsequent section of this chapter when I address what I learned as a mathematics teacher educator.) The teachers, through their own experiences as students, their teacher preparation program, and their experiences as teachers, developed beliefs and assumptions about what it means to know and do mathematics.

People in the field of mathematics can sometimes take for granted that all mathematicians define mathematics in the same way. The canonical view of mathematics, as people have come to understand, is a Eurocentric way of thinking about how to approach the discipline (e.g.,

Ernest, 1991; Henle, 1991). There are, however, other ways of thinking about and defining mathematics. Mathematics might be defined through a consideration of how people outside of Eurocentric countries come to understand and do mathematics (e.g., Borden, 2011; Lipka, Wong, Andrew-Ihrke, & Yanez, 2012), through feminist perspectives (e.g., Anderson, 2005; Burton, 1995), through embodied cognition where learning might be characterized through a relationship between the body and brain (e.g., Glenberg, 2010; Núñez, Edwards, & Matos, 1999), or through a critical perspective (e.g., Skovsmose, 1985; Stinson & Wager, 2012). This range of perspectives can enrich the field's understanding of what it means to learn and do mathematics by reconceptualizing the very discipline of mathematics (cf. Gutiérrez, 2012). This kind of reconceptualization is productive because it provides teachers and students with diverse and more equitable ways of considering how knowledge is constructed (cf. Gutiérrez, 2012).

Mathematics, as a discipline, is often defined as a culturally neutral or apolitical activity (Felton, 2010; Gutstein & Peterson, 2006). Yet, mathematics is constructed, shaped, and defined by people who are cultured beings with values, beliefs, morals, understandings of what it means to know and do, and assumptions (Borden, 2011; Gutiérrez, 2002). Teaching mathematics is never a neutral activity (e.g., Brantlinger, 2007; Felton, 2010; Gutiérrez, 2002; Gutstein, 2006). Considering teaching mathematics for social justice is one way to show how mathematics can be used as a tool with political and social purposes, even unconsciously (Gutstein, 2006). Developing an understanding of how to "read the world" (Gutstein, 2006) is an important part of becoming an active citizen in a society in which one might seek to "write the world" (Gutstein, 2006).

Also, when considering why mathematics is a relevant context in which to do this kind of work, it is important to remember that students' proficiencies in mathematics are used to

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determine access to particular life experiences. If a student does not demonstrate certain levels of proficiency in mathematics, he is unable to graduate from high school, which restricts the opportunities for the student even further. It is, therefore, critical that teachers engage their students in meaningful mathematical work that is relevant to their lives (Gutiérrez, 2012). Teaching mathematics for social justice offers a meaningful alternative to what can become the rote experiences of school mathematics that might provide extra incentive for some students. Students can see the utility of what they are learning when tasks are situated in social justice contexts. In this way, they become more actively engaged and interested in learning more mathematics, which can open up their opportunities as they continue to develop proficiency.

What Role Does Research on Identity Play in Mathematics Education Research?

The answer to this question might have two parts: 1) In sociocultural theories of learning, learning is determined and defined by whether or not someone is becoming a particular kind of person or whether or not they are assuming a particular identity (Moschovich, 2002; Esmonde, 2009; Gee, 1999/2005); 2) Who someone (e.g., a student or a teacher) is influences their interactions with others, regardless of their context. In this subsection, I elaborate on these two points.

First, this dissertation study is situated in a sociocultural theory of learning (Moschovich, 2002; Esmonde, 2009; Gee, 1999/2005). As stated before, sociocultural theories of learning define learning through examining how people become a particular kind of person (Moschovich, 2002; Esmonde, 2009; Gee, 1999/2005). Determining learning in this way is in contrast to other ways to "measure" learning, such as a cognitive approach where one might measure learning by performance on a written assessment with procedural tasks. Mathematics education research can benefit from a variety of perspectives on learning (Greeno & MMAP, 1997; Sfard, 1998),

including a sociocultural perspective. As Bishop (2012) stated, "What we learn in school is much more than the disciplines of mathematics, reading, history, and science. We learn who we are" (p. 36). That is, learning is more than just characterizing content knowledge, but also being able to characterize when people are learning about who they are.

If a sociocultural approach to learning is considered, then one must consider how to define and operationalize what is meant by "becoming a particular kind of person." In order to do that, I argue that it is important to be able to characterize people's (i.e., both students' and teachers') identities. The empirical studies presented in this dissertation, in particular, show two different ways to consider teachers' identities. In Johnson (in preparation) [Chapter 3], the portraits of Luke and Josh and the discourse analysis of their moment-to-moment exchanges show differences in their enduring positions. Enduring positions are one way of conceptualizing a person's identity, which over time could be one way to capture learning through a sociocultural perspective. For example, in that chapter, I discuss how Josh seemed to experience an increased awareness of systems of privilege and oppression. Over time, if Josh were to begin to act differently (e.g., use different discourses), he could begin to construe new Discourses, which would suggest new enduring positions. In this way, his learning would be evident over time as he becomes a particular kind of person (e.g., a transformationist with respect to race and class).

Another example of characterizing learning from a sociocultural perspective is Johnson (in preparation) [Chapter 4]. In this chapter, I show how the teachers were negotiating possible selves while learning to become critical mathematics teachers. The possible selves described are another characterization of identity (in this case, particular kinds of mathematics teachers). Illuminating the participant examples revealed which aspects of the identity of critical mathematics teacher were under exploration. In this chapter, learning, then, is characterized

through the descriptions of the possible selves and how the teachers mediated the contrasting possible selves to continue to come to see themselves as critical mathematics teachers.

Second, people's identities influence their interactions in all contexts. As elaborated on in Johnson (in preparation) [Chapter 2], people's values, beliefs, knowledge, assumptions, and identities shape, skew, transform, and color the way they see other people and the world around them. These identities with their concomitant attributes can affect how teachers and students approach the teaching and learning of mathematics. For example, a student who has opportunities to be successful in mathematics class over time will develop a sense of identity that includes "mathematician" or, minimally, "able to do school mathematics." This kind of identity likely includes a disposition of perseverance such that the student might feel like he[22] is able to solve new tasks, even when faced with complicated tasks. This kind of disposition, as Bishop (2012) points out, is part of learning mathematics as defined by the National Research Council because it is part of the affective domain. This example illuminates one way in which students' identities can shape their interactions with the content of mathematics. Additionally, Johnson (in preparation) [Chapter 2] described some of the ways in which mathematics teacher educators' (and mathematics teachers') identities and subsequent values, beliefs, knowledge, and assumptions can influence their practice. In summary, people's identities are constantly influencing their interactions with others, the content of mathematics, the institution of schooling, and the teaching and learning of mathematics. It is, therefore, important to consider how to characterize identity so that it is possible to illuminate the ways in which identities shape, skew, and color people's lived experiences.

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[22] Although I tend to use "she" as a non-specific pronoun, my use of "he" here is intentional. I prefer not to use "she" as the chosen pronoun when the implication can be that "girls always have a hard time in mathematics" and/or "girls are not able to do mathematics."

The role of identity in mathematics education research is important for two reasons. The first is to consider how learning might be characterized from a sociocultural perspective and the second is to be able to further understand how identity is shaping interactions with the content of mathematics. Mathematics education research can benefit from attending to identity research for mathematics teachers as well as their students.

Concluding Thoughts

People have a tendency to view mathematics education research as a neutral and apolitical area to study. Mathematics, and by extension, mathematics education research is shaped by cultures and peoples and, therefore, is not a neutral subject matter (e.g., Brantlinger, 2007; Borden, 2011; Gutiérrez, 2002; Gutstein, 2006). Bartell and I (Bartell & Johnson, 2013) argued that mathematics education research benefits from many unearned privileges as compared to other education research areas (e.g., social studies education, English education). Just as we benefit from mathematics education researcher privilege, we wrote about the marginalization of our respective work with foci on developing equitable pedagogical practices and teacher identity in the context of teaching mathematics for social justice (for Bartell and myself, respectively). From this perspective, we suggested:

> How might we begin to dismantle and disrupt privileging certain mathematics education
> research? We might consider abolishing "special issues" so as to reframe all research as
> central. We might consider amending the peer review process in an effort to broaden
> "what counts" as mathematics education research (cf. Martin, Gholson & Leonard, 2010).
> (Bartell & Johnson, 2013, p. 43)

Similarly, here, I would recommend that we consider the ways in which mathematics education researchers continue to privilege particular discourses in mathematics education in ways that

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serve to marginalize some work in the field. Mathematics education research, like all educational research, is at the confluence of several fields of work including psychology, sociology, anthropology, and so on. The field can benefit when, together, the researchers build a more equitable space to broaden and deepen our understanding of the complicated experience involved in the mathematical education of students and teachers.

Question 2: About Identity Research

In this section, I answer the questions: **What might someone who studies identity from a narrative or life-history perspective ask me about my work? How would I respond?** This pair of questions provides me with an opportunity to elaborate on the choice of positioning theory as a lens for studying identity and what affordances and constraints there are with using this lens. A person who is situated in the context of studying identity from a narrative or life-history perspective would likely wonder about the affordances and constraints of using positioning theory as a lens for identity. This section is organized around those ideas.

As the reader may recall from Chapter 1, a narrative or life-history perspective of identity falls under my general category of "Identities as Stories or Narrative." In particular, people from this perspective are those who view identities as stable over time through understanding the patterns that people use when telling stories about themselves and their experiences (e.g., Koven, 2002; Mishler , 2004; Wortham, 1999, 2000, 2001). As a result, authors tend to use interview data and identities are better understood through the perspective of a single person's discourse and not necessarily in comparison to the d/Discourses of others. Assumptions, in this perspective, include a stabilizing sense of identity (as opposed to one that is more fluid or transformative in nature).

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I chose to focus on a consideration of responding to someone who is situated in a life-history perspective (as opposed to any of the others I characterized in Chapter 1, such as "Identities as d/Discourses") for two primary reasons. One reason that a life-history perspective might be particularly important to speak back to is that it has a more lengthy history of research in which it is grounded, having developed out of work in psychology or therapy. Another reason to attend to the reactions of someone for whom identities are life-histories is because it is not a perspective attended to often in the context of mathematics education. This perspective is, however, utilized in other disciplines (e.g., anthropology, sociology, psychology) in which scholars are primarily concerned with people's identities.

What Benefits Come with Using Positioning Theory as a Lens for Identity?

I chose positioning theory as a lens for identity because it relies on interactions among people to consider the development of identity. It also depends on the assumption that words and actions are what shape social structures (Wagner & Herbel-Eisenmann, 2009) and that these words and actions are available for analysis in illuminating how people are being positioned or identified with respect to one another. Here, I highlight three benefits of using positioning theory as a lens for identity.

First, positioning theory offers a way to attend to context and how context situates identity. In this dissertation study, there are both larger and smaller contexts at play. With respect to a more localized context, the study group itself served as a context. In Johnson (in preparation) [Chapter 4], the teachers' identities are situated primarily in the context of the study group itself. This more local context provided the teachers with an opportunity to identify themselves as people who were exploring the possible self of critical mathematics teacher. In addition, larger contexts, such as systems of race and class, offered a situated space in which teachers could

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identify themselves. Specifically, in Johnson (in preparation) [Chapter 3], Luke's and Josh's

identities are situated in the contexts of the systems of race and class (minimally). Furthermore,

the contexts of schooling, generally, and the teachers' schools, specifically, as well as particular

communities, the state, and other contexts are implicated.

At times, the contexts associated with developing an identity might get lost in attending

to identity through a life-history perspective. For example, Wortham (2001) described the case of

Jane who was asked to tell her life story as "if it were a novel divided into chapters" (p. 76).

Wortham attended to the local context of the interview with associated positions of power and

subordinance as well as the context of the relationship between the interviewer and interviewee

(strangers before the moment of interaction). From my own reading of the case of Jane, however,

questions were raised about what other contexts played a role in the identities that were

illuminated. For example, was Jane from the United States of America or another country? At

what time in history were the events in her life happening? What was Jane's race and how did

this influence her interactions with others? What were the conditions of the mental institutions in

which she was admitted for her life? Some of these questions begin to be answered by Jane

herself (e.g., she mentioned the years 1954 and 1966 and the city of Louisville); however, many

of these questions were left unanswered. Yet, these questions have important implications for the

kinds of contexts that would have shaped Jane's lived experiences and, therefore, the values,

beliefs, assumptions, and knowledge that were associated with her identities. For example, her

discussion of receiving an abortion would be shaped by the cultural contexts and policies at the

particular time in history which would have made this either a legal or an illegal option. If she

chose to have an abortion when it was legal, for example, particular values or beliefs might be

implied that are not the same as the ones that would be implied through her choice to have an

abortion when it was illegal. These kinds of contexts would be revealed through close attention to the application of positioning theory.

Second, positioning theory provides a researcher with multiple ways of considering someone's identity that are not tied to particular types of stories or grammatical constructions. For example, in my earlier research (Johnson & Herbel-Eisenmann, in preparation) I studied identity through the perspective that identities are stories (Sfard & Prusak, 2005; Juzwik, 2006) in the context of schooling (e.g., a figured world as characterized by Holland et al., 1998) with expected roles and responsibilities. I carefully analyzed interview data and described the identities of three mathematics teachers based on the ways they were telling stories of the form "I am..." which also met the criteria of being endorsable, significant, and included a moral stance (Sfard & Prusak, 2005; Juzwik, 2006). At the end of the study, though, I struggled because I felt my framework had not allowed me to capture important aspects of the teachers' identities. Specifically, it seemed clear to me by listening to one of the teachers talk that she approached life with a sense of humor and was generally a jovial person; however, she never said something like "I am someone who has a sense of humor." Instead, she told jokes. Because her articulation of this aspect of herself did not conform to the "proper" structure for this perspective, I was unable to include it in the analysis of her identities. It made me feel like I was missing an important aspect of who she was. Alternatively, positioning theory would allow for a more diverse set of discourse. Using the lens of positioning theory in that same circumstance would have provided me the space to include commentary about how she approached life with humor because I would have been able to focus on more of her discourse than just the particular kinds of stories.

The third affordance of using positioning theory is how it considers and emphasizes the interactional nature of identity. My desire to use this kind of framework developed out of one of my own beliefs or assumptions about the world: *people do not develop who they are by themselves*. The assumptions concomitant with positioning theory that identities develop out of interactions among people are particularly salient for me. In Johnson (in preparation) [Chapter 4], it is clear that the teachers are developing a sense of self as a critical mathematics teacher through the interactions and discussions we were having in the group (and likely, as they went back to their classrooms and had further experiences). Although I do not attend to characterizing *which* interactions might have led to differences in Luke's and Josh's d/Discourses in Johnson (in preparation) [Chapter 3], I would posit (from my own assumptions) that Luke and Josh did have different experiences or at least interpretations of experiences that led them to construe different enduring positions in their d/Discourses. People's interactions with others are what led them to have different values, beliefs, assumptions, and knowledge with particular ways of interacting and communicating.

This kind of assumption about how identities develop through interactions with others is obscured in the context of a life-history perspective on identity. In particular, using the same example provided earlier about the case of Jane, Wortham (2001) identified Jane's identities through an examination of how she described her own experiences over time. Wortham described Jane's repeated positionings of herself in multiple life stories or experiences as a way to characterize who she was. For example, he asserted that "In both the past and the present, then, Jane develops from a more vulnerable to a more assertive self" (p. 117). He noticed this duality for Jane across multiple stories she told. What feels missing to me is attention to the other people who made these positions possible. In order for Jane to be construed as more or less

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vulnerable, for example, other people are necessary. If she was acting in her own life in the absence of others, Jane could be neither more nor less vulnerable. That is, a life-history perspective on identity masks the importance or relevance of the interactions with others that I see as required for developing identities by attending to only the positions or identities of the story-teller or narrator of the lived experiences.

Positioning theory offers several benefits to a study of identity, including attending to context, opening up opportunities to examine discourse, and dependence on the interactional nature of identity. In the next section, I will elaborate on a few of the limitations of using positioning theory.

What Limitations Are Associated with Using Positioning Theory?

As with any theory, there are affordances and limitations to considering identity through the perspective of positioning theory. Here, I discuss different limitations to using positioning theory, including the implications of focusing on moment-to-moment interactions and the dependence on the outsider's (or researcher's) perspective.

First, people who use positioning theory to analyze identities often focus on the interactional moments between people to make inference about how people are positioned and, therefore, what their identity is in that moment and in that particular context. The focused attention on the moment-to-moment interaction may lead researchers to make inferences about how people are positioned in potentially insignificant moments. For example, in Johnson (in preparation) [Chapter 4], I highlight the possible selves that I noticed that might have contributed to the teachers being unable to see themselves as critical mathematics teachers. Although I drew these possible selves out of the teachers' discourse, I do not know (without asking them further questions) if these are the possible selves that interrupt their abilities to envision themselves as

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critical mathematics teachers. Perhaps, there are other aspects of who they are that prevent them from seeing themselves in this way. Additionally, a focused attention on the moment-to-moment interaction may make it difficult to determine whom people are over a longer period of time. In life-history, it might be more apparent how a person's identity is stabilizing over time because patterns emerge in their storytelling that can show a sense of constancy (Wortham, 1999, 2000). Alternatively, considering a stabilizing perspective through an analysis of repeated interactions might be more complicated as contexts and interactions vary based on who else is participating.

Another limitation to using positioning theory is how the theory typically depends on an outsider's perspective to an interaction (or minimally, a distanced and reflective position on one's own interactions) (cf. Leander, 2004). That is, in life-history studies, it might be easier to see or hear the voice of the people whose identities are being characterized. Instead, with positioning theory, researchers often make decisions about how someone is being positioned in a given moment in a given context and are infrequently able to ask the people themselves how they feel about their positioning and/or if they perceived that positioning themselves. Leander (2004) showed how consulting with the people involved in an interaction revealed a more diverse set of positionings than he had originally seen.

In summary, a person who studies identity from a narrative or life-history perspective would be most concerned with the ways in which my dissertation study focuses on moment-to-moment interaction. Although I argue for the extension of positioning theory to include how interactions codify together over time (cf. Anderson, 2009), this extension is still dependent on an analysis that is focused on moment-to-moment interactions instead of longer, more extensive narratives. These kinds of narratives might be interesting and useful to use in conjunction with positioning theory in some future study as they might reveal important details about how the

teachers see themselves and what role that self-awareness might play in their continued

interactions with others and, particularly, their students.

<h2 style="text-align:center">Question 3: My Positionality As a Researcher</h2>

In this section, I answer the questions: **How did my positionality affect my work as an**

educational researcher? What stories did I tell (in this dissertation) as a result of my

positionality? As I have discussed in other chapters in this dissertation, I find it particularly

important to make clear the ways in which it is apparent to me how my positionality is playing a

role in the ways I interpret who others are. I try to be as explicit as possible with the things that I

see as being related and am careful to reflect using questions that might be able to illuminate the

values, beliefs, and assumptions that are harder to see. Even so, I acknowledge that there are

likely ways in which my positionality influences my work in unseen (to me) ways. Perhaps,

however, there are some stories that I have told that will help the reader see some of those ways.

In this section, I return to a few of the descriptions I have in different chapters of this dissertation

to elaborate on how I see my own positionality playing a role in my work as an educational

researcher. In particular, I first describe my reflections on my positionality as a Christian and

then, I describe my reflections on my positionality as a White, middle-class woman. In the final

subsection here, I begin to describe how a consideration of one's positionality as a researcher is

particularly important for all mathematics education researchers.

As a Christian

As I self-identified at the very beginning of this dissertation and in other places

throughout the chapters, I am a member of The Church of Jesus Christ of Latter-day Saints (e.g.,

a Mormon and a Christian). I was not raised a member of the Church and only became a member

at the end of the first year of my doctoral studies. In this subsection, I discuss briefly about how I

<p style="text-align:center">175</p>

came to be a member of the Church in order to provide the reader a more full context of the intersection of my faith and my work. I then elaborate on some of the ways in which I saw my positionality as a Mormon surfacing throughout the dissertation study. As I have already shared some of my reflections on my positionality as a Mormon with respect to my practice as a mathematics teacher education in Johnson (in preparation) [Chapter 2], I focus here on my position as a researcher.

I was raised in a Christian home. Primarily, we attended a Methodist church while I was growing up but my parents' religious backgrounds were Episcopalian and Baptist. We liked to attend the Methodist church in Connecticut, but found it difficult to locate a new one when we were in other states. In elementary school and middle school, we went fairly regularly on Sundays and sometimes were involved in other activities that took us to church on other nights of the week. By the time I was in high school, however, we did not really attend church on a regular basis. When I was in college, I became involved in an organization called Campus Crusade for Christ for a little while, but then determined I was not really interested. In short, I began to fall out of a belief of God and did not really understand who Jesus Christ was. By the time I started my doctoral studies, I had come to describe my position on faith in this way: *I know that all things about the spiritual aspects of our lives are beliefs*. Furthermore, I did not *believe* that God existed. I found it difficult to say that I *knew* that God did not exist because, fundamentally, it was something that was a belief (for me). I had, however, grown comfortable with allowing people to assume what they wanted about my faith and was not comfortable speaking out about this personal knowledge.

When I arrived at Michigan State for my doctoral program, I was determined to become more open about my beliefs. I started becoming friends with a woman who is a member of The

Church of Jesus Christ of Latter-day Saints. I felt at ease talking to her about religion and, even, being open about my beliefs. As I started becoming friends with her, I used the strategies that were familiar to me (as described in Chapter 1) to try to fully understand her values, beliefs, assumptions, and ways of communicating and interacting in order to understand who she was. At the same time, since I was beginning a doctoral program, I found myself in a sea of new ideas and I read things that pushed the boundaries of what I thought I understood previously.

In particular, I read Philipp's (2007) handbook chapter on beliefs and affect in mathematics education. Philipp's conceptualization of what a belief is, what knowledge is, and how they are related started to push on my certainty of how to define beliefs, knowledge, and their relationship. I began to question what can be known as the distinction between beliefs and knowledge. I started to think that it was possible that whole bodies of information I had previously considered beliefs could actually be held with a conviction so great that they became knowledge.

As I continued to come to better understand my friend, I realized that I needed to understand more about her religious beliefs to fully understand her (and another new friend who was also in my doctoral program). One day, I ended up in the bookstore hunched over a copy of *Mormonism for Dummies* (Riess & Bigelow, 2005) in order to get a broader understanding without directly asking her to speak on behalf of her religion. As I read the contents, I came to better understand who my friends were. Simultaneously, I began to develop a seed of faith that grew much larger as I continued to try to understand the Church and its teachings. Through many experiences, my learning and studying of the Church came to be for me more than trying to understand who my friends were. I developed clearer understanding of whom I was (through the principles taught in the Church).

After I was baptized and confirmed a member of The Church of Jesus Christ of Latter-day Saints, I continued to consider my own identities and the new shape some of them were taking as I grew in my understandings of the teachings of the Church. I also continued my doctoral program and began to become increasingly interested in what I read about teachers' identities. These readings brought new lenses to an analysis of my own life and the ways in which I was coming to participate in new d/Discourses and expressing new values, beliefs, knowledge and assumptions concomitant with being a member of the Church.

My interest in studying identities, as described in Chapter 1, developed out of my interest in others and, then, ultimately, myself, as discussed here. This dissertation study illuminated some of the ways in which my positionality as a member of The Church impacted my work in educational research. In particular, here, I elaborate on how my Mormon identity impacted how I heard some of what was said in the study group as well as how it shaped how I considered the analysis and writing of the dissertation.

My identity as a Mormon influenced how I heard some of what the mathematics teachers said. Although a consideration of what was said might be seen from my position as a mathematics teacher educator (e.g., Johnson, in preparation [Chapter 2]), it is also important to consider what was said from my position as an educational researcher. Both of these positions are relevant, particularly because this dissertation study utilized discourse analysis. As a result, analysis began, at least with initial impressions, as soon as the teachers said something in response to an interview question or in the context of the study group. An example of this initial analysis is presented in Johnson (in preparation) [Chapter 3] in the characterization of Luke's and Josh's enduring positions with respect to race and class.

My identity as a member of The Church of Jesus Christ of Latter-day Saints influenced how I heard what Luke and Josh, in particular, said about their faith and religious beliefs. Attention to how I understood what they were saying is important because it relates to how I might characterize their identities. In Johnson (in preparation) [Chapter 2], the discussion of my understandings of "grace" and how Luke was using it to talk about his students informed my practice as a mathematics teacher educator. Coming to better understand how Luke was using "grace" also exemplifies the kind of work that might be necessary to understand how to characterize someone's identities. Here, I will use another of Luke's contributions (and an interaction he and I had around it) to make this point. In the discussion in the study group of the list of marginalizations associated with poverty (Scalzi, 2005), Luke was making sense of statements that talk about earning more credibility with others when overcoming obstacles. He used a religious analogy that I needed to ask for clarification about. The exchange was as follows:

> **Luke**: It's like if you start off with less, there is more credit given to you because you started off with less. And like the phrase, I started on third base, I didn't hit a triple. [*Chloe: Um-hmm. Kate: Right.*] If you are poor, it's like, no! I hit a freaking triple. [*Kate: Right.*] I had to get here. I started at home plate. I didn't start at home plate. [*Kate, Chloe: Right.*] My dad started at home plate. [*Kate: Right.*] And when I was born he was already on--, half way to third base. [*Kate: Second or something, right?*] Yeah. So, there are--, there are religious parallels to that as well. As to why Jesus would choose to hang out with fishermen because then He gets more credit because He didn't choose educated people, He chose lay people.
>
> **Joshua**: I think it's interesting--,

Kate: Whoa. Hold on one second, Josh. I am like, Whoa! We need to unpack Luke's here just a second.

Joshua: Okay.

Kate: The credit—

Luke: Sorry.

Kate: Can you just repeat what you are meaning by who--, like with respect to the Savior?

Luke: God gets more credit if He does amazing things through people that we all deem to be very average or below average.

Kate: Okay.

Luke: As opposed to taking a person that we all know is awesome and doing something awesome with that person, it's like—

Kate: Right.

Luke: Well, like how hard could that have been.

Chloe: Right. [unintelligible]

Luke: They are awesome already.

Kate: Right.

Chloe: That makes sense.

Kate: Go ahead, Josh.

In this interaction, I stopped the discussion from progressing forward to make better sense of what Luke was saying. First, I heard what Luke said from my positionality as a Mormon which made me particularly sensitive to what he might be saying about Jesus Christ. Second, I wanted to be clear as a teacher educator, but particularly as an educational researcher interested in

characterizing his identities, what he meant by the statement he made. My positionality as a Mormon was influencing both what I heard and how I heard it in this moment.

My identity as a Mormon shaped how I heard and tried to make sense of the teachers in the study group. As discourse analysis depends on paying close attention to what people say, these moments of interest were initial impressions of units of analysis. The other way I elaborate here on how my identity as a Mormon shaped my practice as a researcher is to discuss further how I see my identity impacting my analysis and writing of this dissertation.

My identity as a Mormon also impacted the ways I considered how I might see other people's enduring positions through an examination of their d/Discourses. In particular, as described earlier, as I joined The Church of Jesus Christ of Latter-day Saints, I became more aware of the values, beliefs, knowledge, assumptions and ways of interacting that were a part of being a member of the Church. I pondered what my own participation in the d/Discourses provided me with an opportunity to see and, then, what I might be missing. In a reflective memo, as I was preparing to conduct this study, I wrote the following:

> If a person's identity is (at least in part) expressed through their participation in particular Discourses, how do I know if I have identified those identities that are important to them that may find their expression in Discourses that are unfamiliar to me?

> Perhaps an example will help here: I read an article on CNN a while back that described how politicians try to use particular language to remind voters of their positions/affiliations so that they garner support, even without overtly stating these positions/affiliations. Let's take Mitt Romney as an example here. He uses language that

is reminiscent of how ideas are expressed in the Church.[23] Specifically, I've heard him

say, "I am honest in all my dealings with my fellowmen." This is how we talk about

maintaining integrity with our finances and other responsibilities at church. I am not

suggesting that we have a monopoly on this phrasing as members, but the use of this

phrasing is recognizable to members as something that is significant about Mitt

Romney's good standing in the eyes of the Church. This sentence means something to

others because it carries meaning in and of itself, but its reference to Romney's identity

as Mormon is unmistakable to a person who is also Mormon. That is, my ability to

participate in the Discourses of the Church allows me to hear his discourse in a different

way.

I continue by elaborating on the idea that I am not sure there is a good "solution" to the kinds of

issues I raise here. Over time, as I have continued to work on my dissertation, I have determined

that the best way to clarify the ways in which I elaborate on others' identities is to make clear the

positions and identities from which I am drawing. In this way, I am able to situate my own

characterization of who others are in ways that are clear to a reader, although a consideration of

the reader also raised questions.

Close to the time of my dissertation defense, one of my committee members raised an

important question, particularly in the context of Johnson (in preparation) [Chapter 2], the

manuscript on my positionality as a mathematics teacher educator. Fundamentally, the question

was: In what ways does a non-religious person or a person from a different religious perspective

have access (or not) to the ideas presented in Johnson (in preparation) [Chapter 2]? For me, this

question pushed me to think further about the ways in which my own participation in

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[23] Mitt Romney was a presidential candidate at the time I was conceptualizing this dissertation
study. He is also a member of The Church of Jesus Christ of Latter-day Saints.

d/Discourses were shaping not only my analysis of the teachers' identities but the ways in which I was presenting d/Discourses for others' interpretations. I think this is an important question for me to consider as I continue to move forward with this kind of work. In this circumstance, this dissertation committee member was able to point to places in the manuscript where further elaboration or a reconsideration of ideas was necessary. In the future (without such a convenient method of review in place), I plan to seek opportunities to get feedback on my writing and ideas so that I can continue to uncover the ways in which my positionality is shaping my work.

In summary, in this subsection, I have described some of the context about how who I am as a Mormon was shaped by my learning in my doctoral studies and then, subsequently, how this identity came to inform and shape my practices as an educational researcher. As I am a human being with a multiplicity of identities, I describe a different aspect of my identity in the next subsection.

As a White, Middle-class Woman

I have already described how my identity as a Mormon influenced my work as an educational researcher. Here, I describe how my identity as a White, middle-class woman also influenced my work as an educational researcher during the dissertation study. Specifically, I elaborate on two main ideas. First, I describe the ways in which my identity as a woman may have shaped my analyses of the three teachers. Second, I also describe the ways in which my identity as a White, middle-class woman may have obscured my understanding of particular ideas because of my unseen privilege.

Sometimes, it is hard to see what is there and not there in your own work. The first point I elaborate on here stuck out to me the most when one of my committee members said at my dissertation defense, "What happened to Chloe?" That is, Chloe and her discourse became

obscured by a focus on Luke and Josh. As I pondered the question, I began to wonder what possible reasons there might be for the focus on Luke and Josh. One reason I have hypothesized is the solidarity I have felt with Chloe, both as a woman and as someone who is interested in social justice. In the pre-interview, Chloe self-identified as someone who became interested in teaching mathematics for social justice two years or so before we had those discussions in the methods courses. Also, throughout the study group sessions, Chloe often drew on her experiences as a woman to make points about privilege and oppression. Typically, I identified with her experiences, particularly as she elaborated on what it is like to be a part of the mathematics community, which is often dominated by men. Reflecting on the contents of this dissertation, I began to wonder if I felt more solidarity with Chloe in ways that protected her from my intense scrutiny. I know that the distinction between Luke and Josh was most salient to me, as I considered the whole set of data, but I wonder what I would find if I analyzed Chloe's data with the same kind of rigor. Perhaps that would be another interesting analysis moving forward. An alternative hypothesis to my feelings of solidarity with Chloe is quite the opposite. It is possible that I analyzed more carefully Luke's and Josh's discourses precisely because of the solidarity I felt with them as Christians and because I might have wanted to consider their words more carefully (for reasons I explain more fully in the previous subsection).

Considering the influence my identity as a White, middle-class woman had on the dissertation study also provided me with an opportunity to return to one of my own contributions in the study group. During the discussion of the list of marginalizations associated with low socioeconomic status (Scalzi, 2005), the distinction (or not) between the systems of race and class became something I struggled to understand. As a group, we discussed the kind of pride that some people have in what they have accomplished despite what they do not have

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(monetarily). I then discussed the ways in which I thought it was important to treat people with respect and, therefore, to respect the pride that they have in their life circumstances but that there were some circumstances and life experiences that should be unacceptable (e.g., Lubienski, 2003). I read off the list of marginalizations, "Being poor is people surprised to discover you're not actually stupid" (Scalzi, 2005, p. 2) and described how that was an unacceptable way to treat others. As I listened to my own contribution later, while generating the field notes for the session, I wrote the following in my notes:

> I am trying to process these issues about class here. I feel like I have done a lot more thinking about what it means to be anti-RACIST but I think I've spent far less time figuring out what one does about class to develop an anti-CLASSIST perspective. What DOES an anti-classist perspective really look like? I am struggling, perhaps, because class is the thing I think is "changeable" in some ways. I don't know. I think that it is important to remember that class affects things that can lead to negative judgments of people...but there is a tension with the idea that some things are just unacceptable living conditions and should be changed/challenged.

In this reflective note, I began to wonder how to characterize an anti-classist perspective because I wondered in what ways I was being anti-classist or not in my own contribution. Something that felt complicated for me was that *I*, personally, needed to process the ideas that I was grappling with in respect to class, but I further wondered how my own contribution may have shaped the data or my own analysis of the data. My privileges as a middle-class person have made it complicated for me to understand the lived experiences of others who do not benefit from economic security, but also the ways in which I perceive class to be a part of one's identity that seems (on the face) to be least static. As a result, though, my own contribution could have

contributed to the teachers' notions that class is entirely change-able on an individual level and not influenced by larger systems that can perpetuate inequity with respect to class. My contribution certainly shaped the discussion that immediately followed in which Chloe described behaviors she had begun to see as concomitant with low socioeconomic status (e.g., low expectations for school performance from parents, taking pride in one's work despite life circumstances).

In summary, my identity as a White, middle-class woman shaped how I perceived Chloe's contributions to the study group and also influenced my own contributions to the study group. With respect to both of these ideas, I can see how they have shaped both the data that I have (as the teachers' contributions are necessarily also shaped by my own) and also the ways I approached data analysis (e.g., focusing on Luke and Josh, particularly in Johnson (in preparation) [Chapter 3]).

Concluding Thoughts

In this section, I have elaborated on how I see different aspects of my own identities intersecting, shaping, skewing, and coloring my work as an educational researcher. I have given particularly detailed descriptions on the ways in which I can see how my identities influenced the work in this dissertation study from early stages of data collection through the writing-for-reporting that is the text written here. Furthermore, in Chapter 1, I described how my identities brought me to this dissertation study in the first place. That is, my positionality as a human being with all of my identities including as a raced person (White), a person with a particular socioeconomic status (middle-class), a religious person (Mormon), and a gendered person (woman) has had an impact on the ways I conceptualized, enacted, and completed this dissertation study. The kind of self-reflection that I write about in this section (and in other

chapters in this dissertation study) might be particularly important given the nature of my work (e.g., characterizing the identities of others).

I argue here that all mathematics education researchers should be engaging in the kind of self-reflection in which they are illuminating the aspects of their identities with concomitant values, beliefs, assumptions, and knowledge and ways of being, interacting, and communicating and so on that are influencing, shaping, coloring, and skewing their work (cf. Ellis & Bochner, 2000; Fine, Weis, Weseen, & Wong, 2000; Foote & Bartell, 2011; Peshkin, 1988; St. Louis & Calabrese Barton, 2002; Wolcott, 1992). It is not possible to free one's self from one's selves. That is, it is not possible to write without the identities that one has. At any given time, a person might be able to foreground one or more identities and as a result, background other identities, but it is not possible to conceptualize a study, interact with data or people, and then write a study without the influence of one's identities.

In the context of mathematics education research, this kind of self-reflection might seem superfluous as the content of mathematics (and by extension the work of mathematics education research) can seem to be a neutral discipline lacking a cultural influence. A perception that includes the neutrality of mathematics, as is elaborated on in other sections and chapters of this dissertation, however, is not accurate as mathematics is developed, acted upon, written about, and perpetuated as a tool by people who are cultured, raced, religious and so on beings (e.g., Brantlinger, 2007; Borden, 2011; Gutiérrez, 2002; Gutstein, 2006). Therefore, explicit and careful attention to one's positionality as a *mathematics* education researcher is an important aspect to the work of all mathematics education researchers.

Although the detailing of the exact kinds of reflective tools (e.g., questions, journaling) that might be effective for illuminating aspects of mathematics education researcher positionality

is beyond the scope of this dissertation, I consider the Mathematics Teacher Educator Positionality Heuristic (Johnson, in preparation [Chapter 2]) an important start to a reflective tool. The kinds of reflections I listed in this section were illuminated by a consideration of some of the same ideas. For example, why was I "disturbed" (Wheatley, 2007) by the comment of my one dissertation committee member about where Chloe is in this dissertation? My reflections on that moment of interaction that committee member and I had provided me with an opportunity to investigate the associated biases and privileges that might have influenced my work here with respect to Chloe. These kinds of personal examples are a beginning to generating a more robust tool effective in illuminating the ways in which mathematics education researchers' identities are influencing the field of mathematics education research.

Question 4: Mathematics Teacher Education

The question I address in this section is: **How does this dissertation speak to mathematics teacher educators?** The response to this question is meant to unpack the utility of this dissertation for mathematics teacher educators, more broadly, including those who might not be interested in teaching mathematics for social justice, more specifically. Also, I attend to what I have learned as a mathematics teacher educator to reflect on my own practices as a teacher educator.

All Mathematics Teacher Educators

Each manuscript is relevant to the practices of all mathematics teacher educators. In Johnson (in preparation) [Chapter 2], the implications of the piece for all mathematics teacher educators are perhaps most explicit. In Chapter 2, I present the Mathematics Teacher Educator Positionality Heuristic, which is a set of questions that can be used to reflect on one's positionality as a mathematics teacher educator. In particular, three pairs of questions can be

used to interrogate and reflect on one's own practice that have the capacity to illuminate a range

of insights into how one's positionality is influencing one's own practice. This range of insights

includes 1) raising awareness of status and authority, 2) clarifying (personal) beliefs, and 3)

identifying assumptions. Knowing how one's positionality influences the practice of

mathematics teacher education is important because it is only in seeing the influence that one is

able to consider the (un)intended consequences of one's actions to determine if one is

perpetuating something one disagrees with (cf. Palmer, 1997; Peshkin, 1988). Mathematics

teacher educators can use the Mathematics Teacher Educator Positionality Heuristic without

modification to illuminate a variety of insights into how their practices are being shaped by their

own positionalities.

In Johnson (in preparation) [Chapter 3], I wrote about how the study showed that it is

important to consider how teachers communicate as they discuss privilege, power, and identity.

The two vignettes, in particular, illuminate how in moment-to-moment discourse teachers can

talk on the same topic, perhaps even "agree," and yet a discourse analysis shows important

differences. Discussions of privilege, power, and identity might be particularly salient in a

consideration of teaching mathematics for social justice but should also be taken up in the

context of other pedagogical strategies. The student population is becoming more and more

heterogeneous and mathematics teachers (for reasons explained in other sections of this

dissertation) are not free from considering the ways in which their content and the teaching and

learning of their content is used to perpetuate inequity. Every mathematics teacher educator

should be responsible for providing opportunities for mathematics teachers to engage in learning

about instructionally relevant variation (Tom Bird, personal communication, 2010), culturally

relevant pedagogy (Ladson-Billings, 2009), or any of the other ways learning about teaching diverse peoples might be titled.

The final manuscript, Johnson (in preparation) [Chapter 4], also has implications for the practices of mathematics teacher educators, even with its focus on teaching mathematics for social justice. It is, perhaps, particularly relevant to mathematics teacher educators using practice-based materials or artifacts of mathematics teaching and learning. The materials might be video or written cases of episodes of teaching, student work, curricular materials, or mathematical tasks. Episodes of mathematics teaching and student work, which are more likely to be presented as grounded in a particular class, provide a robust opportunity for prospective and practicing mathematics teachers to use participant examples (Wortham, 1994, 1995, 2003). As discussed in Chapter 4, participant examples are evident when people talk in ways that they are positioning themselves in comparison to a "salient other" (Markus & Nurius, 1986, p. 954). It would be important for mathematics teacher educators to consider the ways in which the teachers they are working with are positioning themselves both with and against the presented "salient other." This provides insight into how the teachers are seeing (or not seeing) themselves as a particular kind of teacher. Beyond just 'critical mathematics teacher,' the identity explored in Chapter 4, attending to this positioning can reveal how mathematics teachers are negotiating identities, such as 'using high-cognitive demand tasks,' 'inquiry-based learning,' 'procedural teacher,' and so on.

The manuscripts contained in this dissertation are relevant to mathematics teacher educators, even those who may not be interested in teaching mathematics for social justice. There are particular lessons to be learned from the two empirical studies as well as the

practitioner article that are useful in the context of educating prospective and practicing mathematics teachers.

What Did I Learn

In addition to the lessons learned that can speak to all mathematics teacher educators, I have learned a few lessons myself as a mathematics teacher educator. I will not use this space to fully elaborate on the role my positionality plays in my practice as it is attended to in Chapter 2. I do, however, want to reiterate that the lessons I learned about my positionality will continue to shape my future interactions with mathematics teachers. Additionally, I will continue to reflect on my practices as a mathematics teacher educator with the Mathematics Teacher Educator Positionality Heuristic as my positionality is always developing and influencing my work (regardless of whether or not I am aware of it).

Beyond the role my positionality plays in my work as a mathematics teacher educator, I have also gained experience working with smaller groups of teachers, facilitating discussions about race, class, and identities, and trying to maintain a focus on mathematics. In the study group, there were three teachers whom I already had some developed relationships with because I had known them for the two years prior to the study group. The small group size afforded some advantages that a larger group does not. For example, each person was able to share in the allotted time for discussion. I was able to hear how *each* of the teachers was making sense of teaching mathematics for social justice as well as the other conceptions we were discussing. Additionally, the small group size allowed us to have more personal discussions. This opportunity was likely facilitated (in this case) by the teachers having known each other prior to the study group. The teachers felt comfortable sharing ideas with one another because they had worked together before in the methods classes.

The small group also had a few limitations. For example, the teachers were never able to try out their ideas with one another before talking about them with me as well. Although I worked hard to position myself as an equal in the group, I was not always successful (see Johnson, in preparation [Chapter 2]). Additionally, in the context of learning about mathematics teaching and learning, I had never facilitated discussion across such a small group. It was not always easy to determine when I should step in and say something or when I should allow the time to sit empty. In this way, I had to develop a better understanding of when it was appropriate to use wait time by reading their body language and faces. Previously, I had found this easier to do in the context of a larger group as there are more people to use as the gauge for whether or not it is appropriate to speak up or wait longer. Another possible limitation to the small group is the potential lack of variation across the participants (me included). A smaller group of people necessarily has a smaller set of diverse experiences. Also, the group (or some subset of us) had many things in common (e.g., Whiteness, middle-class backgrounds, Christian faith). These identities, as I have discussed in other sections of this dissertation, shape our lived experiences and may restrict the kinds of stories we were able to share with one another (cf. Johnson, in preparation [Chapter 3]) and may also restrict the privileges we were able to explore.

In addition to what I learned as a mathematics teacher educator about working with a small group of teachers, I was able to learn more about how to facilitate discussions about race, class, and identities that can be very difficult. In particular, I learned that it was easier to have the discussions over time in the group. I suspect that my next iterations of a study group like this will bring with it the challenges a new group always does, but will become a bit more natural. Having discussions about race, class, and identities can make people feel uncomfortable. I worked hard to strike a balance of providing opportunities for discussion that felt safe as well as pushing each

other's thinking. I encouraged the teachers to ask one another and me for clarification or to consider an alternative perspective. As noted earlier, the small group size likely made this even more possible.

Moving forward with my practice as a mathematics teacher educator who is interested in continuing to engage in conversations about different systems of privilege and oppression as well as identities and positionality, I will try to find more opportunities to think about how to push thinking or offer alternative perspectives. As with teaching any subject, the more a teacher (or teacher educator in this case) understands about what the students (or teachers) might say the more tools are at the ready for use. For example, I have now facilitated a discussion around McIntosh's (2011) list of privileges. Knowing how some teachers might respond will provide me with an opportunity to think about how other teachers might respond, which then allows me to think about how I might respond. Based on that discussion, in particular, I plan to remove the numbers from McIntosh's (2011) list. The teachers referred to the statements by number which (from my perspective) allowed them to talk about the privileges without fully considering them.

One final thing I wish to write about what I learned as a mathematics teacher educator by facilitating this study group is about the content of mathematics itself, particularly in the context of teaching mathematics for social justice. Several of the study group discussions were designed to provide opportunities to consider privilege and oppression as systems and how our personal identities are situated in these larger systems (and shaped by them). Although some of the discussions did focus on mathematizing social issues in order to discuss them (e.g., the video about the inequitable distribution of wealth in America (politizane, 2010), the discussion of the news article (Luhby, 2012)), several of our discussions did not have a specific mathematical focus. I went back and forth about whether or not I should be providing the teachers with more

examples of what teaching mathematics for social justice might look like in their classrooms. On one hand, it seemed, as it was the purpose of the study group, that it might be better to be providing greater opportunity for them to see teaching mathematics for social justice in action. On the other hand, however, it seemed complicated given their diverse school settings when an important component of teaching mathematics for social justice is about developing tasks relevant to the students' experiences. Although I had planned for more opportunities to discuss their own specific work in their classrooms, those discussions did not always take place as the teachers seemed reticent to talk about the work in their classrooms separate from the other discussions we were already having (e.g., insecurity about the kinds of mathematical tasks they were using in their classrooms (elaborated on in Chapter 2)).

I do not think there is an easy or straightforward solution to how to consider what examples to provide about teaching mathematics for social justice or not. In future study groups, it will be important for me to consider whether or not the teachers have experience seeing mathematical tasks situated in social justice contexts. I knew that the group of teachers I was working with in this case had seen at least four different mathematics tasks situated in the context of teaching mathematics for social justice over the course of their work in the methods course. Additionally, Gutstein's (2006) book provided several as he wrote about his own work teaching mathematics for social justice. Each teacher was also given *Rethinking Mathematics: Teaching Social Justice by the Numbers* (Gutstein & Peterson, 2006), which had some examples of mathematical tasks situated in social justice contexts. This set of resources and experiences were likely robust enough for this particular group of teachers; however, future teachers may have less experiences (and possibly resources). It will be important for me to consider these as I plan for and facilitate future groups.

Question 5: Learning As a Mathematics Education Researcher

Answering this final question: **What did I learn as a mathematics education researcher?** allows me to elaborate on what this dissertation provided me with an opportunity to learn. This kind of reflection is important as it is a way to think about how the "case" of completing a dissertation generalizes to the practices I will engage in as a mathematics education researcher in my career. Specifically, in this section, I discuss what I learned particular to the kinds of work that I intend to continue to pursue.

One difficulty I faced in the process of this dissertation study was with recruiting participants. I was interested, initially, in working with mathematics teachers located primarily or exclusively in schools dominated by racial and economic privilege. I sent out more than thirty emails to local teachers who met the descriptions and heard back from none of them, even though a few had expressed some interest earlier in face-to-face discussions. I determined that I really was interested in working with White mathematics teachers. I also strongly preferred that they benefit from economic security (if not economic privilege) but this information is harder to surmise when recruiting. I turned to the pool of teachers that I knew would have learned about teaching mathematics for social justice (mathematics teachers I had taught in the methods courses). I invited five teachers to participate and two were unable to for a variety of reasons. None of the expressed reasons were because of the content of the study group. The experience, though, increased my awareness of a problem that I could face moving forward with my work. I wonder if the teachers I had contacted initially did not want to participate in a study group because they did not have time or if it was because they did not feel that they knew enough about the topic we would be discussing. I wonder if perhaps they did not think it would be relevant to their work as teachers. Having more success with the teachers I had worked with before, I think

the contact with teaching mathematics for social justice was likely important. In the future, I can consider ways to have more personal contact with teachers about what teaching mathematics for social justice is through either methods courses with prospective teachers who become practicing teachers or, most likely, through the mentor teachers working with prospective teachers. In this way, I could encourage teachers to participate by providing them with opportunities to see the relevance in their classrooms.

This dissertation also provided me with an opportunity to learn more about how to think about how different manuscripts can highlight different aspects of the same project. Since my first semester in my doctoral studies, I have been able to read other people's work that developed out of the same project, including an more in-depth study of the Cognitively Guided Instruction project (Carpenter, Fennema, Franke, Levi, & Empson, 1999) and the QUASAR project (e.g., Lane & Silver, 1999; Silver, Smith, & Nelson, 1995; Stein, Grover, & Henningsen, 1996) and the articles those researchers generated. Additionally, I have been able to co-author some manuscripts that have focused on different and/or complimentary aspects of larger studies. This dissertation study was the first time I had the opportunity to consider a variety of manuscripts in a study *I* conceptualized. It was also the first time I had really done so before I had collected all of the data. My research experiences have been primarily on development projects that have focused on developing or implementing materials. After our work with teachers, we have been able to generate manuscripts. In some ways, I followed a similar pattern with this dissertation as it was not conceptualized to be three manuscripts (instead of standard chapters) until after the pre-interviews had been completed and the first study group session had met; however, it was different to think about the manuscripts so early in the data collection process.

The final point that I will discuss in this section about what I learned as a mathematics education researcher is, perhaps, the most important: *I actually really like doing research*. As someone who is about to finish my degree at a well-respected research intensive institution, this point may seem trivial. It is true, however, that not all of my colleagues have come to the same conclusion. It is particularly important to me to know this statement is true because I can remember it when things get difficult. Research is a non-linear, complex endeavor that requires much persistence and tenacity. At times, in this work, I felt like I was standing at the base of a 50 foot wall. At 5'4" (plus or minus a little bit), 50' seems insurmountable. Even as I passed over some of the milestones (getting parts of the work to the dissertation committee for review), I felt the looming presence of the wall. "Why aren't you more excited?" "Because shearing 10 feet out of the total height of a 50 foot wall doesn't actually help me get over it." Each time, though, that I ignored the wall and focused just on a set of bricks, I loved it. I would get lost in it for hours (and sometimes could not even find my car in the parking lot of my local grocery store because I was so immersed in the work). I enjoyed thinking about, processing, and pondering the ideas. I enjoyed collecting the data. I enjoyed the analyzing and writing-for-understanding. I loved seeing new things come to light in the data. Finally, I even (mostly) enjoyed the writing-for-reporting. I am looking forward to the next few manuscripts that will come out of this work and the next few projects I have rolling around in my head. Watching them come to fruition will be even more exciting as I continue to remind myself that *I actually really like doing research* which will focus me on the bricks, not the wall.

Moving Forward

This dissertation study provided me with an opportunity to begin investigating the key ideas that I am interested in continuing to pursue: a) investigating my own positionality in my

work, b) illuminating the identities of mathematics teachers, and c) preparing teachers to teach mathematics for social justice. My focus on White, middle-class teachers in this dissertation was purposeful as I am interested in trying to understand how teaching mathematics for social justice might differ with people who benefit from racial and economic (and other) privileges. In this study, Josh was working at a suburban school with a student body that benefitted from racial privilege and, for some students, economic privilege. Ultimately, I am interested in continuing to unpack the relationship between teachers' identities and teaching mathematics for social justice. I expect that my future work will take shape around two clusters of questions:

- What identities do teachers bring to their practice of teaching mathematics for social justice in schools dominated by racial and economic privilege? How are their identities made apparent (or not) in their classroom practices? What does teaching mathematics for social justice look like in schools dominated by racial and economic privilege?

- How do teachers' identities play a role in how they interpret cases of teaching mathematics for social justice? How might episodes of classroom practice (either video or narrative cases) play a role in this curriculum that prepares teachers to teach mathematics for social justice?

Research in these areas is quite limited, particularly given the context of privilege (a notable exception is Wonnacott (2011)). Considering the ways in which teaching mathematics for social justice in this context is similar to and different than teaching mathematics for social justice in other contexts is an important avenue for exploration. Additionally, as teachers' identities are a critical part of how they make sense of, interpret, and utilize ideas in their classrooms, it is important to investigate how these identities are drawn on, mobilized, extended, complicated, and, possibly, transformed by the teachers' practices. Deeper understanding of these ideas can

lead to a more informed set of materials for preparing teachers to teach mathematics for social justice in contexts of privilege. Exploring how different methods of teacher education might be employed to provide for robust learning about teaching mathematics for social justice is important to better preparing teachers to teach. I look forward to continuing to pursue these questions in order to consider further the ways in which identities shape interactions, particularly in the context of teaching mathematics for social justice.

APPENDICES

APPENDIX A

PRE-INTERVIEW QUESTIONS FOR ALL TEACHERS

Identity
 a) What experience(s) led you to become a mathematics teacher? In what ways or why were these critical?
   o Probe: Why do you teach? Why do you teach mathematics?

 b) What are three to five of your core beliefs about teaching, mathematics, and students? Why do you think these are your most important ones?

 c) Can you describe any experiences you've had with a social or political issue that have had a significant impact on who you are?

 d) What particular insights and passions led you to want to participate in this study group?
   o Probe: What social issues are you most passionate about? Why? What, if anything, do you do in order to address these issues? (Gonzalez, 2008)

 e) How does your understanding of who you are as a person influence your work as a teacher?

Social Justice Teaching
 f) How would you define mathematics?
   o Probe: Describe what it looks like to know and do mathematics. What criteria do you think are important when you decide whether someone knows mathematics?

 g) What does "learning and teaching mathematics" mean to you?

 h) How do you think one might weave together mathematics with social or political issues? (adapted from Gonzalez, 2008)

 i) What benefits or drawbacks do you think incorporating social or political issues into your math classes would have for your students? (Gonzalez, 2008)

 j) Do you presently incorporate social or political issues in your teaching? (Gonzalez, 2008) If so, how? If not, why not?

Student Identities
 k) How would you describe your students? Their families? Communities? (Gonzalez, 2008)
   o Probe: What are the characteristics of a successful mathematics student? How successful do you feel your students are at mathematics? Why do you think this is the case? (Gonzalez, 2008)
   o Probe: What issues, both positive and negative, do you feel affect your students in their homes and communities? Are there ways, in your opinion, of building on or addressing these issues in school? If so, how? (Gonzalez, 2008)

l) What do you see as the future of your students? (Gonzalez, 2008)

m) What social or political issues do you think affect the lives of your students? What, if anything, do you do in order to address these issues? (adapted from Gonzalez, 2008)

Identity, Revisited

n) How would you characterize your racial identity? Do you think your race plays a role in your mathematics teaching? Why or why not?

o) How would you characterize your socioeconomic status, both currently and as a result of your upbringing? Do you think your socioeconomic status plays a role in your mathematics teaching? Why or why not?

POST-INTERVIEW QUESTIONS FOR CHLOE AMES

Identity
    a) Would you change any of the identities you put on your circle in session 1? Why or why not?

    b) Choose one or two of those identities and tell me about how you think they did or did not impact your experience in the study group.

Clarifications and Probings
    c) You've talked a little bit about being asked about your life as a teacher being like Freedom Writers and have at least once linked this to being a reason you don't acknowledge to your students that you are from [city name] until they have gotten to know you. Can you talk a little bit more about why this upsets you (I can imagine some reasons but I'd like to hear your reasons)? Also, can you explain a little bit more about what you think makes you different from the teacher in the book/movie?

    d) When we read that Rico's primary class for the discussion in his book was a group of honors students, you had a reaction to that. When describing your reaction, you stated something like, "I do think that all kids could do it, but I think it was easier because it was honors kids." Do you still agree with your own statement? What assumptions do you have about the students he had in his class? In what ways do you think the kids in his class were smart?

    e) In one session you described that one reason you are nervous about teaching mathematics for social justice tasks is because you might lose control of the discussion and they might become disrespectful. Is this still a concern for you? If so, in what ways do you think you can establish norms for minimizing this concern? If not, why is it no longer a concern for you?

    f) You've periodically talked about your experiences from last year at Hamlet High School and compared them or contrasted them with your experiences this year at Hamlet High School. Can you talk a little bit about what impact your experiences two years in a row have on your practice as a teacher here? In other words, in what ways do you think this changes or does not change your experiences as a first year teacher?

Mathematics Teaching
    g) Why do you think it is important for kids to take mathematics in school?

Study Group Reflections
    h) How has your perception of incorporating social or political issues into your math classes changed?

i) What activities or discussions (see 'course map' of sessions and general discussions) did you find most critical to influencing your understanding of and perception of teaching mathematics for social justice?

j) Will you continue to incorporate teaching mathematics for social justice? Why or why not?

k) How do you think my presence in the study group influenced or did not influence how you participated in the study group? For example, do you think my role was similar to or different from my role as a teacher in your methods course? Do you think you changed how you participated as a result?

APPENDIX C

POST-INTERVIEW QUESTIONS FOR LUKE FISHER

Identity
   a) Would you change any of the identities you put on your circle in session 1? Why or why not?

   b) Choose one or two of those identities and tell me about how you think they did or did not impact your experience in the study group.

Clarifications and Probings
   c) During the discussion of the Inequitable Wealth in America video discussion, you said something like, "We are seeing this big injustice, but so what? What do we do about it?" The group continued to have a conversation and later you say something like, "Someone who has the potential to lose in a power shift might be more easily heard than someone who has the potential to gain from a shift in the power." Can you speculate what you think some answers are to your first question, "What do we do about it?"? And then describe a little bit more about what you think your responsibility is in that?

   d) In discussing the first couple of chapters, you talked a bit about how you felt when you read Rico's response to the NCTM Standards. At one point you said something like, "A lot of things made me raise my eyebrows and say, 'yeah, yeah, why this? Person in power, answer me this.'" In what ways do you think you are part of a group in power? In what ways do you think you are not part of a group in power?

   e) In discussing the map task, you said, "Humanity is such a mess. I don't want to be White anymore. I don't want to be associated with some of these people." Can you talk a little bit more about this reaction you had? Is this a new feeling for you or one you've had before? What impact does it have on what you think about yourself? Your students? Other people?

   f) You've mentioned brought up your faith and Christian beliefs a few times across the sessions and described them in greater detail in the pre-interview. Can you talk a little bit more about how you see the intersection of your beliefs about Jesus Christ and God and the ideas of privilege, oppression, and social justice that we've talked about in this study group?

Mathematics Teaching
   g) Why do you think it is important for kids to take mathematics in school?

Study Group Reflections
   h) How has your perception of incorporating social or political issues into your math classes changed?

i) What activities or discussions (see 'course map' of sessions and general discussions) did you find most critical to influencing your understanding of and perception of teaching mathematics for social justice?

j) Will you continue to incorporate teaching mathematics for social justice? Why or why not?

k) How do you think my presence in the study group influenced or did not influence how you participated in the study group? For example, do you think my role was similar to or different from my role as a teacher in your methods course? Do you think you changed how you participated as a result?

APPENDIX D

POST-INTERVIEW QUESTIONS FOR JOSH WOLFE

Identity
a) Would you change any of the identities you put on your circle in session 1? Why or why not?

b) Choose one or two of those identities and tell me about how you think they did or did not impact your experience in the study group.

Clarifications and Probings
c) In session 1, we talked about our five identities that are important to us. You mentioned family, faith, and service. Can you explain a bit more about what you mean by "service" in here?

d) In one session while discussing the book, you mentioned that Rico is very in tune with what is going on in the community that the school is located. You describe how you don't feel like you have that kind of knowledge as a first year teacher. Then, you say something like, "Rico is motivated to write the world with mathematics. That is an identity for him. He was part of that community. What can I use from my own personality to get students to see social justice issues?" Do you have some speculation about what you think the answers are to this question for you?

e) In the third session, we discussed the lists about White privilege and Being Poor. You mentioned that you had done the walking activity before: to step forward or backward based on privileges. You said something like, "When I do those things, I want to have something in common with others. Trying to show that I don't have White privilege. Or in this case, I am trying to figure out which one of these do I fall into, that I could associate with. And I am trying to see how I am like them (my students or my class). I don't think I am like any of these. And it's kind of an eye-opening thing." Can you speak a little bit more about how this would be relevant to your practice as a mathematics teacher? And/or what you might do with this "eye-opening" information?

f) In your pre-interview, you described that you got into "religion through morality." Can you explain a little bit more about what you mean by this?

Mathematics Teaching
g) Why do you think it is important for kids to take mathematics in school?

Study Group Reflections
h) How has your perception of incorporating social or political issues into your math classes changed?

i) What activities or discussions (see 'course map' of sessions and general discussions) did you find most critical to influencing your understanding of and perception of teaching mathematics for social justice?

j) Will you continue to incorporate teaching mathematics for social justice? Why or why not?

k) How do you think my presence in the study group influenced or did not influence how you participated in the study group? For example, do you think my role was similar to or different from my role as a teacher in your methods course? Do you think you changed how you participated as a result?

Luke Fisher

The codes generated for Luke Fisher can be found in the following table with a description of how these codes were represented in the text.

Table 1. The codes and descriptions used to code the collected data for Luke Fisher.

Code (Code Abbreviation)	Description of Code
I am ignorant of things (I).	Luke directly expressed how there were things he did not know (usually resulting from some identity).
Faith and church (F).	Luke directly discussed his religion and sometimes alluded to biblical teachings as a way of making sense of the discussions.
Gaining respect by giving it (R).	Luke talked about the mutual relationship of giving and getting respect.
Relating to students (RtS).	Luke talked about the importance of building a relationship with students.
I am White (W).	Luke directly described his identity as white.
I am economically secure (ES).	Luke directly discussed his status as someone benefiting from economic security. Sometimes this was in the context of talking about his dad's financial status as he was growing up and sometimes his own current status was mentioned.
What am I entitled to? Not a lot (Ent).	Luke used the word "entitled" in several different contexts in the data. Primarily these indicated things he felt he was not entitled to, but sometimes there were things that he felt entitled to as a result of his upbringing.
Considering the students' perspective (CSsP).	Although closely aligned with "relating to students," this code captured when Luke used language to specifically describe the ways in which he attends to, listens to, or tries to elicit students' perspectives.
Society is a mess and we have systems of privilege and oppression (SM).	This code captured when Luke specifically named a systemic privilege or oppression (such as "racism") as well as when Luke had a specific reaction to these systems. For example, "I am going to throw up" and its further elaborated explanation of how it was related to an increased awareness of economic privilege and oppression was captured by this code.
I am in a place of power (P).	Luke directly described his status as someone in a position of privilege and concomitant power.
Because I have privilege/power, I have responsibility (P→R).	Luke directly attributed a sense of responsibility to make a difference or seek social change because of his privilege in particular systemic structures.

Table 1 (cont'd)

I am a brother (B).	Luke specifically identified himself as a brother and talked about his sisters.
People who have privilege can minimalize others (unwillingly or consciously) (P→M).	Luke specifically described instances in which he or others who benefit from privilege participate in perpetuating a status quo of oppression and privilege.

Josh Wolfe

The codes generated for Josh Wolfe can be found in the following table with a

description of how these codes were represented in the text.

Table 2. The codes and descriptions used to code the collected data for Josh Wolfe.

Code (Code Abbreviation)	Description of Code
I never knew that (N).	Josh specifically stated that he had not known something (typically about a inequity/system of privilege/oppression) or that he thought it was an "eye-opening" experience for himself.
Relating to students (RtS).	Josh described what strategies he might use to develop a relationship with students.
Faith and church (F).	Josh talked about his religion, his religious beliefs, or his religious affiliation.
I need to open my students eyes (OEs).	Josh described a need for instilling values in his students or opening their eyes to a variety of social/political issues.
There are systems of privilege/oppression (Sys).	Josh mentioned that "social issues" play a role in shaping his students' lives or mentioned a specific system that plays such a role (for example, poverty).
I know more than my students about life (MtS).	Josh described the ways in which he had experiences that exceeded his students experiences or directly said that he knew "more about_____ than" the students.
Kids stick to what they know (SWK).	Josh explained that students had a hard time visualizing life beyond what they had already experienced.
My life is different than the students (MLD).	Josh elaborated on various ways in which his life is different than the life his students experience. This was sometimes in reference to his experiences at their same age and sometimes in reference to his experiences at the same time (while their teacher).
Students could be better if they... (Ss↑).	Josh described how the students might improve their life conditions.
I don't want my privilege (DWMP).	Josh talked directly about not wanting to acknowledge his privilege or spoke about ways in which he tries to deny/not admit to his privilege.

APPENDIX F

PARTICIPANT EXAMPLE ANALYSIS MAP: AN EXAMPLE

The map example presented here is from the first participant example presented in the results section. In particular, the participant example is, as follows:

Luke: Page six, about half way down, he (Gutstein) quotes Apple, citing Lankshear and Lawler, "contrasted a domesticating, functional literacy designed to make 'less powerful groups…more moral, more obedient, more effective and efficient workers' versus a critical literacy that would 'be part of larger social movements for a more democratic culture, economy, and polity.'" ... So, it's interesting because when we--, public schools we're very heavily affected by the industrial revolution way of thinking. Input, students, output, productive workers. Compliant, and skilled enough to get the work done, but not necessarily critically thinking. Which just perpetuates the status quo, which the author clearly, and we (*gestured to the present group*) obviously ... we are against. [*Chloe & Kate:* Right.] We are not trying to propagate anything status quo. What we are trying to do is put out students that are, you know, they know what respect is, they know what, they know how to behave themselves, obviously, but they are not just subordinate to everyone, take everything at face value, listen to everything that, and you know what, honestly, the kids that we have, I mean, they're already like that. They won't take anything at face value. And they do want to question everything that you do.

I first identified the book text presented in this participant example. In this case, it was the quote that Luke directly read from the text which was "contrasted a domesticating, functional literacy designed to make 'less powerful groups...more moral, more obedient, more effective and efficient workers' versus a critical literacy that would 'be part of larger social movements for a

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more democratic culture, economy, and polity'" (Gutstein, 2006, p. 6). I, then, examined the book text using the questions: What semantic structures does the text use? What might a semantic relations map show about how the concepts/words/ideas are related in the text excerpt? After this investigation, I constructed the arrangement that ended up in the box in the diagram (Figure 1) that is labeled "text excerpt."

Next, I identified the denotational text of the participant example. These were parts of Luke's contribution that showed the ways in which he was making sense of the text by inserting himself (or the collective group) into the description in Gutstein's (2006) text. These parts were illuminating by investigating the transcribed contribution with the questions: How is the participant connecting his/her (counter)example to the text? In what ways are these structures mirrored in the participant example? What are the concepts/words/ideas that are mirrored? After this investigation, I constructed the arrangement that ended up in the box in the diagram that is labeled "denotational text."

Finally, I considered the participant example, both the transcribed text and the already drawn portions of the diagram to understand what positionings were implicated and for whom. Specifically, I answered the questions, "What are the possible positionings based on the current interaction?" and "Does the current interaction implicate positionings for all members of the study group or just a few or just an individual?" The answers to these questions are captured in the part of the diagram labeled "interactional text."
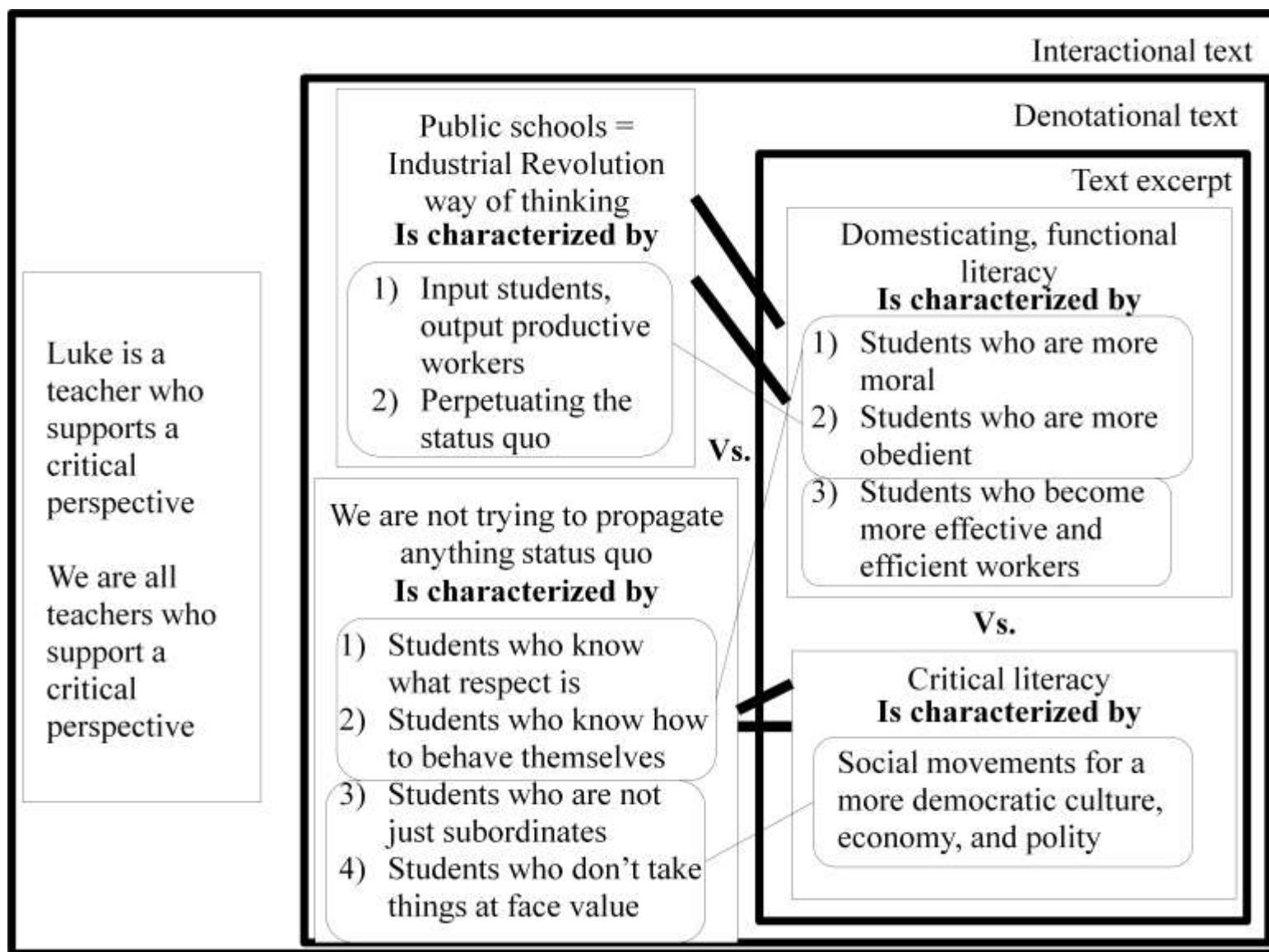
Figure 1. The data analysis map for the first reported result in Johnson (in preparation) [Chapter 4].

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