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The interconnectedness of relational and content dimensions of quality instruction: Supportive teacher–student relationships in urban elementary mathematics classrooms

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ABSTRACT

Scholars assert that the often-impoverished instructional practices found in urban schools are tied to teachers' negative relationships with African American and Latin@[1] students (Ferguson, 1998; McKown & Weinstein, 2002; McKown & Weinstein, 2008; Morris, 2005; Stiff & Harvey, 1988). However, measures of mathematics instructional quality rarely measure relational elements of instruction. This study responds to such shortcomings by analyzing relational interactions in urban elementary mathematics classrooms in tandem with content instruction of teachers who engage in supportive relationships with African American and Latin@ students. This study identified teachers with high quality student performance, content instruction, and supportive relationships as defined through relational interactions. After selecting two teachers, the results detail relational interactions that show how these teachers established supportive relationships with students vis-à-vis their mathematics instruction. Therefore, these findings offer insight into the ways in which relational interactions add to our understanding of quality content instruction for African American and Latin@ students.

1. Introduction

A number of studies have found that mathematics instruction for low Socio-Economic Status (SES) African American and Latin@ students in urban schools often emphasizes disconnected concepts, decontextualized mathematics vocabulary, following steps and procedures, and answers rather than explanations (Ladson-Billings, 1997; Lubienski, 2002; Means & Knapp, 1991). These practices restrict the relationships that students can build with mathematics. For example, using data from the National Assessment of Education Progress (NAEP), Lubienski (2002) found that even when controlling for SES, African American students were more likely to experience instruction that framed mathematics as primarily memorization of facts, having one correct strategy, and being assessed using multiple-choice questions. While the overall lack of quality of mathematics instruction in U.S. schools has been noted in research from TIMSS (Hiebert et al., 2003), the controlling for

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[1] We use the @ sign to indicate both an "a" and "o" ending (Latina and Latino). In alignment with Gutiérrez (2012), we see this as a way to de-center the patriarchal nature of the Spanish language. It is customary for groups of males (Latinos) and females (Latinas) to be written in the form that denotes only males (Latinos) and we see the @ symbol as better than denoting and either/or (Latino/a) form that promotes a gender binary.

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SES in Lubienski's work suggests that it may be even more extreme for African American students. In the context of this study, low SES urban schools were completely composed of African American and Latin@ students; thus, in light of the aforementioned findings, both groups of students are expected to be in danger of receiving low-quality instruction.

Given this, a number of scholars assert that the often-impoverished instructional practices that African American and Latin@ students receive are tied to negative relationships with their teachers (Ferguson, 1998; Lubienski, 2002; McKown & Weinstein, 2002; McKown & Weinstein, 2008; Morris, 2005; Stiff & Harvey, 1988). In a two-year ethnographic study, Morris (2005) examined teachers' assumptions and determined that teachers viewed Latin@ male students' behavior as threatening while considering the behaviors of white and Asian students as non-threatening. When negative teacher attitudes manifest themselves in interactions with African American and Latin@ students, they often result in students' disengagement, misbehavior, or dropping out of school (Feagin, Vera, & Imani, 2001; Solórzano, Allen, & Carroll, 2002). Researchers have found that teachers often respond to African American and Latin@ students with harsher discipline, higher rates of referral for special education, and perceiving their behavior as lower-achieving and threatening (Downey & Pribesh, 2004; Lewis, 2003; Neal, McCray, Webb-Johnson, & Bridgest, 2003; Skiba, 2001). This raises the need to consider relational elements of instruction along with content instruction.

While there is little work in understanding supportive relationships between teachers and students in urban elementary mathematics classrooms, Bartell (2011) theorizes that teachers demonstrate caring relationships in mathematics by sharing their own personal experiences and drawing on students' mathematical ideas, home lives, and cultural selves to build strong relationships. Doing this shows students that teachers have a willingness to develop supportive, nurturing, and caring classroom environments (Bartell, 2011). However, the field of mathematics education is lacking in research illustrating supportive relationships between teachers and African American and Latin@ students in urban schools. Understanding that African American and Latin@ students' experiences are diverse and expand beyond shortcomings, in this study, we bring attention to supportive teacher–student interactions in mathematics classrooms.

This study responds to such shortcomings by analyzing relational interactions in urban mathematics classrooms in tandem with content instruction of teachers who engage in supportive relationships with African American and Latin@ students. Relational interactions are defined as a communicative action or episode of moment-to-moment interaction between teachers and students, occurring through verbal and nonverbal behavior that conveys meaning (Battey, 2013). This conceptualization of relational interactions as within instruction allows for a better understanding of what constitutes high-quality mathematics instruction, particularly for urban African American and Latin@ students (Battey, 2013). The goal of the present study is to detail, concrete examples of supportive mathematics interactions with urban students.

The selection of teachers for this study involved three measures: student performance data from state and district assessments, a measure of the quality of mathematics instruction, and classroom video to code relational interactions. Triangulation of these data sources was used to select two teachers of high-performing students in mathematics that provided high-quality instruction and engaged in caring relationships. The results detail relational interactions that show how teachers established supportive relationships with students through their mathematics instruction. This study is important because it offers a key contribution by detailing strong, supportive teacher–student relationships vis-à-vis high-quality instruction in urban elementary mathematics classrooms. Thus, our analysis addresses the following research question: How do two successful urban elementary teachers engage in supportive relationships in the context of high-quality mathematics instruction?

First, we review recent ways in which the quality of content instruction has been examined in urban mathematics classrooms. Next, we examine work that looks at relational elements of instruction in mathematics. Finally, we outline the conceptual framework of relational interactions used in the current study.

1.1. Mathematics content instruction within urban elementary schools

Current measures to assess the quality of mathematics instruction in urban classrooms focus on similar constructs including explanation and justification, mathematical precision, cognitive depth, and mathematical discussions. We consider these elements of *content interactions* within instruction as opposed to *relational interactions* within instruction. Here we look at three such measures of content instruction. First, Hill, Kapitula, and Umland (2011) use the Mathematics Quality of Instruction (MQI) instrument that captures the disciplinary integrity of the mathematics. This includes mathematical accuracy, quality of explanations and representations, justification, as well as cognitive depth. While Hill et al. (2011) evaluated value-added arguments for teachers in a large urban district, they found, as noted previously in the introduction, that the quality of instruction was lower in the urban district as compared to more affluent areas. In general, the constructs measured using the MQI are focused on mathematical precision and depth of the mathematics explored in the classroom. These constructs are similar to those measured in other instruments.

A second measure, the Instructional Quality Assessment (IQA), is used by Boston and Wilhelm (2015) to look at four urban districts. Interestingly, they found that as few as two observations were needed to yield reliable estimates of instructional practices. The IQA measures two main constructs, academic rigor and Accountable Talk®. Academic rigor is aligned with the MQI as it focuses on the task challenge, implementation, and rigor of mathematical discussions. Accountable Talk® includes dimensions of linking, press, and participation. Therefore, the IQA measures a more reform orientation of mathematics instruction than the MQI. However, teacher expectations are embedded within academic rigor, something that potentially gets at relational elements of instruction. Boston (2012) defines it as "the degree of rigorous thinking" (p. 84) expected from