BEING CHALLENGED IN AN URBAN CLASSROOM: A CASE STUDY DOCUMENTING THE ENGAGEMENT OF A YOUNG MALE WHO WANTED TO 'LOOK SMART'

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ABSTRACT

This study builds on previous research that investigates the nature of engagement as it occurs 'in the moment' in urban classrooms (Goldin, Epstein, Schorr, & Warner, 2011). In this article, we report on a young male student, Eric, who called out an answer in front of all his peers in response to a question posed by the teacher. Almost immediately, his peers challenged his response. Upon hearing their comments, he retorted that he "didn't care anymore" and withdrew from the discussion. Nonetheless, moments later he reentered the discussion, reiterating his response. In a later interview, Eric noted that he called out the answer in order to impress others, but felt disrespected when they disagreed. In this examination, we attempt to characterize his reactions with specific reference to his momentary engagement in order to discuss the implications for learning.

***Keywords*:** Middle school mathematics, Student engagement, African American male

Introduction

A report from the National Research Council (NRC, 2003) notes that the "evidence is clear that students in urban schools are not faring well in mathematics" (p. 76). They note that there are many factors that contribute to this. One leading factor involves the type of instruction that is available to the students. Another factor involves when and how the students engage in learning math. The

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fact that the type of engagement that students experience can be important for their mathematical learning (Marks, 2000) is no surprise. One strategy, noted in the NRC study for increasing engagement, involves the use of open-ended problems and classroom discussion of solution strategies. However, the NRC report also cites a study done by Murrell (1999), with middle school students, pointing out that "open-ended, discussion-oriented classes did not increase African American male students' understanding of mathematical concepts. These students participated in the conversation, but they shied away from substantial engagement with mathematics for fear of making mistakes" (p. 83). We address this point, documenting what happens when an African-American middle school male offers a solution that is immediately criticized by his peers. We discuss how he initially feels disrespected and withdraws from the discussion stating that he 'doesn't care anymore'. He then reenters the discussion and continues to advocate for his solution. Our results indicate that his engagement is highly dynamic and shifts rapidly. We analyze the reasons for the shifts and discuss their implications.

Theoretical Framework

Many studies of engagement in mathematics education emphasize students' longer-term attitudes, emotions, dispositions or orientations (Midgley et al., 2000; Patrick, Ryan, & Kaplan, 2007). In such cases, surveys, questionnaires or interviews may determine how a person typically feels in social situations, and how one person's feelings characteristically differ from another. While important, longer term traits may not necessarily capture the 'in-the-moment' nature of student engagement. 'In the moment,' as it is used here, refers to the varying patterns of engagement governed by emotions, goals, and social interactions that may occur for minutes, or even seconds at a time as the student works on a mathematical problem (Goldin et al., 2011).

Many factors, such as peer interactions, social contexts, instructional styles, problem types, and technological resources, have been found to impact the 'in the moment' engagement that students experience (Middleton & Jansen, 2011). In order to better characterize such engagement, a group of researchers (Goldin, Epstein & Schorr, 2007; Schorr, Epstein, Warner & Arias, 2010) conducted a series of classroom-based research studies in which they examined engagement as students solved math problems in a group setting. After careful analysis, several clear patterns emerged which led to the development of a theoretical construct that the authors refer to as *engagement structures. Engagement structures* are idealized, recurring, highly affective patterns inferred from observed behaviors and student interviews (Goldin et al., 2011). These structures consist of a behavioral/affective/social constellation, and include many interrelated components such as "(1) a characteristic goal or motivating desire, (2) characteristic patterns of behavior including social interactions oriented toward fulfilling the desire, (3) and a characteristic affective pathway experienced by the individual, as well as others" (Goldin et al., 2011, p. 549).

Fourteen engagement structures have been identified thus far. Structures are not considered to be either "good" or "bad." Rather, they are contextually dependent. For example, complete immersion in a task can be beneficial at times and exclusionary or inappropriate at others. Similarly, there are occasions when one might want to avoid work on a task when he is feeling sick or upset about something else. Further, engagement structures do not necessarily operate in isolation; they often operate simultaneously or in support of each other, and can shift instantly—as will be described below.

Two structures appear to occur often in our research. The first is referred to as "Look How Smart I Am." This engagement structure occurs when a student has a desire to appear smart, and acts on that desire by, for example, making sure that others in the class know that he/she knows the answer (for a full description see Goldin et al., 2011, p. 553). The second, referred to as "Don't Disrespect Me," occurs when a student feels exposed, humiliated, or otherwise disrespected by one or more people (or situations) and perhaps tries to defend his position in order to "save face" (for a full description see Goldin et al., 2011, p. 553).

This study will focus on providing evidence documenting the emergence of these two structures in a student as he is offering solutions to mathematical problems. We address the following research question: How does sharing an idea or solution publicly impact Eric's engagement-especially when his answer is perceived to be incorrect?

Methods

This research is one part of a larger study (Sanchez Leal, 2012), which focused on 55 7th grade students (71% African-American and 18% Hispanic) in a high poverty, urban school district in the northeastern part of the U.S. The students participated in an eight-day teaching implementation taught by a senior graduate student (Hispanic female: referred to as T/R) from Rutgers University. The students were divided into three classes based upon their standardized score relative reading levels—low, average, and high. Class selection was made by the school administration.

Videotaped observational data, pre/post test data, and survey data were collected from all classes. The survey (Rutgers University Inventory of Mathematical Engagement (RIME)[19] used in this study was developed by Epstein et al. (2010) in order to measure the presence and strength of the various engagement structures. The RIME survey was made up of 63 items measured by a 5-point Likert scale (ranging from Strongly Disagree to Strongly Agree). This survey was administered during the last 15 minutes of each of four of the eight 80 minute-classes.

Four "focus" students were selected for more in-depth analysis, and were videotaped during all eight days of the study. The focus students, all of whom were in the average class, were chosen according to the following criteria: consent to be interviewed/videotaped, gender, general engagement, social status within the

[19] This survey has been modified since its use in this research. It is currently in the process of being validated.

classroom, and general math achievement (as provided by the regular classroom teacher and based upon standardized state tests). This information was obtained during an interview with the classroom teacher. While specific definitions were not provided for such terms as social status or engagement during the interview, the teacher, through his comments, indicated that he understood social status to refer to the student's general social standing within the classroom. As an example, a high social status student would be one who seemed to command the attention of his peers regularly while a low status student would be one who seemed to be ignored more often. A student with low engagement would be one that appeared to exhibit some degree of difficulty "staying on task."

In this study, we focus on Eric, an African American male who had the following profile: high social status, low mathematics achievement (his score on state tests was lower than average both in terms of his school peers, and in the state in general) and typically low engagement.

Several senior researchers and graduate students observed the classes. They met with the T/R each day, in order to discuss what occurred, especially with regard to hypothesized engagement structures. Instances were identified for further analysis and for use in the semi-structured, retrospectively stimulated recall interviews. The interviews occurred eight weeks after implementation with each of the focus students. The interviews, observational notes, video analysis, and RIME results were analyzed for evidence of possible patterns of engagement, and form the data for this research. In this paper, we specifically focus on data that framed events on Day 3.

In each of the eight implementation sessions, the students worked with simulation software, SimCalc MathWorlds®. SimCalc was chosen because it is representative of innovative technology software that provides a variety of dynamic, linked representations to simulations (Hegedus & Penuel, 2008). It has also been shown to have the potential to engage students (Schorr & Goldin, 2008). In this particular episode, students watched a simulation involving two runners (Andy and Kim) and worked on finding the speed of the runners. They sketched a graph depicting the movement of the runners. They also calculated the speed using a formula often seen in math texts (speed= distance/time). The math solution is as follows: Kim (the first runner), traveled 50 ft. in 10 seconds. Therefore her average speed is 5 ft./s. Andy (the second runner) also traveled 50 ft. but did so in 12 seconds. His average speed was 4.2 ft./s.

Findings and Interpretations

To illustrate patterns of engagement as they occurred for Eric, we share an episode involving a full class discussion led by the T/R. In this episode, the students had moved their chairs to the center of the room where they could easily see the T/R and overhead projector. Just prior to this episode, the students had discussed the speed formula (speed= distance/time). Before sketching the graph, the students created a table of values that represented each runner's motion

according to the simulation. Once they created the table, they sketched a graph with both runners' time and distance information. They then used that information to find each runner's speed using the formula. In this particular segment, the students were discussing the lesson that occurred during the previous class. Eric, the focus of this segment, was seated in the front of the room (by his own choice), in close proximity to the T/R. All of the students involved in the dialogue below were African American males. Sam was seated just next to him. The T/R had just asked the students to recall how fast one of the simulated figures, (Andy), was running.

Table 1

Eric's Part 1, Episode 1

Speaker	Transcript	Description	Interpretive Comments
Eric	Five, oh four meters per second!	Eric uses his fingers in what appears to be an effort to calculate the answer. He then moves forward, as if to jump out of his seat and calls out the answer (without being asked to by the T/R), before anyone else has a chance to respond. All the while, he looks closely at the T/R. The T/R and the other students appear to be listening to his answer. Eric's answer is now the subject of the next series of comments.	As Eric yells out the answer, his tone of voice appears to be loud and confident. We infer that he wants the others to hear his answer. He also appears to be closely monitoring the T/R's gaze for signs of affirmation, as he often did when offering comments.

We suggest that Eric is attempting to show others that he not only knows the answer, but that he is able to respond before anyone else. Further, his tone of voice is loud; as if he is intent upon having others hear his answer. Yet it appeared that he was in apparent need of confirmation from the teacher indicating that his answer was correct. Such affirmation, which was very common amongst all students, appeared to be normative (based upon observations of the classroom as taught by the regular classroom teacher). Such behavior is often associated with the structure that we refer to above as *Look How Smart I Am* (LHSIA). In order to gain insight into Eric's perception of the situation, we share his responses to several relevant RIME questions (see Table 2) and a semi-structured interview.

Table 2

Eric's responses to items associated with the Look How Smart I Am structure

RIME Item:	*Eric's Response*
I wanted to look smart compared to others in today's math class.	*Agree*
I wanted other students in my class to think I was good at math today.	*Agree*
When I knew the answer today, I tried to say it ahead of the other students.	*Agree*
I tried to be one of the first ones to get an answer in doing the math today.	*Agree*

During the interview, Eric was shown a video excerpt of this interaction (and the one that follows in the next section) and was asked to: 1) describe what was going on, and 2) discuss some of the RIME survey responses above. He affirmed that indeed, he did want to appear smart to the other students (and T/R) stating the following: "I wanted to look smart compared to others in class. I said [I] agreed because when I look smart and act smart, I feel smart and everybody else would notice how smart I am." The interviewer (the T/R) then asked him the following: "And can you give me an example of when you feel like looking smart?" Eric answered: "Like when I am paying attention and complete my assignment and answer the question first and correctly." Eric's response indicates that he feels smart when he answers the questions first, which seems to confirm the presence of the LHSIA structure.

As the conversation continued, the T/R, in response to Eric's answer, asked the rest of the class (still seated as a whole group): "So Andy was going four meters per second?" In Table 3, the other students' responses are presented.

Table 3

Eric's Part 2 of Episode 1

Speaker	Transcript	Description	Interpretive Comments
Sam (still seated right next to Eric)	No!	Sam yells NO (in response to Eric's answer)! He calls out, looking directly at the teacher, with a disapproving tone. Then, several other students also express their disagreement with Eric's answer. Eric proceeds to turn and look down at Sam and points his finger at him.	It appears that Eric is unnerved by the disagreement. He diverts his eyes from the T/R, toward Sam and the other students. He also begins to move closer to Sam, touching Sam's backpack.

Speaker	Transcript	Description	Interpretive Comments
Eric	Yes it was!	Eric shouts out affirmation of his original answer while still keeping his arm on Sam's chair. He also continues to looks down at Sam as he points his finger at him while waving his hand from side to side. His tone appears to be defensive and louder than when he originally responded. Sam looks ahead, toward the T/R.	Eric diverts his eyes from the T/R toward Sam, His facial expressions and arm movements appear to visibly demonstrate his disapproval of Sam's response.
Amir (seated right behind Eric)	Yes it was!	Amir appears to be referring to Eric's original answer. He shouts out his answer in a loud tone of voice, while looking at Eric. Eric's chin is down as he continues to look and point his finger at Sam.	Eric now has an ally in Amir. However, Amir's effort to support Eric is unacknowledged by Eric, who continued to look at Sam, the initiator of the disagreement.
Eric	Sam wasn't even here, so how could he know?	Eric's tone is defensive. He is still staring at Sam and pointing his finger at him. Sam looks up at Eric and appears to catch his eye.	Eric appears to be annoyed by Sam's challenge to his response as he confronts Sam with the fact that Sam was not even present when the problem was originally discussed. We suggest that this challenge is intended to discredit Sam, and reestablish Eric as having the more reliable answer.
Sam	Oh, when was this?	Sam is still looking up at Eric. Eric continues to stare at Sam.	Sam appears to be responding to Eric's challenge in a more conciliatory manner. Eric continues to stare at Sam in what appears to be a defensive manner.
Eric	Yesterday!	Eric responds and continues to look down at Sam. Eric's tone is strained. Sam looks down at the floor as Eric speaks.	Eric appears to still be upset by Sam's challenge. His tone, eye contact, and general bodily gestures indicate that he appears to be agitated.

In this set of interactions, it appears that Eric reacted defensively when Sam disagreed with him. After publically stating his answer, we suggest that Eric was surprised, and even annoyed by Sam's (initially) emphatic rejection of his response. Eric stared at Sam in a way that went beyond just glancing at a peer who was also responding to the teacher's question. We suggest that he took Sam's response as a challenge—one that he needed to defend. As can be seen in Table 3 row 2, he emphatically stated: "Yes, it was!" in an angry tone of voice. Our analysis of the situation indicates that when Eric was challenged by Sam's comment, a change in Eric's engagement occurred. Initially, as we noted above, he appeared to be focused on showing others how smart he was. Once he was publically challenged, we suggest that he felt that he had to defend himself. His tone of voice shifted, and his bodily gestures and gaze indicated that he was agitated. Perhaps he was attempting to 'save face' or avoid the embarrassment of being shown to be wrong in front of the whole class. Eric's response, indicating Andy's speed was, in fact, wrong. As discussed in the Methods section, the correct answer to Andy's average speed is actually 4.2 ft./s (as such, Eric's answer is quite close to the correct solution). According to further class discussion, he rounded his answer to the nearest whole number.

More Challenges

As the episode continued, several other students challenged Eric's answer as well. Shaquan, another African American male student sitting in the back of the room behind Eric, raised his hand and waited for the T/R to acknowledge him. Shaquan stated in a low tone of voice: "the answer is 4.91". As soon as Shaquan answered, Eric repeated his answer from before, again counting using his fingers. Eric stated in a high-pitched tone of voice, "It's 4!" Then in a low tone of voice, while looking down and away from the T/R and the rest of the class: "Well I don't care no more [sic]." Eric's response, at least on the surface, indicated that he was no longer interested in the discussion. However, shortly after making this comment, he rejoined the conversation. Video data of Eric provided evidence to us that suggested that he wanted the *others* to believe that he no longer cared, even though his actions, shortly thereafter, indicated that he was still interested in participating.

We cannot be precisely sure why he appeared to get angry and defensive in one moment and gave the impression of withdrawing from the discussion in the next. It seemed as if he was invested in impressing others with his knowledge and therefore took Sam's disagreement personally, as a sign of embarrassment or "loss of face", especially since he had made his announcement of the answer so publically. When several of the other students also expressed disagreement with his response, it is possible that he either doubted the correctness of his answer, or, we believe more likely, wanted to avoid further embarrassment. Our evidence, which is presented below, indicates that he did have a need to maintain at least some level of respect. Eric's responses to several relevant RIME questions for DDM appear in Table 4. He was also asked to address several of these responses as part of the interview conducted after the lesson.

Table 4:

Eric's responses to items associated with the Don't Disrespect Me (DDM) structure

RIME Item:	*Student Response*
One of my goals today was to make sure no one disrespected me.	*Agree*
I stood up for myself or my ideas today.	*Agree*
I told somebody off or put somebody down in class today.	*Agree*
I wanted to make sure others gave me the respect I deserve today.	*Agree*
I wanted to stand up to someone who disrespected me today.	*Agree*

When he was asked about his response to the item "I wanted to make sure that others give me the respect that I deserved," Eric noted: "Yes (Agree). I said I agree because I know I was doing the work correctly and I wanted other people to know how I was doing the work. I wanted to compete." It appears that Eric saw the situation as one in which he needed to 'compete' for possibly the attention of his peers or the T/R, respect, or being viewed as intelligent. Further in the interview, the T/R asked: "So can you give me an example [of] when someone would be very respectful?" Eric stated: "Well, like sometimes when I get 100 on my test people come up to me and say good job. People from other classes would say that it was a good grade and things like that." This response supports the idea that Eric is invested in what others think about him and/or the accuracy of his answers and perhaps even his overall credibility within the classroom. In his interview, he also states: "Everyone in the class was disagreeing and like we were having an argument." T/R followed up by asking how Eric felt about the argument. Eric responded: "I know I was right but other people were disagreeing with me so I just said, oh well I don't care [sic]."

Eric's desire to look smart seemed to be important to him. Sam's disagreement with him publicly made his "looking smart" less likely at best, and possibly humiliating, at worst. When Sam announced his disagreement, and when others joined in the chorus of disagreement, Eric began to argue to avoid looking as if he did not know the answer. Not only was his desire to impress others at stake, but he also ran the risk of being embarrassed and/or appearing intellectually inferior.

Discussion/Conclusion

When students share their ideas and solutions publicly in a classroom setting, or more privately when working in groups, they run the risk of being disrespected, humiliated or embarrassed, especially when their answers are perceived to be incorrect. Eric's reaction is not uncommon (as noted in Murrell,

1999). Based on Eric's responses above, it appears that he wanted others to view him as being, in his own words, "smart." It appears as if Eric's emotional safety or intellectual status was, at least potentially, at stake. As a result, Eric responds by first reaffirming his answer, and then by stating that he does not care anymore. We infer from this that Eric is now focused on "saving face," a behavior often associated with the *Don't Disrespect Me* structure. We note, in particular, the sequence of the two structures: an unsuccessful attempt at looking smart branched into actions designed to avoid embarrassment.

Our analysis reveals how quickly engagement in mathematics can change, especially when a student perceives the situation as having potentially negative consequences. When a student is invested in showing others how smart he is, and derives great satisfaction from having others view him as smart, he may be more vulnerable to feeling disrespected or otherwise threatened (intellectually) when the situation 'backfires' on him. This has relevant implications for all teachers, particularly those in urban schools whose students, as Dance (2002), Anderson (2000), and Devine, (1996) note, are often hypersensitive to situations in which their emotional safety, status, or wellbeing may be challenged (Schorr et al., 2010). In such cases, teachers need to be highly attuned to the shifting nature of engagement and the consequences of those shifts.

We close by suggesting that while further research is needed, our analysis of Eric indicates two main things: the clear need for an emotionally safe learning environment (see Schorr et al., 2010) in which all students can share ideas in public without fear of embarrassment or humiliation; and, the need to better understand the rapidly changing and highly dynamic nature of engagement.

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