

AUTHORITY AND POLITENESS: JUXTAPOSED ANALYSES OF MATHEMATICS TEACHING EPISODES

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In this paper we juxtapose two analyses of classroom episodes from a year 9 mathematics classroom. We build off an analysis using authority structures, and compare that to an analysis that uses politeness theory, with a focus on the notion of face. We conclude by identifying the differences between the revelations from the two conceptual frames and consider what politeness theory may offer a mathematics teacher.

INTRODUCTION

In the mathematics classroom, teachers are expected to have authority and also develop students' sense of authority within the discipline of mathematics. This tension poses challenges for mathematics teachers and students, who have to cope with a range of issues simultaneously. Teachers and students can be seen as involved in the same social situation: they are confined in the same space — the classroom and the school building. They are expected to adhere to some rules and norms (Yackel and Cobb, 1996), and they have to negotiate these in human relationship. At the same time, a series of expectations concerning the 'outcomes' of schooling are at play; some of these come from within the school system, while others come from external sources such as parents or state authorities. Thus, for the analysis of the interactions that take place in the mathematics classroom a number of theoretical and methodological lenses may be helpful (see, e.g., Tatsis & Dekker, 2010). In this paper we juxtapose two analyses of episodes from a year 9 mathematics classroom. We build off an analysis using the conceptual frame developed by Herbel-Eisenmann & Wagner (2010) to identify the way obligation works in mathematics classroom relationships. And we compare that to an analysis that uses politeness theory, as proposed by Brown and Levinson (1987) and implemented in mathematics education (e.g. Tatsis and Rowland, 2006). With this juxtaposition, we ask what the politeness theory adds to the obligation framework in terms of what phenomena it highlights and how this insight might be useful to mathematics educators.

POSITIONING, AUTHORITY AND POLITENESS

The conceptual frame developed by Herbel-Eisenmann & Wagner (2010) draws from a quantitative analysis of the most pervasive speech patterns in mathematics classroom interaction, and builds from positioning theory. Van Langenhove and Harré (1999), who are central figures in this theory, have described positioning as the ways in which people use action and speech to arrange social structures. In any interaction, the participants envision known storylines to help them interpret what is happening. These storylines may be conscious or not. They can be contested explicitly or implicitly. A powerful aspect of this theory is its radical focus on the immanent — its rejection of the transcendent. In other words, the theory considers real only that which is present in the interaction and rejects the power of exterior forces. In an analysis of the way this theory was taken

up in mathematics education research, Wagner & Herbel-Eisenmann (2009) noted that the discipline of mathematics and other exterior forces may be myths, but they can be taken as real in classroom or other interactions because teachers and others may be viewed as representatives of these exterior forces.

Early positioning theory work makes connections to the concept of ‘footing’ described by Goffman (1981), and thus has some relationship to politeness theory, in which Goffman is also a key figure. Politeness theory examines the verbal strategies that are adopted by the participants in a social interaction in order to minimize the potential effect to their own and the others’ *face*. Face is defined as “the positive social value a person effectively claims for himself [sic] by the line others assume he has taken during a particular contact” (Goffman, 1972, p. 5) and is further categorised into positive and negative face. *Positive face* is related to a person’s need for social approval, whereas *negative face* is related to a person’s need for freedom of action (Brown and Levinson, 1987). (The terms *positive* and *negative* in this context do not refer to good and bad.)

During any interaction there is interplay between the face wants of the participants, especially since the satisfaction of one’s own face wants is, in part, achieved by the acknowledgement of those of others. Some acts inherently threaten face: orders and requests, for example, threaten negative face, whereas criticism and disagreement threaten positive face. The previous hold for all kinds of social interactions, including those that take place in a classroom, which is full of questions, requests and orders. The speaker therefore must avoid such acts (which may be impossible for various reasons, including concern for her/his own face) or find ways of performing them whilst mitigating their face-threatening effect — i.e., making them less of a threat. Brown and Levinson (1987) have proposed a taxonomy of available strategies varying from avoiding the intended action (e.g., by remaining quiet) to explicitly expressing it without any concerns for the other’s face. In between we find verbal acts including some redressive actions, which are a way of indicating that no face threat is intended. In this case various forms of indirect and vague language (e.g., the use of hedges) are often preferred. The following categories are an expansion of those used by Tatsis and Koleza (2006) for dyadic interactions and describe the possible verbal acts in relation to their effect on the speaker or the hearer’s face:

- face-threatening act: explicitly threatens the other’s face (e.g., requests, orders, rejection of the other’s suggestion, expressions of sarcasm and irony);
- face-empowering act: explicitly or implicitly empowers the other’s face (e.g., acceptance of the other’s suggestion, expressions of appraisal)
- face-weakening act: implicitly weakens one’s own face (e.g., expressions of uncertainty, withdrawal of one’s own suggestion, admittance of being mistaken);
- face-maintaining act: implicitly aims at maintaining one’s face, even when it is not being explicitly threatened (e.g., initiation of talk, expression of one’s ideas);
- face-saving act: aims at ‘repairing’ one’s face after having received a face-threatening act (e.g., argumentation, justification of one’s own acts, repetition or elaboration of a suggestion, expression of face-threatening acts against the other).

COMPLEMENTARY ANALYSES

To focus on the juxtaposition between the two conceptual frames we draw on the observations and conclusions from an analysis done by Wagner & Herbel-Eisenmann (2014) using the frame that emerged from their analysis of classroom interactions as represented in a large body of transcripts from secondary level mathematics classrooms. In their analysis, Wagner & Herbel-Eisenmann followed the case of a teacher responding to and managing authority relationships when changing schools and thus moving from a familiar context where he was comfortable and established in a small school to an unfamiliar context with different demographics in a much larger school. The following excerpt was taken from Mark's initial classes in the new context. This was the earliest transcript available in that context. Mark was leading the class in the prime factorization of 72. They had $72 = 3 \cdot 3 \cdot 2 \cdot 4$ so far. (Participant names are pseudonyms.)

a134 Mark: In order to perform the prime factorization we have to break it down so that all the factors are prime numbers. So as of right now, we have three of our four numbers are prime numbers, correct? So keep working. So now we have, "Two times what are the factors of four?"

a135 Alexis: Two times two

a136 Mark: Two times two. Two times two is what the four was. And then we have our times three times three. Of the five factors we have now, how many of them are prime?

a137 Students: All

a138 Mark: Okay, if we look back over here, "Two times two times two times three times three times three." That's how we get from seventy-two. This is how we perform our prime factorization. Okay. So that's why I was saying it's not expected that you know that this right away is the prime factorization of that

a139 Simone: Where would we need, where would we use a question like that?

a140 Mark: You are going to use it later on. It makes it very easy later when we are cancelling out or dividing by numbers

a141 Jerry: No, what's a job where we would need

a142 Mark: What job? Uh, not everything we do in math in high school is going to give you, uh, is going to be used in everyday life. Okay. Everyday life you do some adding, subtracting, multiplying and dividing, right? Okay

a143 Emily: I sleep

a144 Mark: You sleep. You don't spend any money? Okay, anyway the purpose of our math courses is to give us all the tools that we need, right. So that later on when you decide on a career that you want to do that you have all opportunities open to you

a145 Kate: What if you want to have nothing to do with math?

a146 Mark: Oh everything has to do with math

a147 Jordan: What if she wants to work at McDonalds?

a148 Mark: Money, money, money is math, math, math

a149 Students: [Many students are talking.]

a150 Mark: All right. Back to the rules of mathematics. Back to the land of the living. Okay, I want you to find all the prime factors of thirty-two. Thirty-two, prime factors of thirty-two. Use your divisibility rules if you're stuck

Wagner & Herbel-Eisenmann (2014, p. 879)

In this transcript, Wagner & Herbel-Eisenmann (2014) found evidence of all four kinds of authority structures in their framework — *personal authority*, *discourse as authority*, *discursive inevitability*, and *personal latitude*. Their analysis was arranged by the categories, not by the progression of the dialogue, but in our comparative analysis here, we follow the progression of the dialogue.

The episode began with Mark telling students what to do. For example, he used the imperative “keep working” (turn a134) referring to their work on the question that he had given them earlier. This represents *personal authority* because he did not give reasons for this task; his expectation for them was based on his authority or status. The same turn also bears evidence of *discourse as authority* because Mark noted, “we have to break it down”. By the plural pronoun “we” Mark associated himself “with some other (un-named) person or persons, thereby appealing to an anonymous ‘expert’ community to provide authority for the imposition of a certain kind of classroom practice” (Rowland, 1999, p. 20). This indicated that some rules outside the class (probably the mathematics discourse) required certain action.

With a politeness theory lens we see each of these kinds of explicit demands as an *order* or *request*. Thus, they threaten students’ negative face because they constrict action. This threat would normally be accompanied with a redressive action. In this vein, by presenting the request in the *discourse as authority* form, Mark minimises the possibility of disagreement by aligning himself with the students, submissive to the external authority. This may be seen as a redressive action or as a rationale for no redressive action.

We note that in many mathematics classrooms there is no immediate redress of such threats on face and this results in tension. In this case there were a few more turns that did not seek redress, but the situation changed in turn a139, when Simone asked, “Where would we use a question like that?” Wagner & Herbel-Eisenmann (2014) identified this as an example of *personal latitude* because the act of asking a question is evidence of a choice made by the student. Moreover, because Mark had told the researchers that he wanted his new students to ask questions like his students had in his previous school, Wagner & Herbel-Eisenmann’s analysis suggested that he did not take Simone’s question as a challenge to his authority. However, the students in Mark’s class would not have been privy to this information.

By contrast, a politeness theory lens sees Simone’s question as threatening to Mark’s positive face. Although the students were encouraged to asked questions, the content of the particular question had nothing to do with the topic under discussion (factorisation) but with the usefulness of the task. Thus, Mark’s authority, and the authority of mathematics (represented by Mark) was questioned, and that could be the reason why Mark answered Simone directly in turn a140 saying “you are going to use [factorisation] later on.” Wagner & Herbel-Eisenmann identified this answer as an example of *discursive inevitability* because “you are going to” suggests only one possible future event and this event was beyond the control of Mark or his students. Using a politeness lens, however, his answer could be taken as Mark redressing the threat to his face. His reply did not treat Simone’s question as out of place, and so he did not threaten her face further. Answering her

question suggests openness to her contributions, so it avoided the threat of negative face, and the answer also recognized her authority and thus avoided threat to her positive face. However, the discursive inevitability and the only one possible future event it suggests is immediately challenged by Jerry in turn a141 who moved the topic of discussion again from mathematics to its usefulness in the students' everyday lives and potential jobs. It seems as if the students were attempting to establish a new orientation to the situation, in which the content of teaching is valued according to its usefulness to their future lives (as perceived by them). We suggest that this prioritization of future potential can be viewed as a sociomathematical norm striving to be established.

The section from turn a139 to a149 was described by Wagner & Herbel-Eisenmann (2014) as an example of personal latitude because the students were asking questions and Mark was answering them. Politeness theory, on the other hand, highlights the tensions in the classroom: the students persisted in their line of questioning, not accepting Mark's answers, thus trying to re-establish the definition of the situation. This continued the threat to his positive face. Mark continued to mitigate the tension by performing some face-saving acts. He answered but not in a way that questioned the students' authority to question him. Wagner & Herbel-Eisenmann (2014), later in their article, identified this as a tension between Mark and his students. The students were not accustomed to his preferred way of interacting with them. Their research reporting said Mark's actions broke what the students thought to be social norms for a mathematics classroom. Thus in a way it was a threat to the students' positive face. For example, in Emily's case (turn a143) he replied in a rather sarcastic way by repeating that the student usually sleeps and does not do anything related to mathematics (e.g., spending money). But immediately, Mark realised the threat to the student's positive face and relocated the focus of the talk from the personal (you) to the social (us), and also by using the hedges "Okay, anyway". When this discourse turned into a buzz (turn a149), Mark exercised his personal authority and cut off the students' autonomous questions. This is an example of imposing a definition of the situation by threatening one's negative face baldly, with no redressive action.

The issues raised during the above interactions led Mark to frustration. This, in turn, opened up for him the possibility to discuss with his students the topic of authority (Wagner & Herbel-Eisenmann, 2014). During this discussion he referred to "the authority" as the holder of knowledge and he also stressed the different sources of authority that vary from him (as a mathematics teacher) to each and every one of them (the students). He followed with a couple of examples that he expected would illustrate the nature of mathematical authority. In particular, he asked the students which of two expressions written on the blackboard was correct: $2 + 3 \times 5 = 30$ or $2 + 3 \times 5 = 17$. The vivid discussion that followed resulted in a shift in the authority structures. Wagner & Herbel-Eisenmann reported that the students started exercising personal latitude by making demands of Mark. This resulted in some moments of tension, which politeness theory identifies with face-threatening acts:

b150 Mark: If we follow as what you guys...or what we refer to order of operations we're following what?

b151 Cam: Is this a trick?

b152 Mark: No, it's not a trick.

b153 Cam: Yah, it is. What about this one? Which one?

The above excerpt contains an interesting reaction of a student to Mark's question. Instead of directly replying to Mark's request, Cam made a meta-comment on it, expressing (and repeating in b153) that the request was actually "a trick." Cam may have been afraid that whatever answer he gave would be wrong, in which case he may have wanted to protect his positive face from the potential threat of a wrong answer. Perhaps the student had a similar experience from a previous mathematics teacher, or, in other words, maybe this was an already established sociomathematical norm. In any case, he chose to respond to the face-threatening act with a meta-comment, which could be interpreted as a face-threatening act to Mark. At the same time, Cam showed his non-adherence to the norm that a teacher may ask "tricky" questions.

After the students discussed the order of operations for a while, Mark referred them to a polynomial expression and asked them why the x -terms cannot be added to the y -terms. Ashley said that x and y are different numbers, and Mark replied with the same question — why can't they be added?

b202 Ashley: Because you told us yesterday.

b203 Various: [*Inaudible too many voices.*]

b204 Brienna: You contradict yourself.

b205 Mark: I'm not trying to contradict myself.

b206 Brienna: Yes, you are. You're like, "Oh well, why is it like that?"

b207 Mark: Okay. Shhh.

b208 Brienna: I am not Albert Einstein.

b209 Mark: How do you know?

b210 Brienna: Uh, do I have his hair?

The above excerpt presents another situation in which Mark had to deal with a bald threat to his positive face. He did it in a way that did not pose any threat to the student's face. In this case, Ashley claimed that Mark had told them that during the simplification of an expression one should not collect the x - and y -terms. Mark responded to that by an indirect evaluation; he went off record by choosing to not express the face-threatening act of the negative evaluation of Ashley's idea. Instead, he said that he was curious on the roots of her idea. Mark's choice led to Ashley replying that it was him who had expressed that rule in the previous day (b202). This then led to Brienna's direct face-threatening act: "You contradict yourself." She noticed that he gave them a rule one day and then questioned the rule the next day. Mark felt obliged to immediately refute this threat (b205) in order to protect his positive face: a good teacher is not the one who contradicts himself. Brienna insisted in turn b206, by adding a very interesting meta-comment on Mark's discursive strategy to ask students to justify their opinions: "You're like, 'oh well why is it like that?'" At that moment Mark probably felt that his intended definition of the situation, as well as the supporting norms are at a serious risk; that would explain his request for silence. Brienna's response is notable; after realising that she had "crossed the border" with her face-threatening acts towards her teacher (which was expressed by Mark's "Okay, Shhh"), she chose a face-saving act: she aimed to justify her behaviour by stating that she is not Albert Einstein. In other words, she said in a humorous way that Mark should not expect her to have all the answers to his questions. This point is crucial, the students (in this case Brienna) seemed to be unafraid to take the responsibility of questioning the

definition of the situation that was promoted by their teacher (threatening his face), and they also took responsibility to protect his face. As Wagner & Herbel-Eisenmann (2014) state “When Mark challenged his students with questions about authority, they exercised authority by telling him how they wanted him to teach them” (p. 881).

Another way to interpret this shift is by focusing on the establishment of a social norm: the student has responsibility for learning and also may question the teacher’s approach. This in turn resulted in a shift of the way that face concerns are considered. In a shared-authority interaction, a request — even expressed baldly — still carries a potential threat to the addressee’s face, and might not require a redressive action by her/him. This frees more space for productive exchanges and an effective focused interaction (Goffman, 1972).

DISCUSSION

Both of the frameworks used to analyse the episode here are frameworks that relate to authority. The Wagner & Herbel-Eisenmann (2014) framework explicitly identified four “authority structures” that were grounded in pervasive word patterns in mathematics classrooms: personal authority, discourse as authority, discursive inevitability, and personal latitude. Politeness theory refers to people’s need for freedom (for negative face) and social approval (for positive face) and identifies the strategies deployed in order to minimize the threat to one’s and/or the other’s face. The two frameworks highlight different aspects of authority. For example, changing one’s mind is seen as an expression of personal latitude if interpreted with authority structures, whereas from the face wants point of view we need to examine the actions that led to it; the person who changed his/her mind might be merely following the request (implicit or explicit) of a person being *in* authority or being *an* authority. This duality of interpretations should not be seen as leading to conflicting results. The teacher’s authority is an aspect of his/her positive face, whereas students’ positive and negative faces also are in play during any interaction in the classroom.

Our combined analysis of the episode has provided some interpretations on the interactions of Mark with his students. Just as with most interactions in the classroom, there were moments of tension between the participants. These moments usually signify the points when the existing or the proposed definition of the situation is questioned. We have seen at least two norms being established in Mark’s classroom: the first is related to the usefulness of school mathematics (sociomathematical norm) and the second with the shared responsibility on the nature of teaching — or, particularly, questioning (social norm). With the help of Mark, his students have shown their willingness to participate in the joint establishment of an acceptable definition of the situation.

Attending to face wants may help a teacher be responsive to students. As soon as the teacher identifies the face wants of the students s/he can accordingly modify his/her actions to either open space for action (redressing negative face) or affirm the students’ authority or status (redressing positive face). Indirect requests and the use of hedges are two possibilities; expressions of appraisal are face-empowering acts (Tatsis & Dekker, 2010), thus may empower the student’s authority. In any case, moments of tension do arise in the classroom and eventually the teacher has no other option but to exercise his/her authority (see turns a150, b207) in order to lead the class to his/her expected definition of the situation.

The politeness theory in this analysis helped elaborate aspects of the analysis using Wagner & Herbel-Eisenmann's (2014) framework. In particular, the three authority structures that feature demands (personal authority, discourse as authority, and discursive inevitability) threaten the face of students. A teacher's choice to embrace the two structures that position him- or herself along with the students subject to the discourse (discourse as authority and discursive inevitability) mitigates the threat. This may help explain why mathematics teachers gravitate to these authority structures. Furthermore, the authority structure called *personal latitude* may seem the best for teachers wanting students to develop authority. However, politeness theory explains why this structure is full of tension. This tension may again explain why teachers gravitate to the other authority structures.

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