VAGUE LANGUAGE IN GREEK AND ENGLISH MATHEMATICAL TALK: A VARIATION STUDY IN FACE-WORK

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In this paper we consider data selected from two larger studies of mathematical discourse, one in the Greek language, the other in English. The analysis focuses on participants’ ‘face-work’ in the cause of ‘politeness’ i.e. efforts to sustain the autonomy and well-being of themselves and other participants. We examine the application of politeness theory (Brown & Levinson, 1987) in two differently ‘politeness-oriented’ cultures. Our analysis shows that speakers in both countries respect and try to preserve their hearer’s face, and that mathematical talk in both cultures deploys vague language in similar ways. The Greek case demonstrates that, under certain circumstances, the speaker may choose to threaten his/her partner’s face in order to maintain his/her own face.

INTRODUCTION

The fact that everyday and mathematical language are interwoven in mathematical discussions (Pirie, 1998; Moschkovich, 2003) has led a number of researchers to adopt linguistic methods of analysis in order to clarify a number of issues concerning the teaching and learning of mathematics. Currently, among the various linguistic analyses in mathematics education we can see a trend towards a view according to which language is a means through which the speakers perform specific acts. Speech act theory (Austin, 1962; Searle, 1969) stresses the fact that language is – or can be – used to convey more than a single message. Consider, for example, the following sentence produced by a 14-year-old student, Allan (Rowland, 2000, p. 1):

The maximum will probably be, er, the least ‘ll probably be ’bout fifteen.

The above sentence was a reply to the teacher’s request to make a prediction about the number of line-segments between points on a square-dot grid. If we isolate the ‘mathematical’ message included we end up with the proposition:

There are fifteen segments.

However, Allan’s utterance communicates more than the propositional content of its message. Stubbs (1986) claims that every (spoken) sentence encodes a point of view. In particular, we may infer something about his propositional attitude (Jaszczolt, 2000) – that he expresses uncertainty. On the other hand, one might ask why Allan didn’t simply reply that he lacked confidence in his prediction. These issues that come up from a single utterance – or a single exchange to be precise – demonstrate the richness of the meanings included in mathematical discussions; on the one hand there are the overtly ‘mathematical’ meanings, and on the other hand the personal and interpersonal meanings, related to speakers’ communicative and personal attitudes. In this connection, Brown and Yule (1983, pp. 1-4) refer to the ‘transactional’ and
‘interactional’ functions of language, a distinction which relates to that between semantic and pragmatic meaning. These meanings are continuously interrelated to produce mathematical discourse. Analyses of mathematical discourse that take account of both kinds of meaning include those of Bills (2000), Rowland (1997) and Wagner (2003). One issue raised by such analyses is whether the linguistic strategies described can be found in different cultural settings. In English, for example, the utterance “I don’t suppose I could possibly ask you to bring back a newspaper” is an indirect speech act – a polite request – but in Greek it is not a request at all. This issue led us to the formation of a variation analysis, between cases from two different cultures: the English and the Greek. Before we proceed with the analysis itself we shall present our basic theoretical framework, i.e. politeness theory.

**POLITENESS THEORY**

Politeness theory (Brown and Levinson, 1987) is a sociolinguistic theory based on Goffman’s (1972) notion of ‘face’ i.e. “the positive social value a person effectively claims for himself by the line others assume he has taken during a particular contact” (p. 5). Face is categorised into positive and negative: 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. The Model Person (MP) of the theory not only has these wants her/himself, but recognises that others have them too; moreover, s/he recognises that the satisfaction of her/his own face wants is, in part, achieved by the acknowledgement of those of others. Indeed, the nature of positive face wants is such that they can only be satisfied by the attitudes of others.

Now some acts (‘face threatening acts’, or FTAs) intrinsically threaten face. Orders and requests, for example, threaten negative face, whereas criticism and disagreement threaten positive face. The MP therefore must avoid such acts altogether (which may be impossible for a host of reasons, including concern for her/his own face) or find ways of performing them whilst mitigating their FTA effect, i.e. making them less of a threat. Imagine, for example, that someone says something that MP believes to be factually incorrect; MP would like to correct him/her. Such an act would threaten the first speaker’s positive face – the esteem in which s/he is held as a purveyor of knowledge. Or suppose that MP would like someone to open the window, but is aware of the threat to the other’s negative face. Brown and Levinson identify a taxonomy of strategies available to MP in such circumstances, viz.

1. Don’t do the FTA – simply agree or keep quiet.
2. Do the FTA: in which case there is a further choice of strategy:
   2.1 Go off record – don’t do the FTA directly, but implicate it e.g. “Don’t you think it’s hot in here?” (indirect request to open a window).
   2.2 Go on record: either
      2.2.1 ‘baldly’ – essentially making no attempt to respect face; or
      2.2.2 with redressive action: having regard either for the other’s -
         2.2.2.1 positive face (“You’re the expert in these matters, but I thought that ...”); or
         2.2.2.2 negative face (“I’m sorry to trouble you, but would you mind ...”)
Redressive action – ‘face-work’ – is very commonplace when FTAs are in prospect; such action is a way of indicating that no face threat is intended. Face-work typically deploys various forms of indirect and vague language. Hedges i.e. “words whose job is to make things fuzzier or less fuzzy” (Lakoff, 1973, p. 490) are a form of vague language; modality is used to convey the speaker’s propositional attitude, which may vary from confidence to doubt. Allan’s quote, for example, includes one hedge – ‘probably’ – reinforced by another – ‘(a)bout’. ‘Probably’ is a let-out for him, for it makes his lack of commitment explicit, redressing the threat to his positive face. The use of the approximator ‘about’ is a more subtle protective strategy, for it “trivialises the semantics” of the sentence, and thereby renders it “almost unfalsifiable” (Sadock, 1977, p. 437).

While attempting to analyse an instance of communication (e.g. a transcribed discussion) one needs a theoretical foundation to guide analysis, and also a concrete methodology for analysing the verbal data. Conversation analysis (CA) provides a framework for the analysis of utterances produced in a particular context; more than that, context is not treated as a static property of the situation, but as an entity which is continuously re-shaped by the on-going discourse (Heritage, 1984). CA looks for patterns in discourse in order to examine features such as turn-taking and ‘adjacency pairs’, distinguishing between preferred and dispreferred responses to initiating remarks, such as agreement and disagreement (Schiffrin, 1994, pp. 232-281). This is particularly useful in mathematical talk, where concepts and procedures are continuously introduced and negotiated. In the next two sections we shall demonstrate how politeness theory enhanced by conversation analysis may be used to analyse and compare the features of mathematical discussions in two cultures: English and Greek. The text fragments in both cases are necessarily brief.

THE GREEK CASE

The 40 participants in the study reported here were undergraduate students aged from 20 to 22. Each student was asked to choose a partner, and one problem was assigned for each pair in each of three sessions. Some findings of the study concerning shared mathematical knowledge were reported at an earlier PME meeting (Tatsis and Koleza, 2004); here, we shall examine the different politeness strategies deployed by one pair of Greek students.

The dialogue that follows is translated from Greek and refers to the ‘fish tank problem’, which was given at the third session:

George and Phil were playing with their fish tank. The fish tank is 100 cm long, 60 cm wide and 40 cm high. They tilted the tank, as shown, resting on a 60 cm edge, with the water level reaching the midpoint of the base.

When they rest the tank in a horizontal position, what is the depth of the water in cm?

The following excerpt comes from the beginning phase of the encounter, when the students have not yet clarified the process to be followed. The first author was the observer/researcher.
Paul Where is it exactly, where will it go? [Paul is referring to the water] It’ll go someplace here, it may go to 20, it may go here, anywhere… Does it have to do with triangles?

Jina The only triangle is the one we’ve found.

Paul Triangle, trapezium, whatever it is … Is this a random point, or is it exactly in the middle? [Paul is asking the observer]

Observer It’s in the middle.

Paul So, logically, it should be under 20. Cause when it’s 40, and what I’m doing seems too practical, it’s 50. So, when it reaches 20, it’s half, it goes to 100, it’ll be like that …

Jina Good, we take it like that.

Paul So, it’s 10.

Jina Why 10?

Paul Eh, if it is … Using the same logic since 40 50 …

Jina Yes, with …

Paul 20 100. It has to be 10 so the … horizontal. The tank cannot be horizontal and the water stand like that. Is it possible for the water to be like that?

Jina Yeah, OK. But we still don’t use the 60 …

Paul So, if you take it … First, these two axes, look: the one is 40, BC is 50, so when it goes to 20, it’ll go to 100. Or when it goes to zero here, it’ll go to … where will it go?

Jina Here.

Paul No, if it goes down …

Jina What if it’s somewhere between 10 and 20?

What is evident throughout the particular excerpt is the students’ attempt to reach an agreed solution to the problem; Paul, by using some sort of analogies proposes that the depth of the water must be 10cm, while Jina [75] asks for explanation, perhaps because her partner’s thought does not seem justified in a ‘mathematical’ manner. Indeed, Paul himself [72] asserts that his rationale is “too practical”. Initially, while he is trying to organise his thinking, he hedges his language: [68] “It’ll go someplace here, it may go to 20, it may go here, anywhere…” This is a characteristic case of the use of vague language when a speaker lacks information, in order to protect his/her positive face. Gradually, Paul is led to the conclusion that the height of the water must be less than 20cm [72]; he realises that his justification is not ‘mathematical’ but ‘practical’, and his use of the modal ‘should’ conveys his propositional attitude – possibility rather than certainty. He elaborates his suggestion [78, 80], but Jina remains sceptical about it. Paul ignores her insightful comment [79] about the redundancy of the third dimension of the tank. Her final comment in [83] and serves two purposes. First, it expresses her scepticism about Paul’s solution but it redresses the FTA by using the ‘what if’ scheme, and by offering one extreme (10) that agrees with Paul’s proposal. Second, it expresses her own uncertainty about what the height of the water may be, by using the ‘somewhere between’ scheme.
Eventually, there were instances when a FTA was performed with no redressive action; these were cases when a student chooses to express disagreement or lack of understanding baldly. In the following exchange, for example, Jina perhaps feels unwilling to accept a solution that she does not comprehend; in any case, her turns [228, 230] are ‘dispreferred’:

227 Paul It goes to 25. 25 is \(\frac{1}{4}\) of 100, when the tank rests like that, so it’ll go to \(\frac{1}{4}\) when it’ll be like that. \(\frac{1}{4}\) of 40 is 10. But it’s not a proof …

228 Jina I don’t get it.

229 Paul But I like my thinking very much, it …

230 Jina It confused me.

It is also relevant to consider how these students use the personal pronouns ‘we’ and ‘you’ in their talk (Rowland, 1999). Only Jina uses ‘we’, while Paul’s expressions are mainly impersonal, with the exceptions of “what I’m doing seems too practical” [72] and “I like my thinking very much” [229]. ‘We’ serves two purposes. First, it is an indicator of joint activity and second, it is used as part of a politeness strategy ([79]). By uttering “we” in the particular moment Jina aims at expressing her scepticism towards Paul’s suggestion, but without threatening his positive face. She places herself alongside him, instead of expressing direct disagreement. Paul’s impersonal expressions, on the other hand, probably reflect his attempt to present his views in a ‘neutral’ way in order to minimise the threat to his own face in case of a potential mistake. The ‘you’ in [80] refers to nobody in particular, while the expression “what I’m doing seems too practical” [72] sounds more like egocentric talk, having also a ‘face-protecting’ function: it’s as if he is pointing out that his solution is not mathematically justified, before Jina can make the accusation. The same is the function of “it’s not a proof” [227], while in [229] Paul is praising himself, perhaps as a ‘face-maintaining’ strategy: after his partner utters her lack of understanding he feels exposed and in need of taking some redressive action.

THE ENGLISH CASE

Jonathan was an undergraduate mathematics/education student in his early 20s. He had been working on the problem of finding the number of integer solutions of

\[x^2 + y^2 \equiv n \pmod{p} \quad (\text{a prime number}).\]

The supervision meeting considered here lasted about 45 minutes. Jonathan had made a number of conjectures at the previous supervision. The process most to the fore in this encounter is proof. Jonathan’s proposals are mostly skeletal, in need of detail, and the role of the supervisor (the second author) is to provide some scaffolding around his construction of the details. Early on, Jonathan claims that he has “an argument” for an earlier conjecture in the case \(n = 0\). Before giving him opportunity to articulate the argument, the supervisor is eager for Jonathan to appreciate the distinction between the cases \(p \equiv \pm 1 \pmod{4}\). His intervention [28] is an imposition on the student, and his reluctance to perform the FTA is evident in the hesitation [28] which has no fewer than six false starts:
Tatsis & Rowland

28 Tim OK, OK. And, I mean, can I, I think, I just want to ask, does it hinge on the fact that in one case minus one is a quadratic residue and in the other case it isn’t?

29 Jonathan [pause] Um ... well, yes [coughs] ... sort of. Um, I mean /it’s, yes there’s one/

30 Tim /[laughs] Would/ you like to rehearse the argument with me, or ...

31 Jonathan Well [coughs], yeah (yes), I’ll come back to that bit about the quadratic residue bit. Um, but for where it’s equal to one mod four ...

32 Tim Right.

The ‘well’ that initiates Jonathan’s response [29] seems to be a hedge on Grice’s (1975, p. 46) maxim of Quality:

Try to make your contribution one that is true. Do not say that for which you lack adequate evidence.

After coughs and pauses, the best he can claim is “sort of”. Jonathan is then invited, at last, to express his argument [30], but the supervisor redresses the potential FTA (request) by an indirect speech act (“would you like”) and by giving the option (“or”) so that consent is not the only preferred response. Jonathan accepts the alternative, but realises that this might disappoint his supervisor. So although his answer [31] is (for the moment) “no”, he presents it as “yes”, appropriately marked by another hedge on Quality (“Well”). Thus, he asserts his right to present his argument in the way he chooses, but bears the supervisor’s prompt [28] in mind and eventually responds to it later on. Soon, it becomes apparent that Jonathan’s argument is incomplete.

47 Jonathan And, then there’s this pairing thing …

48 Tim Yeah?

49 Jonathan Which ... that’s the bit I can’t, I’m not... able to explain. I can’t, I’m not, I can’t say why they pair off, like that. Um, but then we’ve got, um, \( p \) minus one over two pairs [number of quadratic residues mod \( p \)] [inaudible]

50 Tim Oh, \( p \) minus one over two squares.

51 Jonathan Yes. And so, so you get [long pause] yes, sorry, yes that’s it. And they add up to give \( p \) each time, these two… these pairs of squares…

52 Tim Yes.

53 Jonathan So you’ve got \( p \) there, nought.

54 Tim [pause] Um, [hesitant] that’s an absolutely fine ... um, I mean, let’s think, we’re talking about when \( p \) is congruent with one mod four here, aren’t we?

Jonathan identifies the gap in his argument, which is to show that, when \( p \equiv 1 \mod 4 \), the quadratic residues can be always be paired to give sum zero. By accepting that he is not able to explain it [49], Jonathan poses a threat to his own face; this is a very crucial point, and the supervisor takes some redressive action with his “absolutely fine” and use of the inclusive ‘we’ [54]. It seems that the supervisor is caught between two conflicting needs: the need to correct Jonathan’s argument on the one hand, and the need not to impose a threat to his positive face on the other.
COMPARISON AND CONCLUSION

The basic similarity that can be traced is that speakers in both countries use vague language while they talk (about) mathematics. The students’ attempts to articulate formal mathematical statements are hindered by their lack of specific knowledge, and this leads them to use various kinds of modal (e.g. ‘should’, ‘must’) and vague language by using hedges such as ‘about’ or ‘probably’. In the Greek case, the students aim to protect their face when their reasoning is exposed to the researcher and their partner. In the English case Jonathan aims to protect his face when his thinking is placed under the microscope; his supervisor responds by using various forms of hesitation, inclusive and indirect language to redress his FTAs.

We also see similarities in the strategies deployed by the students to redress FTAs in both cases – to protect the student-partner in the Greek case, and the supervisor in the English case. Speakers express their attitudes in indirect ways, so as to reduce the threat to the interlocutor’s positive face. What differentiates the two cases is that, under certain circumstances, speakers in the Greek case chose to perform a FTA with no redressive action; this was made in order for the speaker to protect face.

The analysis presented in this paper is intended to exemplify a way of seeing interactions taking place in educational settings, particularly those related to mathematics. As we have demonstrated, the politeness strategies deployed by students and/or teachers in England and Greece have some common features. This is not to say that both cultures share an identical set of linguistic strategies; what is evident though is a common tendency for participants in the articulation of mathematical reasoning to protect their own face, and sometimes that of other participants. Moreover, the Greek case demonstrates that protecting one’s own face can take priority. As Rowland (2000, p. 125) states: “the participants care about the mathematics, but they also care about themselves, their feelings and those of their partners in conversation”. In this paper, we have shown some similarities and differences in particular ways that this affective dimension is manifest in two European cultures, albeit with reference to different contexts and to small fragments of data. We believe that more extensive cross-cultural comparisons of this kind would be very profitable.

References


