Wagner, D. (2015). A speech act in mathematics education—the social turn. In P. Gates & R. Jorgensen (Eds.). *Shifts in the field of mathematics education: Stephen Lerman and the turn to the social*. (pp. 75-87). New York: Springer.

The text below was submitted and accepted for publication in the book. Some minor editorial changes will have been made, and the pagination does not align with the published chapter. I encourage readers to buy the book (http://www.springer.com/us/book/9789812871787).

A Speech Act in Mathematics Education—The Social Turn

David Wagner, University of New Brunswick
http://davewagner.ca

When Stephen Lerman (2000) identified the social turn in mathematics education research, he described the phenomenon but also shaped it. He characterized the social turn as "the emergence into the mathematics education research community of theories that see meaning, thinking, and reasoning as products of social activity" (p. 23). In the tradition of the social turn, this chapter considers Lerman's claim in its social context by drawing from another theory that also emerged to consider its social context, namely speech act theory (e.g., Searle, 1979) in the field of linguistics.

After introducing some fundamentals of speech act theory, I illustrate them with mathematical examples. Next, I identify what Lerman claimed to be doing in the book chapter in which he identified the social turn and compare it to the way other scholars positioned his claim. From this, I reflect on the politics of Lerman's speech act and how it represents a model for other researchers. Like others, his speech act rests on authority. I then return to the mathematical examples of speech acts to identify similar politics in mathematics classrooms. My reflection closes with an alternative reading of the politics of his and other speech acts.

Speech act theory

Early speech act theory appealed to everyday examples of utterances to distinguish between a speaker's intention and the effects of the speaker's utterance. For example, utterances that have the grammatical structure of a statement, sometimes called *declaratives*, generally describe something. However, declaratives can do more than describe the world as it is. They can change the world. To exemplify the difficulty of appealing to grammar alone to identify an utterance as a declarative, Austin (1975) pointed to bequests, bets, the performance of marriage ceremonies, and the naming of ships. When the authorized person says, "I name this ship the *Queen Elizabeth*" (p. 5), it is the utterance itself that christens (names) the ship. Similarly a designate of the state changes the status of people by pronouncing them married; it is the pronouncement itself that begins the formal

union. Bets and bequests change the status of the speaker as well as the status of others. Austin describes such acts in this way: "The uttering of the words is, indeed, usually a, or even *the*, leading incident in the performance of the act, […] the performance of which is also the object of the utterance" (p. 8, emphasis his). However, he also recognized that the speech act is only consummated when the context aligns with the utterance: "[I]t is always necessary that the *circumstances* in which the words are uttered should be in some way, or ways*, appropriate*" (p. 8, emphases his).

Speech act theory, with its careful attention to the effects of language on social situations, has been influential in more recent theorizations of language and social dynamics. For example, Halliday's (e.g., 1978) Systemic Functional Linguistics distinguishes between a speaker's intention (illocutionary force) and the effects of the speaker's utterance (perlocutionary force) by analyzing the utterance itself (locutionary force). Halliday, a linguist, noted how language in mathematics is developed to increase "its range of social functions" (p. 195). Halliday's theory has been used widely in mathematics education research, starting with Pimm (1987). Positioning theory also built on the idea from speech act theory that it is important to consider social situations. Positioning theory, as developed by social psychologists Harré and van Langenhove (1999), went beyond conventional psychology and attended to people's word choice in social situations and how that word choice initiates and sustains the roles of people in their relationships. In mathematics education research it is common to describe the 'positioning' within interactions, but such interpretation is often done without referencing positioning theory, as I have noted elsewhere (Wagner & Herbel-Eisenmann, 2009).

Speech acts in mathematics

Special instances of speech acts occur in mathematics and mathematics classroom discourses. Like the non-mathematical examples listed above, mathematical actions involve naming and reformulating relationships. The nature of naming is especially relevant to Lerman's speech act.

When the owner of a steamship line christened a ship the Queen Elizabeth, people started using the new name to represent this particular ship. A student or mathematician may name (or christen) a quantity in the same way. When I work on a problem involving handshakes, for example, I might say, "Let *x* represent the number of people in the room." Before I make my statement, *x* does not represent the number of people in the (hypothetical or real) room. My statement turns *x* into an index of that quantity. Similarly, to solve the equation $e^{2x} - 10 = 3e^x$, I would find it useful to say (to myself or to others) "Let $y = e^x$" because this speech act turns a fairly messy equation into a simple quadratic equation, $y^2 - 10 = 3y$. In geometry, similar speech acts are useful. Given a diagram, it is useful to label key points with letters. When I put labels on the vertices of a triangle, for example, I christen these points as *A*, *B,* and *C*, and thus facilitate the communication that makes certain work possible. This kind of indexing, a special form of naming, is a powerful tool in mathematics for facilitating the development of ideas.

Netz (1998) analyzed the role of diagrams in early Greek geometry and noted that "[p]oints are assigned letters – they are baptised" (p. 34) (baptism is associated with christening/naming in some cultures). He noted the significance of the order in which one

represents ideas. Sometimes the mathematical object is determined first by text and then with a diagram, followed by the naming of certain points. Other points initially enter into play from the diagram. Either way, this suggests that the diagram itself, like words, is an utterance or text that represents some sort of mathematical idea that exists first in one's imagination. Radford (2002) theorized this mathematical necessity, in which people use spoken or written symbols to refer to objects that have no concrete existence. Pointing things out by naming them is a speech act because the act draws attention to something in particular and gives that thing a signifier to facilitate communication about it. Radford used the linguistics term *deixis* to refer to such pointing (the root of *deixis* is the Latin word for finger) and coined the term *objectifying deixis* to describe the "process that makes apparent something new" (p. 18). Just as a ship exists as a concrete thing before its owner christens it, the mathematical examples of indexing I gave above involve naming ideas and objects that were already manifest in the world. By contrast, with objectifying deixis, a mathematical object is christened into being because it had no concrete form before it was named.

Kalthoff and Roehl (2011) pointed to a related phenomenon in mathematics education that might be seen as an opposite to Radford's objectifying deixis. Mathematics teachers (and, I would add, applied mathematicians) impose mathematical objects that exist in their minds onto everyday objects that are not as perfect or pure as the ideal object. For example, if we use a chocolate bar to talk about triangular prisms, we must ignore the aspects of that chocolate bar that make it less than a perfect prism and we must ignore the distractions of colour, smell, and taste. Kalthoff and Roehl described the performative nature of speech that turns the less-than-perfect object into an image of a perfect prism. For example, I could hold up a chocolate bar and say, "This is a triangular prism." It is not a perfect prism, but my speech act allows the people I am talking with to use the physical thing as an index for a perfect prism. This is a form of abstraction achieved by describing an object as though it is a perfect mathematical object (instead of a perfect chocolate bar, for example). Like indexing and objectifying deixis, these acts of abstraction are powerful because the abstraction makes possible certain kinds of calculations that would be otherwise cumbersome.

As noted by Halliday (1978) and others, nominalization, which is the process of making nouns or names for all sorts of things, is an important feature of mathematical language practices: "[L]ocutions with nominals in them have a greater semantic and syntactic potential for different emphases and different information structures" (p. 202). The speech acts I described above are all examples of nominalization.

In addition to acts of naming/nominalization, there are mathematical moves that parallel to the declaration of marriage by a justice of the peace. At my wedding, the minister cleverly referenced my mathematics background by expounding on the nature of unions. He noted that he had often heard people say that $1 + 1 = 1$ in marriage because the two become one, but he argued that in marriage $1 + 1 = 3$; my partner and I would each keep and develop our own identity and also develop a new identity together. No one was fooled by his math. We all knew that two independent bodies do not magically become one body or three bodies, but we recognized the wisdom (or power) in thinking about things that are separate as though they are together. Mathematical operations are similar. For example, $2 + 3 = 5$. A set of two objects and a set of three objects may be seen as a set of five objects. This move to connect two groups of objects can facilitate certain actions that are

difficult if we continue to separate the two objects from the three objects. It is the addition statement that changes the way we see the various objects with which we are working. We are not fooled into thinking that something magical happened with the objects. The only thing that changes is the way we think of the objects. However, we recognize the wisdom (or power) in such shifts of attention.

The above examples are relatively local mathematical acts performed by utterances but there are larger scale speech acts too. For example, there have been arguments about terminology for the roots of polynomial equations that do not appear on a number line. Gauss (1863, p. 177) complained about Descartes dismissively calling such numbers imaginary:

> That the subject [of imaginary magnitudes] has been treated from such an erroneous point of view and enveloped with such mysterious obscurity is due largely to the inadequate terminology used. If instead of calling +1, -1, $\sqrt{-1}$ the positive, negative and imaginary (sometimes even impossible) unities, they had been called, say, the direct, indirect and lateral unities, this obscurity would have been avoided. (quoted in Dantzig, 1930/2005, p. 243)

Perhaps Descartes did not intend to christen $\sqrt{-1}$ as imaginary, but his term stuck and continues to be in force.

A speech act in mathematics education

Given the above description of speech acts and examples from mathematics discourses, I return to my claim that Stephen Lerman's identification of the social turn in mathematics education was a speech act. The proof that it was a speech act is that the declaration had an impact on the community in which it was spoken. With his declaration, Lerman described a phenomenon but also shaped the phenomenon by naming it. Perhaps his speech act was a case of objectifying deixis, using Radford's (2002) term — a case in which Lerman made something that was vague and not concrete in itself into something that can be discussed and worked with. There was (and always is) movement and development within the field of mathematics education, but Lerman brought to our attention this particular development and gave us a way of talking about it.

What did Lerman claim about the social turn?

Before looking at the way others have written about the turn that Lerman pointed out, I will consider how he positioned his own speech act. His identification of the social turn was no doubt partially an intuitive recognition of a trend in theoretical frameworks, but it also built on careful analysis of more than a decade of "papers from Proceedings of the International Group for the Psychology of Mathematics Education (PME), from *Educational Studies in Mathematics* (ESM) and from the *Journal for Research in Mathematics Education* (JRME)" (Lerman, Xu & Tsatsaroni, 2002), which Lerman reported on in various contexts with his collaborators. In their reporting they noted that an "orientation towards social theories of one kind or another is increasing" (p. 37).

The first publication in which Lerman referred to "the social turn" was a chapter in book edited by Jo Boaler (2000), *Multiple Perspectives on Mathematics Teaching and*

Learning. The title of Lerman's (2000) chapter is "The social turn in mathematics education research." This is how he introduced the social turn:

> I have called these developments the social turn in mathematics education research. This is not to imply that other theories, mathematical, Piagetian, radical constructivist, or philosophical have ignored social factors […]. The social turn is intended to signal something different; namely, the emergence into the mathematics education research community of theories that see meaning, thinking, and reasoning as products of social activity. (p. 23)

As with most declaratives, when Lerman identified the social turn he described what was happening in mathematics education at the time. However, Lerman seemed to be aware of the significance of his act when he used the past tense to recognize his agency in identifying the trend. He chose to write, "I have called these developments the social turn" (p. 23), but he could have obscured his agency in various ways. For example, he could have used a passive voice to say, "There has been a social turn" or he could have foregrounded the agency of the community of researchers by saying, "mathematics education researchers have made a social turn." Lerman also showed awareness of his act of agency by writing about intention – "the social turn is intended to signal something different" – though he could have taken even greater ownership by saying, "I intend to signal something different."

Taken as a whole, Lerman's chapter demonstrates self-awareness of his positioning. He positioned himself not only as a reporter on trends but as an advocate for the shift he was reporting on. In his conclusion he focused on the difference between socio-cultural theory and psychological theory in the context of the unit of analysis in research: "But the object of study itself needs to take account of all the dimensions of human life, not a fragment such as cognition, or emotion" (p. 37). By using the imperative *needs to*, he christened the social turn into reality.

What have others said about the social turn?

According to positioning theory, it is necessary to consider the reciprocal nature of positioning (van Langenhove and Harré, 1999), which refers to the way an utterance is positioned by the speaker and by others in the context. While it is important to see how Lerman positioned his identification of the social turn, it is equally significant how others have positioned his speech act. The first to position his identification of the social turn was Boaler (2000, p. 6). Hers was a unique positioning because of her role as editor of the book in which Lerman declared the turn; it is like she was standing behind or beside Lerman when he made his utterance. She wrote:

> In an interesting analytical move he raises the importance of sociological theories to account for [power relations that are differently distributed across learners] — thus acknowledging the individual differences within social accounts of learning and employing sociological analyses to account for broader patterns of difference across individuals.

Boaler attributed agency to Lerman's act. She did not say that he identified or recognized the social turn. Instead, she wrote that he raised the importance of sociological theories.

How did Lerman's speech act raise the importance of sociological theories? How did his act make things possible that were not as possible before? These questions are central

to my calling Lerman's utterance a speech act. To answer this, I look to instances in which others have referred to his identification of the social turn, although this approach merely scratches the surface of what Lerman did. While I am sure that his speech act influenced the research behind publications that do not explicitly cite his claim, in this chapter, I limit myself to explicit references. I can identify three things that his move has supported for others: attribution shields, further steps in the same direction, and critique.

First, attribution shields are prevalent in research reporting; most citations are examples of attribution shields. Linguistics uses the term *hedges* to describe how writers and speakers make language intentionally fuzzy. An attribution shield is a particular kind of hedge, identified by Prince, Frader, and Bosk (1982), in which one avoids providing rationale by attributing an idea to someone else who is deemed an authority. This kind of attribution is useful in research reporting because it allows us to focus on new ideas by avoiding discussion of ideas that have already been established.

For example, Gutstein (2003) noted that a reason for social justice issues not being associated with mathematics education was that "researchers have historically focused more on cognition than on sociocultural contexts (although this is changing)" (p. 41). He attributed this claim to Lerman. Gutstein was suggesting that Lerman's research is taken-as-shared and thus not up for argument. This move allowed Gutstein to focus on the new research he was contributing. In this way, Lerman's research, like most good research, provided a basis for others to move the field forward by building on his work. There are numerous examples of scholars who used Lerman's identification of the social turn in this way.

Second, I have identified instances of others taking what I call "further steps" to characterize the field of mathematics education and articulate imperatives for it. For example, Gutierrez (2010) and Valero (2004) have argued separately for a "sociopolitical turn" in mathematics education in much the same way as Lerman argued for the social turn; they all identified a turn and also advocated for it. Valero (2004) argued that Lerman's sense of the word *social* was more encompassing than a straightforward reference to social theories. She highlighted his suggestion "that some researchers in mathematics education started focusing on the fact that there seemed to be a systematic exclusion of some students from the possibility of engaging in the learning of mathematics" (p. 12). She thus argued that this political concern was indicative of a "political turn" and to exemplify this she cited work as far back as fifteen years earlier, when Mellin-Olsen (1987) wrote *The Politics of Mathematics Education*.

Similarly, Gutierrez (2010) recognized that "Lerman's meaning of the term 'social' went beyond the layman's [sic] definition of involving social beings and interactions and included the consequences for addressing hegemony in society" (p. 4). However, Gutierrez positioned her claim differently from Lerman and Valero, who implied that the field was taking a turn. By contrast, Gutierrez (2010) suggested a split in the field: "[W]hile many mathematics educators are comfortable with including social and cultural aspects in their work, most are not so willing to acknowledge that teaching and learning mathematics are not politically neutral activities" (p. 4). Nevertheless, Lerman's speech act was a model for other researchers who sought to characterize and advocate for changes in the field.

Third, there are critiques of Lerman's identification of the social turn. These critiques have not said that Lerman's claim was unfounded, but rather that the social turn is problematic. Pais and Valero (2012) opened the social and political turns to question by

referring to them as the "so-called" social and political turns, and then claimed that the identification of the social and political turns in mathematics education had missed the mark for reflexivity, which would require questioning the object of study. Stinson and Bullock (2012) took up this criticism and explained it with the metaphor of zooming out; the research focus remains the same but the social and political turns help us see more of the surroundings. Even with these turns, the focus remained on the "agenda that primarily explores questions of how to improve mathematics teaching and learning" (p. 45). They advocated for critique of this object of inquiry. Lerman's speech act made possible such critique. Unless researchers identify the movement (turn) in the field of mathematics education, it is difficult to ask what this movement does and does not do.

The politics of Lerman's claim

Just as Lerman argued for the necessity of interrogating mathematics teaching and learning in its sociocultural context, it is appropriate to zoom out and look at Lerman's claim in the sociocultural context of mathematics education. And, as suggested by the scholars who have upped Lerman's claim to include political aspects, it is appropriate to raise political questions — in this case to raise these questions about his claim in its context. What were the power relations at work in Lerman's act of naming the shift in attention to sociocultural realities? In this section I identify some uncomfortable aspects of Lerman's speech act. Although these may feel out of place in a book celebrating his work, I argue that any powerful act is inherently complex because of its social dynamics. The complexity of the political milieu is a testament to the power and necessity of Lerman's work.

For Lerman's speech act to have weight it is necessary that his authority be recognized within the mathematics education community. To illustrate the necessity of this authority, I return to the example of the naming of the ship that was eventually called the *Queen Elizabeth*. Any pet names, joking names, and functional/descriptive names that would have been used to refer to the ship during production would have had no staying power once the ship had been christened. Also, if someone had snuck into the shipyard at night before the christening and said, "I christen this ship the *Queen of the Sea*," the name would have had no power because the person would not have been acting in authority. For the christening to be accepted at large, it had to be enacted by someone with the authority to name the ship once and for all. Furthermore, the person in authority had to speak within a context that engaged his or her authority. For example, if the same person who officially christened the ship had snuck into the shipyard at night to christen the ship, that secret christening would not have had power. Thus two criteria are necessary for a speech act to succeed: the speaker needs to have authority and the context must invite an authoritative speech act.

These two criteria were in force for Lerman's speech act: the right context and the right person. In his public declaration of the social turn, Lerman (2000) used the past tense to say that he had "called these developments the social turn" (p. 23). This suggests that he had identified the turn before. However, when he did this on his own or among colleagues, it did not have the same force as when it appeared in a prominent mathematics education publication, which was the right context for a global speech act. Significant speech acts in the academy usually happen in publications. When these acts occur in different ways, it can

be difficult for researchers to cite the origins of an idea. For example, I understand that although Ubiritan D'Ambrosio was talking about ethnomathematics at conferences in the early 1980s, he did not use the word in an English publication (the journal *for the learning of mathematics*) until 1985. Some scholars point to the 1985 publication as the moment in which D'Ambrosio coined the term, but others are aware that it was relatively well-known before then.

Lerman's authority was also necessary for the success of his speech act. He based the claim on a careful analysis of mathematics education literature. This was substantiated by his authoritative position in the community. Lerman had been a member of the International Committee and president of the International Group for the Psychology of Mathematics Education a few years before his speech act was published. He was also influential in the newly-formed Mathematics Education and Society group, which had its first conference in 1998. I can only speculate about the effect of the declaration of the social turn if a relatively unknown scholar were to have identified it. Would other scholars have paid attention in the same way? My graduate and undergraduate students often invent terminology to describe a phenomenon they notice in the literature but this does not have the same power as someone with Lerman's stature in the community identifying a movement within the field.

Our field's recognition of Lerman's authority raises the question of how he developed this authority. I suggest that his authority came from two forms of activity in the field: service and scholarship. While his leadership in key organizations exemplifies his service, his numerous acts of informal service cannot be ignored. Indeed, the small acts likely underpinned the trust others placed in him in his leadership roles. I did not know him at the time of his 2000 speech act, but since then I have observed him paying close attention to the work of both novice and experienced scholars and raising questions that support further development.

His scholarly activity complemented his service. What fascinates me is that Lerman's authority to make a powerful speech act rested to some extent on the fact that he had made other powerful statements before. His numerous publications bore many examples of speech acts before 2000. In those publications he identified phenomena and provided descriptions that indexed ideas, and thus moved the field forward. A person develops the authority to move others with words by saying powerful things that become increasingly recognized in that person's community.

Though we esteem our academic colleagues for their activity in the field, it is worth raising questions about this activity. As I noted above, authority is central to speech acts like Lerman's. In Judeo-Christian and other cultures, giving names is associated with power. In a Jewish creation story, Adam (the first human) is authorized by God to name the animals, and, in the same breath, to rule over them (exercise dominion over them). Leguin (1988), indexes this story in a modern fiction piece that turns this dominion on its head. The character she called Man un-named the animals, which indicated a release of power. This release prompted Man to be more attentive to experience:

> I could not chatter away as I used to do, taking it all for granted. My words now must be as slow, as new, as single, as tentative as the steps I took going down the path away from the house, between the dark-branched, tall dancers motionless against the winter shining. (p. 196)

Thus, when we as scholars draw attention *to* something, we are also drawing attention *away* from other things. Drawing on Leguin's insight, I would say that when I draw people's attention to something I distract them from noticing or attending to the experience themselves. This is like the abstraction I described above with the example of the perfect prism abstracted from a chocolate bar. Hermeneutical phenomenology is a research method that attempts to undo the directed attention that comes with language and names given by others. There are a few examples of such research in mathematics education, but I claim that the principle is warranted for any methodology. We need to ask what we are ignoring through our choices of objects of study. The critiques raised by Pais and Valero (2012) and by Stinson and Bullock (2012), noted above, are examples of scholars doing this for the field, but we can all do this as individual researchers too.

Colonized settings help make clear the power and dominion related to names. For example, the river that flows near my home is called by most people and labeled on maps as the Saint John River. The river's original name among the Indigenous people was the Wolastoq but English settlers renamed the river after a Christian saint. The fact that the English name has eclipsed the Maliseet name is an indication of historical and current power relations. It is likely that various settlers referred to this big river in various ways until someone seen to be an authority (probably Samuel de Champlain) declared it to be the Saint John River (actually the Rivière Saint-Jean, later translated to English).

Similarly, when the mathematics education community heeds an important characterization of the field articulated by a respected person like Stephen Lerman, the community may ignore other characterizations of the field. Furthermore, I claim that European and North American scholars, particularly male and English-speaking scholars, have had the advantage of being the first ones active in the field because of power relations that permeate historical and current geopolitics. I am saying this not to discount the good work by Lerman and others but rather to argue that we need to be attentive to voices from the margins when they speak and write about our field.

As I noted in the mathematical examples above, there are local and global speech acts. Lerman wrote that he had identified the social turn and called it that some time before he introduced it to the global mathematics community. There is value in scholars characterizing the field for themselves, but for the development of the field the political questions become prominent.

The politics of Mathematical Speech Acts

Because I used mathematical examples to illustrate speech act theory, and because our scholarly community is characterized by our interest in the teaching and learning of mathematics, I will return to the examples of speech acts in mathematics. I noted above how speech acts can be useful in developing mathematical ideas. Now, having considered the power relations at work with speech acts in scholarship, I note that similar dynamics are at work in the development of mathematics both for learners and for mathematicians. I will focus on learners. The potential power of mathematical speech acts is mediated by the power relations in their contexts.

For example, if a group of students is working on a mathematical problem, certain people in that group are better positioned than others to perform objectifying deictics, to index values or points, and to abstract ideas. When they label points on a diagram, their

labels stick better than when others try to label the same points. When they suggest the introduction of a variable, it carries more force than when others do so. When they see a particular object as an example of a perfect mathematical idea, it is accepted more than if others did so. These students may acquire this power through a history of initiating similarly powerful mathematical ideas. But other factors are at play too — including gender, race, and other identity-related dynamics. Similar dynamics are at work in whole-class discussion, in which the teacher alone is too often positioned as the only one capable of powerful mathematical speech acts.

One reason that I value the teaching of mathematics is that it can equip people to use mathematics in society. In this way people have access to a discourse in which sound reasoning accompanied by clear explanation can trump status hierarchies. Thus mathematics has the potential to help people challenge inequities in society. However, if access to mathematics in schools is compromised by status hierarchies in classrooms, some of the children who might use mathematics well in society could be discouraged from seeing themselves as capable of using mathematics. Indeed, as I noted above, Valero (2004) made the case that the problem of access to powerful mathematics was explicitly cited by Lerman in his justification for attention to the social in mathematics education research.

Power and Intimacy

Though naming is associated with power, it is more than power; it also represents intimacy and knowledge. Thus I will close with an alternative reading of the politics of Lerman's speech act. Names associate with stories and experience. Van Manen, McClelland, and Pilhal (2007) described the significance of naming in the context of personal names: "The stories of who named us and why that particular name was chosen are a link to our origin and take on significant meaning for us" (p. 85). They illustrated both the intimacy associated with the knowledge and use of a correct name and the profanity of using a name carelessly or incorrectly. The prohibition against the use of God's name in vain, as referenced in the Ten Commandments, is an extreme case of this abuse in the Judeo-Christian tradition.

Authority can rest on intimacy as much as it does on power. I might even refer to intimacy as a form of well-earned relational power. To illustrate, I may be receptive to critique or guidance from anyone, but I am most receptive to critique and guidance from someone who knows me well and who is committed to a relationship with me. In short, their intimacy with me allows them to move me to action or change.

I close this chapter by foregrounding this aspect of Stephen Lerman. He has intimate knowledge of the field of mathematics education and he has shown his commitment to the field and its people. A duty of such intimacy is to critique the field, just asa good friend might offer a difficult but well-meaning word of advice or guidance. I have noted that Lerman has had some advantages over non-native English speakers, for example, but he has also worked very hard and conscientiously. Most importantly, he has used the positions that he has found himself in and that he has made for himself to amplify the voices of people at the margins both in mathematics classrooms and in the mathematics research community. For this, he has garnered my deep respect.

References

Austin, J. (1975). *How to do things with words*. Cambridge, MA: Harvard University Press.

Boaler, J. (2000). Introduction: intricacies of knowledge, practice, and theory. In J. Boaler (Ed.), *Multiple perspectives on mathematics teaching and learning* (pp. 1-18). Westport, CT: Ablex.

D'Ambrosio, U. (1985). Ethnomathematics and its place in the history and pedagogy of mathematics. *For the Learning of Mathematics*, 5 (1), 44-48.

Dantzig, T. (1930/2005). *Number: The language of science*. New York: Plume.

Gauss, C. (1863), *Theoria residiorum biquadraticorum Commentatio secunda; Werke, Bd. 2.* Goettingen.

Gutstein, E. (2003). Teaching and learning mathematics for social justice in an urban, Latino school. *Journal for Research in Mathematics Education*, 34 (1), 37-73.

Gutierrez, R. (2010). Editorial: The sociopolitical turn in mathematics education. *Journal for Research in Mathematics Education*, 41 (0), 1-32.

Halliday, M. (1978). *Language as social semiotic: the social interpretation of language and meaning*. Baltimore, Maryland: University Park Press.

Harré, R., & van Langenhove, L. (1999). *Positioning theory: Moral contexts of intentional action*. Blackwell, Oxford.

Kalthoff , H., & Roehl, T. (2011). Interobjectivity and Interactivity: Material Objects and Discourse in Class. *Human Studies*, 34:451–469.

Leguin, U. (1988). *Buffalo gals and other animal presences*. New York: Penguin.

Lerman, S. (2000). The social turn in mathematics education research. In J. Boaler (Ed.), *Multiple perspectives on mathematics teaching and learning* (pp. 19–44). Westport, CT: Ablex.

Lerman, S., Xu, G., & Tsatsaroni, A. (2002). Developing theories of mathematics education research: the ESM story. *Educational Studies in Mathematics*, 51, 23–40.

Melin-Olsen, S. (1987), *The politics of mathematics education*. Kluwer, Dordrecht.

Netz, R. (1998). Greek mathematical diagrams: their use and their meaning. *For the Learning of Mathematics*, 18 (3), 33-39.

Pais, A., & Valero, P. (2012). Researching research: mathematics education in the political. *Educational Studies in Mathematics*, 80, 9-24.

Pimm, D. (1987). *Speaking mathematically*. London and New York: Routledge and Kegan Paul.

Prince, E., J. Frader, & C. Bosk (1982). On hedging in physician-physician discourse, in R. J. Di Pietro (ed.), Linguistics and the professions. Proceedings of the second annual delaware symposium on language studies. Norwood, NJ: Ablex, 83–97.

Radford, L. (2002). The seen, the spoken and the written: a semiotic approach to the problem of objectification of mathematical knowledge. *For the Learning of Mathematics*, 22 (2), 14-23.

Searle, J. (1979). *Expression and meaning: studies in the theory of speech acts*. New York: Cambridge University Press.

Stinson, D. & Bullock, E. (2012). Critical postmodern theory in mathematics education research: a praxis of uncertainty. *Educational Studies in Mathematics*, 80, 41-55.

Valero, P. (2004). Socio-political perspectives on mathematics education. In P. Valero & R. Zevenbergen (Eds.), *Researching the socio-political dimensions of mathematics*

education: Issues of power in theory and methodology (pp. 5-24). Dordrecht: Kluwer Academic Publishers.

van Langenhove, L., & Harré, R. (1999). Introducing positioning theory. In R. Harré, & L. van Lagenhove (Eds.), *Positioning theory: Moral contexts of intentional action* (pp. 14–31). Blackwell: Oxford.

Van Manen, M., McClelland, J., & Pilhal, J. (2007). Naming student experiences and experiencing student naming. In D. Thiessen & A. Cook-Sather (Eds.), *Internaional handbook of student experience in elementary and secondary school* (pp. 85-98). New York: Springer.

Wagner, D., & Herbel-Eisenmann, B. (2009). Re-mythologizing mathematics through attention to classroom positioning. *Educational Studies in Mathematics*, 72 (1), 1-15.