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Schooling Novice Mathematics Teachers on Structures and Strategies: A Bourdieuian Perspective on the Role of 'Others' in Classroom Practices

Novice mathematics teachers are faced with many challenges as they negotiate transitions and teaching identities in school mathematics classrooms. School discursive practices produce and reproduce acceptable notions of the good mathematics teacher, thereby shaping identity and agency in becoming a teacher. The focus of this paper is on how novice mathematics teachers enact agency when negotiating their place within the powerful discourses of school mathematics. The use of Bourdieu's social field theory highlights the conflicting demands on novice mathematics teachers and their process of becoming in a new light. In the language of Bourdieu, the mere act of *wanting* to disrupt one's habitus is easier said than done when the school playing field remains intact and when it continues to "organize itself by imposing an objective structuring upon pupils and teachers through curriculum, pedagogy and the organisation of learners" (Jorgensen, Gates, & Roper, 2014, p. 225).

In this paper, I draw on key aspects of Bourdieu's social field theory— his conceptual 'thinking tools' and his reflexive sociology—to explore the relations and discourses of school mathematics classrooms as experienced by two novice secondary mathematics teachers. The reflections in this paper are made relevant for mathematics teacher education through a better understanding of novice mathematics teacher agency, including an account of how these two teachers are being 'schooled' on the structures and strategies of classroom practices including the role of 'others' (hereafter referred to as Others) in their becoming process. An additional contribution of this paper to theory in mathematics education lies in the approach to analysis that draws on Bourdieu's reflexive sociology, specifically the concept of a *field of opinion*, to introduce competing discourses offered by novice teachers in mathematics classrooms and by teacher educators/researchers in teacher education programs.

Context for Study and Literature Review

Reformed secondary mathematics curricula promote inquiry-based pedagogies characterized by construction of mathematical understanding through student investigation, collaboration, and communication (Chapman & Heater, 2010; Nolan & Walshaw, 2012). Such pedagogies refocus the mathematics classroom environment away from learning rules for manipulating symbols and toward one that values "all students' experiences and ways of thinking, so that students are comfortable taking intellectual risks, asking questions and posing conjectures" (WNCP, 2008, p. 2). Teaching mathematics through innovative and inquiry-based approaches represents a significant departure from the learning experiences of many prospective and novice mathematics teachers (Towers, 2010). Simply put, mathematics teachers are being asked to *teach* using more open and innovative ways, even though they may not have experienced *learning* mathematics in these ways.

The shift in pedagogical focus draws attention to the complexity of a mathematics teacher's work within the classroom, and to the critical role of mathematics teacher education programs in the education of new teachers. As others have argued (Brodie, 2011; Lewis, 2014), unless mathematics teachers directly experience more innovative, inquiry-based learning for themselves, it is unlikely they will be able to implement such approaches in their classrooms. Thus, in my work as a mathematics teacher educator, I introduce prospective teachers to more innovative pedagogies in their courses, predominantly through modelling them in my own teaching. By innovative, I am referring to approaches that include

mathematics experiments, flipped classrooms, collaborative mathematics projects, and frequent use of manipulative materials—all alternative discourses to traditional textbook approaches. Over the years, my attempts to inspire uptake of such approaches by prospective teachers during their field experience (practicum) have produced questionable outcomes. In fact, it is common for prospective teachers to inform me that practicum is not the time to innovate but, they assure me, things will be different once they get their own classrooms (Nolan, 2014). The impetus, then, for research with novice mathematics teachers was to study how/if teacher agency with regard to innovative pedagogies featured prominently in the first few years in one's "own classroom."

In Nolan (2014), I expose several "threads of normativity" that weave through the work of novice mathematics teachers to impede uptake of inquiry approaches in their teaching (for example, threads such as curriculum time pressures, lack of a clearly articulated 'recipe' for teaching through inquiry, etc.). Since, in that study, it was revealed that mathematics teaching practice was not, in fact, more innovative and inquiry-based in one's own classroom, I reasoned that mathematics teachers (prospective and novice) were not sold on the idea of adopting new pedagogies when the old ones had worked just fine for them. Simply put, I reasoned that, after years of accepting the subtext of school mathematics teaching practice as "that's how it's done" (Nash, 2002, p. 279) and that's how it "ought to be" (Bourdieu, 1977, p. 166), these novice mathematics teachers merely chose to conform. As I expand on later, my own subjective positioning as researcher and mathematics teacher educator (along with my clear draw to some discursive practices and not others) falsely constructed these novice teachers as individual agents who "have an interest in obeying the rule, or more precisely, in *being in a regular situation*" (Bourdieu, 1977, p. 22) and thus in reaping the benefits of conforming to dominant discourses rather than being change agents.

What emerges clearly for me through my research with prospective and novice mathematics teachers is my own misrecognition of the change process. I made an "inconvenient assumption" (Klein, 2012) that prospective teachers "are rational, in control, autonomous individuals" who could, if they so choose, "readily transfer the knowledge and modelled practice to the classroom" (Klein, 2012, p. 31). Walshaw (2013) asks that we "rethink what lies behind a teacher's receptiveness to change her practice" (p. 89), declaring that:

> Pedagogical change turns out to be a mode of activity circumscribed beyond the rational autonomous teacher. It is mediated by unseen, unspoken, atemporal coordinates, all of which serve to undermine any certain rational basis for change. (p. 89)

The misrecognized dispositions surrounding the acts of facilitating change require a deeper understanding of how social structures and individual agency can be reconciled within the fields of schools and mathematics teacher education. Here, I draw on different data from that same study with novice mathematics teachers (Nolan, 2014) to interrogate the discursive educational Others (structures and relations) as they impose upon novice mathematics teacher agency. In so doing, I attempt to reframe these impositions as opportunities for enacting agency through strategizing and reflexivity in the field.

Theoretical and Methodological Framing

Bourdieu's social field theory serves to highlight a network of structures and relations that support (and (re)produce) traditional practices in the teaching of mathematics. Key concepts of Bourdieu's social field theory confirm the complexities of teaching and teacher education by focusing on the dynamic relationships between structure and agency within a social practice (Bourdieu, 1977). In this paper, I

provide a reading of the data that underscores these relationships between school structures and teacher agency in the context of a study with novice mathematics teachers. More than this, I introduce an approach to the analysis that draws on Bourdieu's reflexive sociology, specifically the concept of a *field of opinion*, which positions the paper to make a unique contribution to the field of mathematics education research and the role of theory within. Below, I introduce Bourdieu's social field theory, focusing specifically on his thinking tools in relation to concepts of agency and field of opinion.

On Bourdieu and agency

Underpinning Bourdieu's social field theory's logic of practice is the drive to understand how subjects reconcile and interact with the objective structures of a social practice; in other words, how subjects negotiate agency within a practice. His theory highlights how "various 'agents' and 'structures' shape new mathematics teachers' emerging pedagogic preferences and practices" (Noyes, 2004, p. 21), pointing to the influence of normalized practices and dispositions of schooling on teacher agency. According to Klein (1999), embracing the complexity of the concept of agency means understanding that teachers "are not unitary, rational and autonomous individuals freely able to choose new ways of viewing and doing [and teaching] mathematics at whim" (p. 86). Similarly, Walls (2010) confirms that mathematics teachers' "actions do not take place in isolation; they are molded and delimited by the beliefs and expectations of children, school, parents, community, and state policy" (p. 66).

The application of Bourdieu's concepts of practice, habitus, field, and doxa can reveal the ways in which becoming mathematics teachers negotiate discursive spaces for exercising agency amid the influence of these school Others. Fields are conceptualized as socially-instituted networks of structures and relations in which everyday decisions and actions are carried out. These decisions and actions shape, and are shaped by, a system of dispositions or tendencies (habitus) of the agents within. In any social practice, agents are continually vying for positioning within the field such that their habitus is a good match for the logic and operation of that field while, at the same time, these agents are being produced and reproduced within the field by the practices characterizing that field. In essence, Bourdieu's concepts of habitus and field challenge the familiar subjective-objective dualism.

The mutually constitutive nature of habitus-field illuminates how the field is structured around the value of particular resources and/or strategies (cultural capital) on the part of the agents. A good fit in the social space of mathematics classrooms ('located' within the wider institutional school field) is associated with a habitus formed by "early socialisation within the family, home and immediate environment" (Jorgensen, et al., 2014, p. 223) in terms of what it means to be a teacher and learner of mathematics. Beyond the influence of this early socialisation, Bourdieu (1990a) proposes an ongoing relation where "the habitus tends to favour experiences likely to reinforce it" (p. 61). That is, the legitimate and sanctioned discourses of the field persuade novice mathematics teachers into reinforcing and reproducing a comfortable, non-conflicting habitus-field fit in their classrooms and schools.

A Bourdieuian lens shaped out of the above concepts has been used elsewhere in mathematics education research (see, for example, Jorgensen, et al., 2014; Nolan, 2012; Noyes, 2004). Hence, while critical to understanding the structures and relations shaping novice mathematics teachers, a discussion of habitus-field fits is not the most significant contribution of this paper. Rather, I expand the discussion into Bourdieu's additional concepts of doxa, orthodoxy, and heterodoxy to better situate both the social spaces for habitus-field fits and the discourses arising from habitus-field (mis)fits. In other words, I highlight

how a "critique that brings the undiscussed into discussion" (Bourdieu, 1977, p. 168) can emerge through an objective crisis that brings the self-evident to light and the cultural arbitrary no longer misrecognized. Principally, the contributions of this paper to theory in mathematics education lie in the approach to the analysis that draws on Bourdieu's reflexive sociology, specifically the concept of a field of opinion.

On Bourdieu and a field of opinion

The habitus-field fit has been described by Bourdieu (1977) as the subjective experience of a world of "ought-to-be"s (p. 166), where an agent feels "there is nothing to do except what he [sic] is doing and also that he [sic] is only doing what he ought" (p. 166). In other words, social practice fields acquire a set of core values and discourses that come to be viewed as natural, normal, and inherently necessary. Referred to as doxa, this set of "ought-to-be"s work to ensure that their arbitrary and contingent nature is not even recognized, let alone questioned.

In addition to doxa, Bourdieu (1977) points to two other related concepts: orthodoxy and heterodoxy. Together, these reflect three types of dispositions, or "ways of thinking and speaking the natural and social world" (Bourdieu, 1977, p. 169). Whereas doxa is a constructed view of the world that is so natural and self-evident that it is seen as the only view in existence, "an orthodox or heterodox belief [implies] awareness and recognition of the possibility of different or antagonistic beliefs" (Bourdieu, 1977, p. 164). Simply stated, orthodoxy is the recognition of multiple versions or possible constructions of reality, with only one version being accepted as the correct one, whereas heterodoxy is the recognition of multiple correct versions and possible constructions of reality.

Relevant to the analysis here is the claim that each of these terms is invisible until placed alongside the other two since, according to Bourdieu (1977), "[t]he truth of doxa is only ever fully revealed when negatively constituted by the constitution of a *field of opinion*, the locus of the confrontation of competing discourses" (p. 168). The critical connections here to mathematics education lie in why/how competing discourses for mathematics pedagogy do not emerge—or, if they do, are marginalized— as long as doxa (approaches having the status of "that's how it's done") are in a privileged, unquestioned position in the social practice. As soon as agents begin to question and introduce discourses which call into existence other (pedagogical) possibilities, the potential arises for those dominant, doxic views to become replaced by orthodoxy or possibly heterodoxy.

Research Design and Methods

The research design involved working with ten (10) novice teachers (with 1-7 years teaching experience), who are graduates of the secondary mathematics teacher education program at my university. I selected these specific novice teachers for the study because I served as their course instructor and practicum supervisor when they were prospective teachers in the teacher education program. Data were collected through an online survey, two semi-structured interviews with each participant and three small group interviews. The study's research questions inquired into novice secondary mathematics teachers' experiences in the first few years of teaching mathematics (including what they recall in terms of the challenges and rewards of being a first year teacher), their beliefs on teaching and learning mathematics (especially the new curriculum focus on inquiry-based approaches), and their views on the role of the university teacher education program in becoming a mathematics teacher. The data featured in this paper

are drawn from one of the small group interviews with two novice mathematics teachers, Andrea and Sandra.

At the time of the study, Andrea had completed five years as a secondary mathematics teacher, after which she resigned her position to travel for two years. Andrea described how her experience prior to resigning had left her disillusioned by the politics and pressures at her school when she attempted more innovative (non-traditional) teaching approaches. Sandra, on the other hand, was completing her first year as a secondary mathematics teacher when she participated in the study. Though her experience of the politics and pressures associated with introducing innovative teaching approaches into the classroom held similarities to Andrea, Sandra remained somewhat optimistic about additional freedoms she might be allowed in the future. This paper has its genesis in one particular interview question, that is, when Andrea and Sandra were asked to describe the role of Others (other teachers, mathematics consultants, curriculum policy documents, textbooks, administrators, etc.) in their decisions and actions as teachers. This interview question highlights the idea that the "identities teachers construct of themselves are made in and through the pronouncements, interests and investments of others" (Walshaw, 2012, p. 107), thus suggesting an important role played by Others in enacting agency in/through alternative discursive practices in the field.

Presentation of Data

Prior to the group interview with Andrea and Sandra, I conducted an individual interview with Andrea. In addition to describing her efforts to teach mathematics through non-traditional and innovative approaches (for example, designing mathematics experiments, group problem solving activities, and the use of various manipulative materials), Andrea responded to my query as to whether there were barriers to innovative teaching at her school:

> Yes. At our school it was referred to as not starting brush fires. Coming up with an innovative idea and wanting to try something new and different and just being told 'no' by the administration because there might be a parent out there who doesn't like it or who will question it. That happened a few times when I was trying to do new things... It can be a barrier; it doesn't need to be.

It is now apparent to me that, in my work with prospective mathematics teachers over the years (encouraging them to take risks and innovate in their teaching), I had not fully grasped the extent to which novice/becoming teachers' desires to be innovative in their teaching (in one's own classroom) would be resisted and/or dismissed by Others. Thus, I was intrigued by Andrea's response and so, when it came time to conduct my small group interviews, I directed the conversations with participants deeper into this line of questioning. That is, I asked Andrea and Sandra to share any stories of resistance encountered when attempting innovative pedagogy in their mathematics classrooms. While the meaning of innovative pedagogy was not explicitly discussed during our conversations, I assumed a common understanding of the expression due to their recent experience of my university mathematics curriculum course.

Data are presented here using a two-column format: excerpts of the interview transcript are presented in the right column and a series of fictional 'dear novice teacher' letters in the left column. The interview transcript excerpts reproduce key aspects of my conversation with Andrea and Sandra as they discuss the role of Others in their decision-making processes as novice teachers. I highlight (bold-face) phrases in the excerpts that, in my interpretation, identify these influential Others. The bold-face phrases

were then reframed into 'dear novice teacher' letters, *as if* written by their school administrator, colleague, etc (the Others). By interspersing the fictional letters from Others with the words of Bourdieu, also reframed into 'dear novice teacher' letters, I draw attention to the normalizing structures confronting these novice teachers. Thus, these "letters from the field" are constructed by drawing on two sources: (1) words used by Andrea and Sandra in their responses to my question about the role of Others in becoming a teacher, and (2) words from Bourdieu's writings on objective structures, agents' dispositions, conformity, doxa, the cultural unconscious, and the inclusions/exclusions of sanctioned behaviors, all grounded in this text in the specific context of mathematics classrooms and the social practice of teaching mathematics.

The fictional letter and two-column format drawn on for re-presenting data is a tool of interpretation and communication— it is a performance of text drawn on to encourage the reader to move around/within the text to construct a personal reading of, and resonance with, the data. The "letters from the field" are not constructed with the intent of establishing any form of 'truth' about these Others (such a truth, if even available, could only be grasped through research specifically with/on the Others, which this paper does not set out to do). Simply put, the words of Andrea and Sandra reflect their perceptions on their own discursive positioning in the field of school mathematics classrooms which, in turn, contextualizes their agentic actions (to be introduced and discussed later). The data represent their reflexive account of being novice, and in no way should be read as an account of "the way schools are." By recognizing and confronting near-perfect habitus-field fits, Andrea and Sandra devise strategies to follow a path that they perceive is different, not compliant—one that, in effect, constitutes a field of opinion to confront school doxa. The letters compel the reader to identify with the dominant discourses for becoming a mathematics teacher—that is, the discourses holding the most cultural capital in guiding the novice teacher "away from novice error toward the faithful reproduction of expert practice" (Marble, 2012, p. 24). In other words, the letters expose the prevalent dominant discourse of producing new mathematics teachers in the image of old.

Dear Novice Teacher:
I am writing to you about the idea you shared with me for trying something new and different in teaching the grade 9 class. I think that's a great idea, but we are not going to do it because we don't want to start any brush fires. I'm concerned that there might be a parent out there who doesn't like it or who will question it.

Sincerely,
Your school administrator

Dear Novice Teacher:
"Doing one's duty… means conforming to the social order, and this is fundamentally a question of respecting rhythms, keeping pace,

Researcher: Are there some things about school that are not working well that you try to change? Do you find that you get resistance from some people if you try to do things differently?

Sandra: I don't really bring up what I do in my classroom too much in the staff room, not because I don't think that everyone would be supportive but I do know that there would be a few teachers who would be like, "Well why change? **What we do here works.** You're the crazy hippy teacher coming in from university." So I am conscientious of my confidence as a teacher still that I don't have the guts to say, "Yeah, you know what, I did research on this. This is going to work," because I don't know if it's going to work. Like **you have to fit into the norm**. And any time you deviate either a staff member is 'oh what are you doing?', or a parent phones in and tells you to start teaching from the textbook or whatever. Yeah, I got an e-mail from one of the moms. I'd done a flipped classroom sort of thing with the polynomials

not falling out of line. These various ways of reasserting solidarity contain an implicit definition of the fundamental virtue of conformity, the opposite of which is the desire to stand apart from others."

Sincerely,
Pierre Bourdieu, 1977, p. 161

Dear Novice Teacher:
I welcome you to our school and hope that everyone will be supportive. I want to say though that you don't need to be a "change the face of education" teacher. What we do here works. The university may have made you believe that everybody teaches through inquiry and innovative ways, but nobody does. I don't want you to feel like you're swimming upstream.

Sincerely,
Your teacher colleague

Dear Novice Teacher:
"In a determinate social formation, the stabler the objective structures and the more fully they reproduce themselves in the agents' dispositions, the greater the extent of the field of doxa, of that which is taken for granted… order is perceived not as arbitrary, i.e. as one possible order among others, but as a self-evident and natural order which goes without saying and therefore goes unquestioned…"

Sincerely,
Pierre Bourdieu, 1977, p. 166

Dear Novice Teacher:
I know you're new, but I noticed that my child comes home with videos to watch (a flipped classroom?) and I'm not sure this is an effective way to teach. It is not the way I was taught; it's not how I see school and the way school should be. How will it prepare my unit, which I've been working on since last year. And I did it, and then the mom e-mailed me and said **could you start to teaching to the textbook so I can actually teach my kid**. So it's frustrating. Apparently they think [video] is not an effective way to teach. But I'd like to point out that my kids know polynomials so… I let her know that one of the packets I did hand out was from a real textbook. And I didn't hear back from her after that... So definitely **the parents would be reining me back in** I guess.

Andrea: I didn't learn until my third year just how much resistance there is to a lot of these things. I thought it was kind of what everyone strove for but, as I told you, I was part of a structural innovation demonstration team so we ran a grade 9 program. There were six teachers— subject area teachers and two support staff on this team— and we were basically given the grade 9 class for the entire morning to teach the academic subjects: math, English, science and social. It was an incredibly difficult year. It came down to resistance mostly. Our colleagues were against us. Our administration was against us. The Board office was against us. It very much felt like we were sitting there in a circle with our backs facing each other and fighting off everyone else just trying to make change happen and it was supposed to be this changing thing. I mean, it was growing pains but I never realized how political things are. I never expected a Principal to say, "Oh, **that's a great idea, but we are not going to do it because we don't want to start any brush fires."** I didn't realize parents would be as resistant to change. I mean I saw some of that in my first years but especially with the program. But, I didn't see other teachers actively saying, "You shouldn't teach stuff that way."

Researcher: What Sandra is saying is she is doing something in her classroom and really not letting a whole lot of people know, so you don't get a lot of resistance maybe, but whereas yours is a [structural innovation] program, it is very clear what you are aiming to do. So anyone who is against change will…

Andrea: It's really interesting because my fourth year of teaching was my most satisfying year of teaching and I was doing all of the things we were supposed to be doing in the third year with another math teacher. That's the collaborative piece. They gave us the same time table for a semester with the same preps and we both had Math 9 in period 1, we both had Math 20 in period 2 so we could team teach. We also had adjoining classrooms with a common space in between. It was incredible. It was my best year teaching and **we didn't tell anyone what we were doing**. We didn't ask permission

child for university? Could you start teaching from the textbook so I can actually teach my kid?

Sincerely,
Your student's parent

Dear Novice Teacher:
"… the genesis amnesia which finds expression in the naïve illusion that 'things have always been as they are', as well as in the substantialist uses made of the notion of the cultural unconscious, can lead to the eternising and thereby the 'naturalizing' of signifying relations which are the product of history."

Sincerely,
Pierre Bourdieu (& J-C Passeron), 1977, p. 9

Dear Novice Teacher:
Why do I have to write these questions all down? Why can't you just say odds or just say evens? I would rather just write down odds and get started and have it simple instead of having to write down a list and then refer back to the list. We always got odds before or evens before.

Sincerely,
Your student

Dear Novice Teacher:
"In short, being the product of a particular class of objective regularities, the habitus tends to generate all the 'reasonable', 'common-sense', behaviours (and only these) which are possible within the limits of these regularities, and which are likely to be positively sanctioned because they are objectively adjusted to the logic characteristic of a particular field, whose objective future they anticipate. At the same time, 'without violence, art or argument', it tends to exclude all 'extravagances' ('not for the likes of us'), that is, all the behaviours that would be negatively sanctioned because they are

because it was on such a smaller scale; we didn't need to go approve it with the Principal and things like that. But because it was that smaller scale we didn't have to directly report or ask permission for a lot of things and we were able to do so much more. It's exactly what you said; **I just kept quiet about it**. I wasn't sitting in the staff room telling people how well it worked or if they would bring up something similar, I am not like, "Oh you should try this." I did a little bit, but **I really censored myself** before I kind of let anything out because I had fought so much the year before. I wasn't willing to fight again that year.

Sandra: I found it really interesting. I feel like **I am sort of teaching in a bubble in my school**, not because there are not great teachers there but I think the teachers who are doing interesting things are quite intimidated to say anything because some of the traditional teachers tend to be more vocal about "My way is the best". But you can see really on Twitter or blogs and different things, other teachers who are doing those similar things and there is a huge support group there that is available for that stuff. I mean, it is so hard to start looking, because once you get in you are like chest deep, like oh god; there is so much to learn and read from. But it's interesting to see how they're kind of like, "Oh, I am not going to say anything at school but we can talk about it on the internet where nobody knows who I am and you're not judged there."

Researcher: It sounds like – I mean there are a lot of things that are working against you trying to *be* innovative.

Sandra: Definitely and you come out of university so like, "Oh, I'm going to be like this 'changing the face of education' teacher!" and then it's like **you run into a brick wall your first day even at school**. You have so many great ideas and it's like "Oh crap, I actually have to teach like this? Nobody wants me to." You feel like **you're definitely swimming upstream**. You come out fresh off the press with everything up to date and new and then you come into a classroom and you're like, "Oh my goodness. Nobody else does this." Especially to the extent that we are inundated at university, so we get so much information that it is just like, **"Well everybody must teach this way," and nobody does.**

Andrea: Yeah, and students are very resistant too as a result because they haven't experienced it. I know, like something as simple as not giving odds or evens as the assignment—students *hate* when you don't give odds or evens. If you give them a list of fifteen questions to write down, they're like, "**Why do I have to write these all down? Why can't you**

incompatible with the objective conditions."

Sincerely,
Pierre Bourdieu, 1990a, pp. 55-56

just say odds or just say evens?" You are like, "you're actually doing half the work because I'm giving you 15 questions instead of 30 which is what odds would amount to," and they don't care. They would rather just write down odds and get started and have it simple instead of having to write down a list and then refer back to the list. It's something simple like that because they are like, "Well, **we always got odds before or evens before**". It is such a basic thing but…

Discussion and Interpretations

Dear Novice Teacher:
"Agents shape their aspirations according to concrete indices of the accessible and inaccessible, of what is and is not 'for us', a division as fundamental and as fundamentally recognized as that between the scared and the profane."

Sincerely,
Pierre Bourdieu, 1990a, p. 64

Dear Novice Teacher:
I think it's best if you don't tell anyone what you are doing. Just keep quiet about it, even censor yourself. If you teach in a bubble at your school then you won't feel like you're swimming upstream and the parents won't be reining you back in. You'll run into a brick wall if you think everybody teaches this way; nobody does.

Sincerely,
Yourself

Bourdieu's social field theory offers a compelling account of how "reproduction is achieved because social members internalise the 'rules of the game' and so adopt practices that ensure their 'unconscious' replication" (Nash, 2002, p. 272). In the data, Andrea and Sandra convey how they exercise agency by introducing new rules for the old game. Their words, however, reveal that the structures and dispositions of Others in the field work to maintain the old rules. These Others in the field— those who, for example, unapologetically advise against starting brush fires—rely on agents accepting this is 'just the way things are done,' thus drawing attention away from the (arbitrary) origins or roots (doxa) and the promises of alternative discourses (heterodoxy).

The good news in this novice teacher story is the unveiling of competing discourses and the negatively constituted field of opinion shaped by Andrea and Sandra. Decidedly, the field of opinion constituted by Andrea and Sandra in this study barely creates a tear in the field's familiar fabric, explained by the fact that dispositions constituting habitus tend "to adjust to the objective chances of satisfying need or desire, inclining agents to 'cut their coats according to their cloth', and so to become the accomplices of the processes that tend to make the probable a reality" (Bourdieu, 1990b, p. 65). However, my interpretation is that Andrea and Sandra have articulated their form of agency in silently procuring more and different cloth from which to cut their coats. Since Bourdieu's concept of agency "involves strategic improvisation within a limited range of possible choices" (Williams, 2011, p. 131), my reflections on these data suggest that Andrea and Sandra demonstrate considerable improvisation. In fact, I argue here (and further explore in the next two sections) that their discourse performs these improvisations through two particular agentic teacher actions: first, strategizing on the value of keeping quiet (an action that serves to work *around* doxa) and second, invoking reflexivity on the dominant (an action that attempts to work *through* doxa). Together, the discourse constitutes a field of opinion.

Strategizing on the value of keeping quiet ('doxa workaround')

Andrea and Sandra exhibit agency through a strategy of keeping quiet or silencing oneself. A reading of the interview data reveals several utterances indicative of this strategy: "we didn't tell anyone what we were doing"; "I am sort of teaching in a bubble in my school"; "I just kept quiet about it"; "I really censored myself." As Andrea discloses, she endured the scorn and sanctioning of Others for an entire year when she sought approval for her innovative teaching ideas. She learned the value of privileged (tried and true) cultural capital and the truth of how such capital ensures the protection and reproduction of existing power relations and social class distinctions. Ultimately, she learned the value of keeping quiet.

Strategizing is key to forging a link between Bourdieu's concepts of habitus, field and social practice since strategies are "the ongoing result of the interaction between the dispositions of the habitus and the constraints and possibilities which are the reality of any given social field" (Jenkins, 1992, p. 83).

> The strategies of agents depend on their position in the field, that is, in the distribution of the specific capital, and on the perception that they have of the field depending on the point of view they take *on* the field as a view taken from a point *in* the field. (Bourdieu & Wacquant, 1992, p. 101)

Jenkins (1992) asserts that "a field is, by definition, 'a field of struggles' in which agents' strategies are concerned with the preservation or improvement of their positions with respect to the defining capital of the field" (p. 85). In drawing on a strategy of keeping quiet, both Andrea and Sandra display insight into the cultural arbitrary being reproduced in schools—one they know will preserve and/or improve their position. They are convinced, however, of the benefits of a non-compliant approach, of one that marks their difference in the field. In a sense then, they recognize that, by being quiet, they are performing a 'doxa workaround,' enacting agency while censoring themselves.

Invoking reflexivity on the dominant ('doxa work-through')

Andrea and Sandra exhibit agency through invoking reflexivity on the dominant. They unsettle and displace doxa, exposing that the natural and self-evident constructed view of the world as (perceived to be) imposed by parents, students, and Others is only one view, not the only view. In so doing, Andrea and Sandra make a critical shift toward orthodox, or even heterodox, beliefs, where "an orthodox or heterodox belief [implies] awareness and recognition of the possibility of different or antagonistic beliefs" (Bourdieu, 1977, p. 164). In other words, Andrea and Sandra recognize, and attempt to work through, the doxa that they perceive does (or could) govern their every move.

For Andrea and Sandra, the first step to displacing doxa within a structure of relations where a good habitus-field fit is a highly valued form of cultural capital has been to expose particular discourses as dominant. In re-positioning themselves to acknowledge multiple non-dominant constructions for classroom practice, they reflect on the dominant discourses as simply representing Others' lack of understanding and inability to change. For example, Sandra confronts the doxa of teaching to the textbook (as demanded by the parent) by pointing to how it reflects the parent's own coping mechanism for not understanding change and/or alternative discourses. Similarly, Andrea's story of students' firm grasp on evens and odds reflects, for her, a form of self-preservation on the part of students to maintain familiarity and belonging within the normative approach to assigning homework tasks.

In discussing the concept of reflexivity, Moore (2004) states "that it is not just about the ability to reflect on what has happened and what one has done but about the ability to *reflect on the way in which one has reflected*" (p.148). Further, she suggests that through reflexivity "the 'habitus'—those normally 'hidden dispositions' that typically guide our actions and choices without our conscious awareness of what is happening—can be made 'visible' and therefore worked upon towards the possibility of change..." (p. 148). Andrea and Sandra make visible their views on the dominant discourses of mathematics classrooms, thus working toward the possibility of change. They demonstrate a situated reflexivity—"a reflexivity which is not separated from the everyday but is intrinsically linked to the (unconscious) categories of habit which shape action" (Adkins, 2004, p. 195).

In summary, these two agentic actions point to how Andrea and Sandra recognize school and mathematics classroom doxa (and its arbitrariness) and, in doing so, demonstrate the emergence of competing beliefs (heterodoxy). The recognition, however, is a mostly silent one since the heterodoxy remains mediated by the ruling school and mathematics classroom doxa. There is, in my view, an implicit understanding on the part of Andrea and Sandra that "the dominant classes have an interest in defending the integrity of doxa" (Bourdieu, 1977, p. 169). They may find their voices and lift the censorship when they both have "the material and symbolic means of rejecting the definition of the real that is imposed on them" (Bourdieu, 1977, p. 169).

Thinking the "unthought": A researcher's reflexivity

Here I return to an earlier reference to my own subjective positioning as researcher and mathematics teacher educator, making a case for a reflexive sociology for teacher education and for mathematics education research. I do this by reflecting on my efforts to think the "unthought" – that is, "the 'unthought categories of thought which delimit the thinkable and predetermine the thought' as well as guide the practical carrying out of social inquiry" (Bourdieu & Wacquant, 1992, p. 40). In the case of my social inquiry into 'schooling' novice mathematics teachers on structures and strategies, this means that I consciously attend to the effects of my own positioning, including my own investments and interests, that make possible particular discourses and observations, and not others.

I may have naïvely portrayed my stance as an impartial observer, "committing a kind of disloyalty by setting myself up as observer of a game I was [am] still playing" (Bourdieu & Wacquant, 1992, p. 254). In taking a reflexive stance, I see how Andrea and Sandra have demonstrated a way of making sense of the game; however, it is challenging for me to distinguish which game is being played through their agentic actions. I become confused in determining whether their recognition of doxa and apparent emergence of heterodoxy occurs within the game played in the *school field* of mathematics pedagogy or if they are playing *my* game, according to rules inculcated in the field of teacher education. My own reform/inquiry discourse circulating within the fields of teacher education and school mathematics classrooms constructs traditional mathematics pedagogy as ineffective and in need of changing, whereas inquiry and more innovative teaching approaches engage students and stimulate deeper learning. I admit to being culpable in presenting as self-evident the benefits of inquiry and innovative pedagogies in mathematics, thus clouding my own ability to reveal other possible points of view, or fields of opinion. My reform/inquiry discourse positions prospective and novice teachers within yet another, though admittedly different, highly structured discourse.

If, in fact, Andrea and Sandra are playing my teacher education game, and so act according to their feel for *my* game by conforming to the dominant reform/inquiry discourse of teacher education (in which they know I am invested), then they have learned the rules well in telling me what I want to hear—that is, that they are trying to implement inquiry and innovative pedagogies but the dominant discursive Others in the field are suppressing their attempts. If, on the other hand, their agentic actions within the field of schools and mathematics classrooms are as I have read and interpreted in this paper— that they silently and strategically confront doxa as an initial move toward proposing new game rules and constituting a field of opinion—then perhaps they are, in fact, attempting to dismantle the world of "ought-to-be"s.

'Thinking the unthought' has implications for mathematics education and potentially a theoretical approach to studying mathematics teacher education. This account conveys the importance of a reflexive sociology for recognizing the biases, beliefs, and assumptions inherent in my own subjective sense-making of the objective structures of school fields. Understanding that the field of opinion "may be overtly declared or may remain hidden, even from the eyes of those engaged in it" (Bourdieu, 1977, p. 168) helps me acknowledge teacher education (ortho)doxa in the form of my own stifling pedagogical discourse, compelling me to reveal yet another field of opinion*,* one that will confront doxa in mathematics teacher education.

Implications and Concluding Thoughts

To close this paper, I summarize its key contributions to mathematics teacher education and to theory in mathematics education. I also highlight the paper's contributions in the area of mathematics education research analysis and representation by discussing the value of my approach to grounding theory in research data (that is, the use of fictional 'dear novice teacher' letters, from Others and from Bourdieu).

In drawing on Bourdieu's reflexive sociology, specifically the concept of a field of opinion, this paper offers an account of how two novice mathematics teachers are 'schooled' on the structures and strategies of classroom practices. The novice teacher discourse in this paper reveals the agency of mathematics teachers in how they may reposition and reproduce themselves when improvisation takes over—improvisation in the form of agentic actions such as *strategizing on the value of keeping quiet* and *invoking reflexivity on the dominant*. Admittedly, the context of this data collection interview provides a safe environment for Andrea and Sandra to speak up about the unspoken discourses of school mathematics reproduction and self-preservation. That said, in terms of mathematics classroom pedagogy and the role of teacher education, these "letters from the field" (when framed as a discussion of the undiscussed) highlight "the idea of pedagogy as always on the move" and that "pedagogy is never constructed at the exclusion of the interests, activities, desires and investments of others" (Walshaw, 2013, p. 90). Introducing a reflexive sociology, and the notion of competing fields of opinion, into the toolkit for becoming a mathematics teacher could make a substantive contribution to the field of mathematics teacher education.

In addition to implications for a reflexive sociology in becoming a mathematics teacher, this paper also contributes to theory in mathematics education by making a case for a reflexive sociology for mathematics (teacher) education research. It does this by highlighting the subjective positioning of researcher and mathematics teacher educator, acknowledging and interrogating researcher positioning and "unthoughts" in carrying out social inquiry. Acknowledging the games being played in fields— by Andrea and Sandra, and also by me as researcher— emphasizes that "what is commonly considered to be

appropriate and accepted practice in various fields is made of unrecognized and unformulated forms of received wisdom, censorship, accepted ignorance and unknown ones" (Deer, 2008, p. 204). In the midst of these received forms of knowledge and practice, however, reconciling the structure and agency relationship avoids being lured into the false assumption that one's embodied set of dispositions (habitus) are held captive by the relations and structures of the field. For researchers, this means seeking an "epistemological rupture;" that is, "a rupture with modes of thinking, concepts, and methods that have every appearance of *common sense*, or ordinary sense, and of good scientific sense... going for them" (Bourdieu & Wacquant, 1992, p. 251). Principally then, a significant contribution to theory in mathematics education implicated in this paper rests in how it serves as a caution to observers and analysts in the field who might "project their own vision of the world onto their understanding of the social practices that are the object of their studies" (Deer, 2008, p. 201). This account conveys the importance of a reflexive sociology (and hence, field of opinion) in mathematics teacher education, to acknowledge and confront teacher educators' own "vision of the world" and the possible blinding effects of mathematics teacher education (ortho)doxa.

In addition to these substantive, theory-based contributions to the field of mathematics education, another significant contribution of this paper is to the field of research analysis and representation. The fictional letters ("letters from the field") serve as a powerful tool for research interpretation and communication in how they highlight competing fields of opinion while grounding Bourdieu's sociology in the specific context of mathematics classrooms and the social practice of teaching mathematics. Such a work of fiction presents a textual performance that affirms how different textual formats can communicate greater depth, complexity, and contexts of research data (Polkinghorne, 1997). In other words, form mediates understanding. The letters themselves introduce possibilities for constructing new insights into the social practices of mathematics pedagogy and of mathematics teacher education, highlighting connections between the letters from the field in this paper and the wider (more influential) field of power.

As discussed in this paper, the social structures of a field both constrain and (re)produce the becoming teacher. This means that one cannot focus solely on novice teachers' agency without a rigorous critique of the roles played by other agents (that is, administrators, colleagues, parents, students, *and teacher educators*) in maintaining and legitimizing dominant discourses for what it means to teach and learn mathematics. Bourdieu (1998) proposes that fields are "quite peculiar social worlds where the universal is engendered" (p. 71) and where little, if anything, may be overtly contested. The research conversations suggest that Andrea and Sandra are performing strategic improvisations within these peculiar social worlds— they work through and around doxa by mobilizing strategies and reflexivity amid the discourses silencing difference in the field. Ultimately, the space to overtly contest may come about from having these conversations in mathematics teacher education programs, using letters from the field to foster a situated reflexivity that enables one to work the field in less silent ways.

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