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## Theorizing and Studying the Language-Teaching Mind: Mapping Research on Language Teacher Cognition

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The overarching project of the conceptual and empirical contributions in this special issue is to redraw boundaries for language teacher cognition research. Our aim in this final article is to complement the foregoing collection of articles by conceptualizing ontologically and methodologically past and current trajectories in language teacher cognition research and synthesizing various themes that arise across this body of work. To that end, we begin by first making the case for the construct under examination and posing some key questions: What is the nature of the mind that we are examining in language teacher cognition research? How have conceptualizations of that mind changed over the period that language teacher cognition research has emerged as a field of empirical study? We then consider how the mind in language teacher cognition research has been studied ontologically, and the conceptual advances that have characterized such research. We conclude by examining how studies in this collection reflect our account of these changes over time.

*Keywords:* language teacher cognition; teacher thinking; ontology

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THE TERMS *TEACHER THINKING* OR *Teacher Cognition* have been in circulation for almost three decades (e.g., Clark & Peterson, 1986), with much excellent work undertaken to study them. Foregrounding the intellectual

dimension was a necessary and productive move toward better understanding the fullness of the work of teaching, a fullness that has proved complex and problematic. Teaching combines public activity—classroom actions, routines, interactions, and behaviours, which are publicly accessible through observation (including video and audio recordings)—with private mental work—planning, evaluating, reacting, deciding, which remain invisible to outsiders and beyond the reach of researchers. For many decades, this

mental work was simply not part of the picture of teaching; it was not studied or even acknowledged (Jackson, 1968). The work of teaching was essentially understood as what could be seen and externally documented; what those interactions and behaviours meant to participants was not part of the picture. Underlying reorientations to the mind and meaning-making in psychology (stemming from the cognitive revolution, e.g., Heider, 1958), and to meaningful study of activity in anthropology (stemming from ethnographic approaches, e.g., Geertz, 1962), supported the notion that teachers might be engaged in meaning-based cognitive activity that was shaped by the social context of their classroom.

In this article, we examine how teachers' cognitive work in language teaching has been conceptualized. We offer this reexamination for several reasons. First, we believe that there are important perspectives to be gained by describing the conceptual definitions that have anchored research in teacher thinking and cognition in language teaching. These perspectives can help to identify the deeper epistemological structures and assumptions that supported the cognitive view of language teaching, and thus both its strengths and blind spots. Second, in identifying the epistemological structures, we want to outline this loose body of research work as a series of conceptual *generations*. Such a meta-organizational view can provide a map of the major conceptual features of the research terrain over time. Third, by naming the conceptual definitions and describing their generational development, we argue that the field of second/foreign language teaching is better positioned to move forward in several ways. These definitions, and their proposed generational structure, can help to situate research on language teacher cognition within related work in educational research more generally, and thus to highlight how language functions as a content area in teaching (Freeman, 2016). Further, the generational structure can offer a map of what has become a somewhat ungainly territory of research.

Most fundamentally however, this special issue provides an opportunity to take stock. In the 30 years since Clark and Peterson's review (1986), research in language teacher cognition has developed into a sprawling, productive, and at times somewhat ad hoc enterprise. Organizing a comprehensive map of that landscape seems both necessary and timely. In a recent, though far more ambitious, project "to chart the contemporary landscape on teacher preparation and certification," Cochran-Smith and Villegas (2015, p. 7)

express a similar impulse: "to provide a cohesive overview of this sprawling and uneven field" (p. 8). Our intent is similar, although our review is far more modest. We hope these proposals for a conceptual meta-language and for a generation framework to house the trajectory of that work, can bring a measure of cohesiveness to this "sprawling and uneven field" (Cochran-Smith & Villegas, 2015, p. 8) of research in teacher thinking and cognition in language teaching. We hope that with this map of the landscape researchers, teacher educators, and classroom practitioners will be better positioned to manage and to use that work for their respective ends.

#### WHAT IS THE MIND WE ARE STUDYING?<sup>1</sup>

The notion of mind in teacher thinking and cognition research is a changing one. Like any idea, it has evolved through a mix of internal dynamics of definition and external trends in related areas of social science. In language teaching, we can trace that movement from the period of the 1970s, when there was a singular view of classroom methodology in the Direct and Audiolingual methods (ALM; Richards & Rodgers, 1986) and teacher thinking was not part of that view. The goal of making learners' responses and use of the target language automatic fostered a parallel view of automaticity in teaching. The highly structured drilling in ALM teaching called for little cognitive work on the part of the teacher; in fact, the less thought and the more patterned behaviour, the better. This isomorphic view of teaching and cognition continued in the 1980s with the development of so-called innovative methods (Blair, 1982). That was an important shift, however. During the period of ALM teaching, the psychological rationale for learning was found in the overarching theories of behaviorist psychology (Skinner, 1938). With innovative methods (usually defined as Community Language Learning, the Natural Approach, the Silent Way, and [de]Suggestopedia [cf. Larsen-Freeman, 1986]), each method carried with it a way of thinking. Teaching within a particular method entailed thinking within that method (Freeman, 2016). In order to teach the Silent Way, the teacher assumed that particular view of language and learning (see Stevick, 1982).

#### *The Invention of the Methodological Mind*

It could be argued that the innovative methods of the 1980s exposed thinking as a component of classroom teaching (Freeman, 2007). If teachers

could adopt the principles and assumptions of a particular method in order to enact it faithfully, then logically cognition had to be somehow part of the public activity of teaching. If a teacher could choose or decide how to teach, then there must be some cognitive capacity governing those choices and decisions. The notion of teachers as informed decision makers (Stevick, 1976), or of teaching as decision making (which we examine in a subsequent section), became the vernacular for this new capacity. What was referred to as *principled eclecticism* (Brown, 1994; Celce-Murcia, 1991) or subsequently as the *post-method condition* (Kumaravivelu, 1994) throughout the 1990s confirmed and extended this invention of the methodological mind. Kumaravivelu (1994) explained that this shift was essentially a political recalibration.

If the conventional concept of method entitles theorists to construct knowledge-oriented theories of pedagogy, the post-method condition empowers practitioners to construct classroom-oriented theories of practice. If the concept of method authorizes theorists to centralize pedagogic decision-making, the post-method condition enables practitioners to generate location-specific, classroom-oriented innovative practices. (p. 29)

In the technicist language of *macro and micro-strategies*, the concept of mind moved away from enacting prescribed practices to describing classroom language teaching in terms that were supposedly methodologically neutral. Whether these and other descriptions of teaching would indeed qualify as theoretically agnostic is beyond this analysis. Rather, the central premise of this argument is that reconceiving methodology as a synthetic undertaking, as a set of choices and decisions that a teacher could make, effectively liberated the concept of mind in language teaching. With this post-method view of cognition, language teachers could be seen to be making decisions and negotiating competing contextual demands to shape curriculum and pedagogy toward learning.

### *The Language-Teaching Mind*

The notion of a teaching mind that could be seen as independent, though directly connected to classroom practice, essentially created a new locus of study. As we outline in subsequent sections, there were various antecedents that would shape the idea of thinking in language teaching (Freeman, 2016). Woods's (1996) description of language teacher cognition offers one of the

first versions of these conceptualizations, which we take as a starting point for this review. In proposing an "ethno-cognitive model of teachers' decision-making" (p. 2), Woods argued for a sort of noble teaching mind, that would address "an implicit neglect and disregard for what the individual teacher brings to the learning experiences of the students in the field of second and foreign language teaching" (p. 2).

There is still relatively little research on what the second language teacher brings to the process of second language learning. (. . .) The role of the teacher has remained a relatively peripheral component in language teaching research throughout the years, and of current theories of classroom second language acquisition. (p. 2)

Thus this emerging idea of a teaching mind furnished the focus of study for both political and epistemological reasons: It could establish a focus on teachers as the principal classroom actors and examine what they could contribute to understanding the hidden dimensions of language teaching. These intertwined lines of reasoning supported a new ontology in which the language teacher existed to think and do rather than to simply do (Freeman, 1996). It was the interconnection of that thinking and doing that research in language teacher cognition began to define and better understand.

### *Conceptualizations of the Language-Teaching Mind*

Conceptualizations of the language-teaching mind have evolved since 1996, in part due to redefinitions through research and in part in response to the wider arena of theorizing in educational research on teachers and in the social sciences more broadly. In its early iterations, the new ontology was understood in individualist, cognitive terms, which led to definitions of its elements, as Woods (1996) did, for example, in enumerating his framework of *beliefs, assumptions, and knowledge (BAK)*. These details elaborated the basic idea of decision making, thus strengthening the focus on the teacher's cognitive activity. With the introduction of conceptual material from general research on teacher learning, the *individualist ontology* was increasingly situated within the social context of the classroom. Research on language teachers' personal practical knowledge (e.g., Golombek, 1998) and narrative studies (e.g., Johnson & Golombek, 2002) are examples of how constructs from educational research more broadly—as in the case of *personal practical knowledge* from Elbaz (1983) or narrative

studies from Connelly and Clandinin (1990)—broadened ideas of how language teacher cognition occurred in situ.

This movement toward a view of the language-teaching mind as socially situated drew on the influences of situated cognition (Lave & Wenger, 1991) and sociocultural thinking more generally (Vygotsky, 1978; Wertsch, 1991). What we will call a *social ontology* of the language-teaching mind found broad theoretical and research methodological support in these views that defined teaching and learning in social and interactive terms within classrooms. In this sense, this shift from understanding language teacher cognition through the lens of an individualist ontology to a social one mirrored and was supported by changes from a cognitive to a sociocognitive understanding of learning more broadly.

Throughout the 1990s and 2000s, this social view was elaborated beyond synchronic definitions of place (as in the current lesson in the present classroom) to encompass diachronic factors of time (as in the social history of the classroom and school, the backgrounds of students and teacher, the curricular history of the lesson). Powerful theoretical frameworks from sociocultural theory (e.g., Lantolf, 2000) and cultural-historical activity theory (Engeström, Mietinen, & Punamaki, 1999) introduced new vernaculars for describing the language-teaching mind. As Johnson (2009) explained, “The epistemological stance of a sociocultural perspective defines human learning as a dynamic social activity that is situated in physical and social contexts, and is distributed across persons, tools and activities” (p. 1). This *sociohistorical ontology* broadened the notion of context to include the temporal dimension of history (in both its immediate and longer term senses) and the notion of activity to include the thinking within the doing.

The sociohistorical ontology is decidedly systemic in orientation: Proponents argue that context for human activities like language teaching and learning is crucial to studying not only what happens but also what and how participants are thinking. This systemic perspective presents certain definitional challenges, however, since the features of activity being studied are themselves dynamic and interactive. This tension between the sociohistorical system of activity and the conceptual stability, which often accompanies this view, has grown as a central concern across research in language teaching. Starting initially with reconceptualizations of language itself (e.g., Larsen-Freeman, 2002) and of language acquisition (e.g., de Bot, Verspoor, & Lowie, 2005a), a

new view of the sociohistorical ontology has taken hold in which systems are seen as fundamentally chaotic and therefore complex. This view of *complex, chaotic systems* argues for an ontology that focuses on the dynamic, emergent aspects of teaching–learning interactions. It portrays language teacher cognition itself as dimension of these changing systems.

In the next section, we elaborate these four ontological generations in greater detail.

#### HOW HAS THE LANGUAGE-TEACHING MIND BEEN STUDIED?

The generational ontological moves in research on language teacher cognition over the last 25 years are evident in the burgeoning publications in the fields of applied linguistics and second/foreign language teaching. To analyze how the field of language teacher cognition research has conceptualized its underlying ontology of the teacher as a thinking, agentive being, we undertook a review of the literature produced over this period of time, breaking it down chronologically into 5-year periods, beginning from 1990. We distinguished empirical research from conceptual work. As our principal criterion, we categorized publications reporting on original research as *empirical*, while those arguing conceptually for ways of conducting language teacher cognition research, or theorizing the nature of and operationalizing language teacher cognition, we categorized as *conceptual*. We differentiated books, both authored and edited collections, from journal articles, since they may combine empirical and conceptual research.<sup>2</sup> Using this body of work, we organized a synthetic analysis of research across this time span. Our goal was to substantiate the four-dimensional typology of generational change we see emerging from research in this field. Table 1 maps our configuration of a generational structure in studying the language-teaching mind.

In the sections that follow, we first provide a synopsis of each ontological phase, in the process explaining our definitional stance. This discussion is followed by an exemplar study that characterizes research undertaken within that ontological generation. In selecting these studies, our intent was to capture, through the one piece of research, the ways in which that ontological generation framed language teacher cognition and the study of the language-teaching mind. Thus we argue that each of these studies exemplifies a period; we do not wish to characterize them in any further way (i.e.,

TABLE 1  
Ontological Generations in Studying the Language-Teaching Mind

Ontological Generations	Conceptual Unit of Study	Prevailing Research Methodologies	Exemplar Study
Individualist [1990 ff]	Decisions, thoughts, beliefs	Often quantitative, surveys (belief inventories), observations and stimulated recall interviews, frequency tallies	Johnson (1992a)
Social [1995 ff]	Meaning and explanations, situated in social contexts	Qualitative, introspective methods such as diary studies and in-depth interviews	Numrich (1996)
Sociohistorical [2000 ff]	Thinking as a function of place and time, through interaction and negotiation with social and historical contexts	Qualitative, interviews and narrative inquiry Researcher positioning is important, and often the research process consists of co-constructed researcher-participant dialogue	Breen et al. (2001)
Complex, chaotic systems [2010 ff]	Dynamic, emergent systems that involve the interaction of multiple interconnected elements	Qualitative, interviews, diary studies, analysis of interactions Research includes analysis of social, cultural, historical and political factors	Kiss (2012)

as being exemplary), which in any case would entail a different type of analysis.

#### *The Individualist Ontology in Language Teacher Cognition Research*

In the first half of the 1990s, an early foundational base for research in language teacher cognition was laid by Richards and Nunan's (1990) seminal publication recognising the relatively unexplored paradigm of second language teacher education as a field to be scrutinised in its own right. In prefacing the volume, Richards and Nunan noted that few existing publications were data-based, and most were little more than "anecdotal wish lists of what is best for the teacher" (p. xi). The chapters in this volume were underpinned by the concept of investigating teaching as undertaken by the teacher, who in turn is seen as a critical, reflective, decision-making agent with her own assumptions, attitudes, thinking, and beliefs about the classroom. The volume opened the door for a theoretical agenda for the development of a second language teacher education (SLTE) knowledge base, which led to further work on teachers' decision making, knowledge base, thinking, and beliefs (e.g., Burns, 1992; Johnson, 1992a, 1992b, 1994; Nunan, 1992).

The ontological focus of this generation was essentially individualist and cognitivist, examining

the beliefs the language teacher held, how and why these beliefs were constructed, and how they related to practice. The individualist particularity of this perspective was grounded in the predominant analytical unit used in this phase of research, namely the decisions and decision-making processes that could be discerned in teacher practice. The context for these decisions was often the processes of language teacher learning during preparatory courses. This focus, which drew substantially on the mainstream teacher cognition and teacher decision-making literature, often lay in the cognitive dimensions of interactive decisions in the classroom, with the metric or unit of study being the particular thoughts, beliefs, and decisions of individual teachers. Studies oriented toward displaying data quantitatively, drawing from mainstream educational research foundations, to describe and create typologies of the content of decisions. Some researchers also employed quantitative analyses such as frequencies and, occasionally, correlational analyses to identify the patterns in those decisions.

The individualist paradigm highlighted several important implications for future language teacher cognition research. Cognitions were shown to be complex conceptual processes that were interrelated: "a single decision cannot be talked about in isolation" (Woods, 1996, p. 280). Thus, it was important to understand "the process

of decision-making that creates those relationships” (Woods, 1996, p. 280). In addition, the interrelationships between cognition and practice were not necessarily consistent or convergent, so that it was not automatically possible to claim direct relationships (Johnson, 1992b). Tensions and inconsistencies between belief systems and practices were shown to be susceptible to “interconnecting and interacting” classroom and institutional contextual influences, which meant that “thinking at one level interacted, became interdependent with and was influenced by beliefs operating at another level” (Burns, 1996, p. 158). Moreover, it became questionable whether cognition was fixed or could be seen to be mediated over time through professional development and other educational experiences. Studies that were individualist also served methodologically to illuminate the empirical design possibilities that could further underpin a language teacher cognition research agenda. They employed established methods, such as performance classification schemes, belief inventories, observation and observation protocols, and interviews, but they also began to move toward integrating less well-established tools, such as stimulated recall, verbal protocols, introspection–retrospection, discourse analysis, and more ethnographically motivated work.

Johnson’s (1992a) study is an example of what we have argued to be an individualist ontology focusing on the cognitive dimensions of language teacher learning and practice, specifically the types of and reasons for interactive decisions language teachers make in the classroom. In order to capture and interpret the decisions and responses of six pre-service language teachers during their initial teaching experiences in a practicum, Johnson used stimulated recalls of the teachers’ videoed teaching practice, as well as retrospective written reflections about their decisions. Much of the data is displayed quantitatively, to show the frequencies of teacher instructional actions in response to performance cues from the students. However, analysis of retrospective teacher accounts painted a more detailed picture of the reasons behind their actions: The pre-service teachers reported that their decision making related to ensuring student understanding as well as student engagement in the lesson, and was also based on classroom management.

As Johnson (1992a) points out, her study was one of the first in the field of SLTE to explore the cognitive dimensions of language teacher knowledge and thinking. She directly acknowledged the limitations of an individualist cognitive

focus on language teacher decision making, as it “can in no way provide a comprehensive characterization of the complex conceptual process of second language teaching” (p. 510). However, Johnson also recognized this direction as a useful initial line of inquiry, and indeed it paved the way for future empirical work from an individualist perspective that continued throughout the 1990s (e.g., Borg, 1998, 1999a, 1999b; Farrell, 1999; Gatlinton, 1999; Johnson, 1994; Karavas–Doukas, 1996; Lamb, 1995; Woods, 1996), the 2000s (e.g., Borg, 2001; da Silva, 2005; Farrell & Lim, 2005; Mattheoudakis, 2007; Peacock, 2001; Phipps & Borg, 2009; Tsang, 2004; Urmston, 2003), and post 2010 (e.g., Baker, 2014; Borg 2011). Borg’s conceptual work in the 2000s (especially 2003b, 2006) was also significant in defining the current state and future directions for language teacher cognition research situated within this ontology. This body of work has continued to explore teachers’ beliefs, thinking, knowledge, decision making, and the impact of various types of teacher education on those internal cognitive processes. Table 2 exemplifies the range of conceptual and empirical work conducted within this ontological generation of language teacher cognition research.

#### *The Social Ontology in Language Teacher Cognition Research*

While an individualist research orientation maintained itself into the second half of the 1990s (and well beyond), research trajectories began to broaden to focus in more complex ways on various dimensions of the contextualised nature of language teacher cognition. One important stimulus to this reorientation was the collection of papers in Freeman and Richards (1996). This volume placed emphasis on linkages between cognition and language teacher learning, envisaging language teacher thinking and beliefs as both shifting and contextualised with teachers developing “the process of learning to teach” across professional careers, and within instructional contexts where “those learning processes actually unfold” (p. 1). Teachers’ (re)conceptualization and (re)construction of their experiences, previous knowledge, and personal beliefs were seen to respond to “both macro- and micro-level contextual factors in their classrooms, schools, and communities” (p. 5). Arguments for more socially oriented formulations of language teacher cognition and the SLTE knowledge base were furthered by Freeman and Johnson’s (1998) call for a “broader epistemological view of ESOL teacher

TABLE 2

Summary of Key Conceptual and Empirical Work Adopting an Individualist Ontology (1990–2014)

Time Period	Books	Conceptual Journal Articles	Empirical Journal Articles
1990–1994	Richards & Nunan (1990) (Collection, conceptual & empirical)	Freeman & Richards (1993)	Burns (1992) Johnson (1992a) Johnson (1992b) Nunan (1992) Johnson (1994)
1995–1999	Woods (1996) (Single author, empirical)	Richards (1996)	Lamb (1995) Karavas–Doukas (1996) Borg (1998) Borg (1999a) Borg (1999b) Farrell (1999) Gatbonton (1999)
2000–2004		Borg (2003a)  Borg (2003b)	Borg (2001) MacDonald, Badger & White (2001) Peacock (2001) Urmston (2003) Tsang (2004)
2005–2009	Borg (2006) (Single author, conceptual)		da Silva (2005) Farrell & Lim (2005) Mullock (2006) Mattheoudakis (2007) Gatbonton (2008) Farrell (2009) Phipps & Borg (2009)
2010–2014		Baker & Murphy (2011)  Basturkmen (2012)	Busch (2010) Wong (2010) Borg (2011) Kuzborska (2011) Woods & Cakir (2011) Borg & Al–Busaidi (2012) Farrell & Bennis (2013) Baker (2014)

education” (p. 397). They stressed the need for SLTE research to take into account the sociocultural contexts in which teaching and learning take place.

More finely differentiated notions of context in the enterprise of learning to teach highlighted context of place (e.g., Freeman & Johnson, 1998) as well as context of mind (Freeman, 1996, building on the work of Cazden, 1982). Thus, we conceptualize this second generational ontology as social because it emphasizes how the wider surroundings, both internal to the person and external in the social setting, shapes thinking. The unit of analysis of such studies shifted away from quantification to uncover insights, rather, based on qualitative interpretation and meaning and introduced a move from researcher-determined decisions and beliefs about language teacher

thinking to participant-oriented conceptualizations and explanations. Methodological trends were simultaneously being redirected to bridge emic and etic views, for example through diary studies and other introspective methods that aimed to uncover the internal and external contextual influences on the experiences of language teachers. This reorientation was in tune with a broadening *social turn* in mainstream as well as second language teacher education (Freeman & Johnson, 1998; Johnson, 2006) that had characterized empirical fields such as New Literacy studies (e.g., Barton, 1994; Street, 1984) and was influencing other areas of applied linguistics (e.g., Block, 2003; Norton Peirce, 1995).

Numrich (1996) is an example of studies beginning to be underpinned by a social rather than individualist ontology. In an exploration of

TABLE 3

Summary of Key Conceptual and Empirical Work Adopting a Social Ontology (1995–2014)

Time Period	Books	Conceptual Journal Articles	Empirical Journal Articles
1995–1999	Freeman & Richards (1996) (Collection, conceptual & empirical)	Freeman & Johnson (1998)	Numrich (1996) Golombek (1998)
2000–2004			Warford & Reeves (2003)
2005–2009	Burns & Richards (2009) (Collection, conceptual)	Johnson (2006)	Hu (2005) Kubanyiova (2006) Feryok (2008)
2010–2014	Kubanyiova (2012) (Single author, empirical)	Crookes (2010)	Nishino (2012) Li (2013) Yuan & Lee (2014)

language teacher learning via diary studies, Numrich examined 26 novice English as a second language (ESL) teachers' personal experiences of and feelings about teaching beyond their cognitive processes to include the relationships with their students and each other (through team teaching). Numrich points out that a key benefit of diary studies, unlike other data collection methods, is that they allow the researcher to gain "insights into some of the unobservable affective factors" (p. 148) that influence the experiences of novice teachers. Thematic analysis of diary entries written by the novice ESL teachers before and during their teaching practicum as well as their own analysis of their diaries revealed four key findings. First, the teachers had many concerns about their teaching practice (as opposed to a focus on their students' needs), such as creating a suitable learning environment. Second, they reflected on their own language learning experiences and either accepted or rejected techniques they had been exposed to. Third, they made unexpected discoveries about teaching (for example, their students' need for error correction), and finally, they experienced ongoing frustrations, for instance about managing class time and lacking knowledge about grammar.

The emphasis on social and affective as well as (or instead of) cognitive factors in language teacher learning, as exemplified by Numrich's (1996) study, has continued to the present and has led to further evolution of the epistemological perspectives used in SLTE research. Additional examples of work conducted from a social ontological perspective include Golombek's (1998) exploration of language teachers' personal practical knowledge, Warford and Reeves's (2003) qualitative study of novice TESOL teachers' preconceptions about teaching, and Kubanyiova's (2006) research on EFL teacher change, which considers the impact of the sociocultural context on

teacher development. This shift in understanding language teacher knowledge and learning has been accompanied by theoretical articles such as Johnson (2006), which (re)defined second language teacher learning as "socially negotiated and contingent on knowledge of self, students, subject matter, curricula, and setting" (p. 239). The publications falling within this social ontological orientation are outlined in Table 3. No typological categorization can ever be claimed to be watertight, however: In the case of some of these publications (Burns & Richards, 2009; Johnson, 2006, in particular), it is possible to also detect themes from the sociohistorical ontological orientation to which we turn in the next section.

#### *The Sociohistorical Ontology in Language Teacher Cognition Research*

Socially oriented conceptualizations of language teacher cognition in the early 2000s, illuminated by new empirical research, further elaborated ontological developments. Drawing extensively on language teacher cognition research, Tsui's (2003) volume was the first detailed study theorizing expertise in teaching and its development over time through the theories, knowledge, experience, and goals that shape teachers' classroom practices. This research highlighted the sociohistorical, distributed, and multiple nature of the process of developing language teaching expertise. Language teaching was shown to occur in situated interactions between teachers' personal propensities and social practices. Thus, the unit of research analysis in this ontological system placed emphasis on capturing thinking as a function of place and time operating through interaction or negotiation. Inherent in this orientation was recognition of ways in which the researcher's representation of meaning and their



TABLE 4  
Summary of Key Conceptual and Empirical Work Adopting a Sociohistorical Ontology (2000–2014)

Time Period	Books	Conceptual Journal Articles	Empirical Journal Articles
2000–2004	Tsui (2003) (Single author, empirical)		Breen et al. (2001) Golombek & Johnson (2004)
2005–2009	Johnson (2009) (Single author, conceptual)		Liu & Fisher (2006) Tsui (2007)
2010–2014	Johnson & Golombek (2011) (Collection, empirical)	Cross (2010)	Kanno & Stuart (2011) Feryok (2012) Hiver (2013) Golombek & Doran (2014)

positioning within language teacher cognition research contributes to the process.

The trajectories of teaching experience over time, and teacher–researcher co-construction of meaning in the process of explicating theory–practice relationships, are exemplified in Breen et al. (2001). Drawing on Bourdieu’s concepts of *habitus* and *le sens pratique* (defined by Breen et al. as a common set of principles and the relationships between principles and practice that are shared across a group), the authors view language teaching as the “situated interaction of dispositions and social practices” (p. 474). In Breen et al.’s (2001) study, five researchers worked with 18 experienced ESL teachers in Australia, and data collection involved observations and elicitation techniques in a co-constructed reflective process that in turn created teacher–researcher dialogue. Detailed individual principles and practices were documented for each teacher, and the links between principles and practice were explored. The researchers discovered that shared principles across the group of teachers, such as the need to consider students’ individual differences, were enacted in different ways in the classroom by the individual teachers. Breen et al. found the relationship between principles and practices to be complex, and that despite individual diversity, a “collective pedagogy” (p. 496) across the group of ESL teachers was evident.

Throughout the next decade or so, language teacher cognition work within the sociohistorical ontology made use of techniques such as narrative inquiry to access language teacher knowledge and development, focusing on the emotional aspects of language teacher learning (e.g., Golombek & Doran, 2014; Golombek & Johnson, 2004), teacher identity formation (Kanno & Stuart, 2011; Tsui, 2007), and language teacher *selves* (Hiver, 2013; Liu & Fisher, 2006). This work is listed in Table 4.

#### *The Complex, Chaotic Systems Ontology in Language Teacher Cognition*

The growth of interest in second language acquisition and applied linguistics in complex and dynamic systems theory, although not completely new at the time, was heightened in the mid-2000s by several key publications, including de Bot et al. (2005a, 2005b), the articles in special issues of *Applied Linguistics* (edited by Ellis & Larsen–Freeman, 2006) and the *Modern Language Journal* (de Bot, 2008), and Larsen–Freeman and Cameron (2008). Attributes of complex systems including ecology, emergentism, dynamism, change, unpredictability, interconnectedness, and nonlinearity confronted notions of fixedness and codification in language description and acquisition and their evolutionary trajectories over time. From a complex systems perspective, Larsen–Freeman and Cameron (2008, pp. 241–242), for example, critiqued traditional approaches to research and argued for new methodological research principles. These included consideration of context, avoidance of reductionism, awareness of dynamic processes and changing relationships, reference to reciprocity relationships rather than causality, avoidance of dualistic analysis by using units of analysis capturing interaction in the system, heterochronological thinking, and consideration of both the stability and variability of the system under investigation.

Although not widely integrated into the research to date, such concepts have gradually begun to alert some applied linguists working in the field of language teacher cognition to fresh lenses through which to view the interrelationships among beliefs, knowledge, and practice (e.g., Burns & Knox, 2011; Crookes, 2009; Feryok, 2010; Finch, 2010). The unit of analysis in such studies shows a shift toward considering

TABLE 5

Summary of Key Conceptual and Empirical Work Adopting a Complex, Chaotic Systems Ontology (2010–2014)

Time Period	Conceptual Journal Articles	Empirical Journal Articles
2010–2014	Feryok (2010)	Finch (2010) Burns & Knox (2011) Kiss (2012)

*coupled systems* prone to alteration by attractors, which give them emergent rather than stable properties. Larsen–Freeman and Cameron (2008) refer to units of analysis within a complex theory perspective as “‘collective variables’ or those that characterize the interaction among multiple elements in a system, or among multiple systems over time” (p. 242).

Kiss (2012) is a recent example drawing on complexity theory, referred to in his article as *Complexity Science*. In this empirical study, he analysed student teacher learning in an intensive postgraduate SLTE course, and specifically how the teachers made meaning by drawing on their past experiences. The participants in the study were five graduate students on either a master’s or doctoral program at a university in the Philippines. Through thematic analysis of reflective journals, anonymous post-course questions, and comments written by these teachers, Kiss was able to map the teachers’ cognitions, which proved to be temporally diverse (spanning past, present, and future) and included a multitude of references through which each teacher positioned themselves variously as learner, teacher, administrator, and personal self. These identities often overlapped and spanned different time periods: For instance, the teachers strongly related to the learner identity in terms of the past and present (being on the SLTE course), while the teacher and administrator identities were most often associated with the future. It also became clear that the teachers made meaning of the SLTE course content in a variety of ways, reflecting their unique thought processes.

In summarising recent conceptual work (from Cochran–Smith and others), Kiss (2012) explained that complex systems often have some of the following six features: “(i) sensitivity to initial condition; (ii) unpredictability; (iii) having a nested structure; (iv) showing a non-hierarchic network system; (v) making use of feedback loops; and (vi) emergence of self-organisation” (p. 18), and he used these features to structure his discussion of the study’s results. Using this framework, he described the student teachers’ reflec-

tions on the SLTE course as complex systems formed by their prior experiences, interactions during the course and the resulting thought processes triggered, the physical environment, students’ moods and behaviour, and unexpected memories of episodes that served to create meaning and internalise learning. Kiss concluded that teacher learning can be viewed as dynamic, non-linear, dependent on initial conditions (prior experiences), unpredictable, and chaotic, and that this perspective has important implications for teacher education programs, which (like many programs for language students) are still generally structured around the idea of learning being a linear process. However, even though Kiss provided a clear analysis of social factors, as well as some cultural and historic factors impacting teacher learning, studies drawing on complexity theory could usefully include richer discussion of the historic and political factors involved, in order to present as full a picture as possible of the system being described.

Table 5 shows a summary of the few conceptual and empirical works available to date in the area of language teacher cognition that have adopted a complex, chaotic systems ontology. This small body of work is, however, in the process of expanding—see, for example, Hiver’s (2015) book chapter on the dynamic development of system immunity in language teachers.

#### ONTOLOGICAL ORIENTATIONS AND THEMES IN THE CURRENT COLLECTION

The eight articles in this special issue, one of them conceptual (Crookes) and the others incorporating original empirical research, serve as exemplars both of ontological generations and epistemological and methodological directions that may be taken by researchers of language teacher cognition. What is perhaps first most noticeable is that the current collection and the themes emerging across it confirm a decided shift away from the early individualist ontology that characterized the field. None of the articles in this issue adopts such a lens on the language teacher

cognition research they present. Given the increasingly pervasive impact of the recognition of the vital place of (social, cultural, and historical) context in language teacher education, language learning, and language pedagogy, this change is unsurprising. What is also clear is that, while all of the articles do indeed, in various ways, redraw boundaries of language teacher cognition research to incorporate more holistic, ecological, and situated positions on cognition, diversity is manifested in the various characterizations of the ontologies adopted. In some cases (Crookes [2015], Feryok & Oranje [2015], Golombek [2015], Johnson [2015], and Svalberg [2015]) social ontological positions are defined and the theoretical frameworks employed, such as sociocultural theory or complex systems theory, are explicitly outlined. In other papers (Coffey [2015], Kubanyiova [2015], and Moodie & Feryok [2015]), while theoretical framework are not directly delineated, a holistic or ecological social (rather than individualist) perspective is clearly implied and serves to frame the research. All the articles reinvigorate and extend typical notions of what have constituted core constructs in language teacher cognition research.

Four of the articles that adopt social ontological perspectives on language teacher cognition (Coffey, Crookes, Kubanyiova, and Moodie & Feryok) also show considerable variation in terms of the constructs studied or theorized, as well as the methodological approaches adopted. For example, Moodie and Feryok investigate the construct of commitment (in contrast to the more usual construct of motivation) to language teaching, one that is under-researched to date. Using case study methodology, they incorporate well-established teacher cognition data collection methods of reflective writing, interviews, and classroom observations in an exploration of the nature of commitment of four in-service EFL primary teachers in South Korea. Taking cognisance of both the micro-contexts of the teachers' own experiences and histories and also the macro-context of national educational policy change, they project a multi-dimensional construct of commitment, integrating dimensions that have previously been treated as separate and distinct: the cognitive, emotional, motivational, and social. The article extends current notions of the significance of both positive and negative past experiences on teachers' commitment to teaching and broadens the theoretical lenses that can be brought to bear on this construct, the conditions for commitment, its temporal dynamic, and the multifaceted dimensions of commitment mind-

sets. One possible alternative interpretation of this study is that if teachers are committed to language learning early in their lives, their commitment to language teaching appears to be commensurately increased.

Coffey's article is another example that lies within a socially contextualised and interpretative ontological framework. The data collection method incorporated into the research is novel, in that he requested his participants, 26 teacher candidates in the UK, to construct language portraits, which conveyed graphically their subjectively constructed and embodied experiences of language and learning language. He adopts a phenomenological methodological approach, to identify metaphors that represented these experiences as they were shaped by the participants' previous and current (pluri)lingual lives within their sociocultural contexts. The metaphors reveal the importance of the emotional and affective dimensions of language learning experiences and the considerable investments that are made on the part of learners. The article offers a cogent example of how language teacher cognition research can productively integrate nontraditional methods of data collection to develop novel insights into the connectivities that can be forged with teacher development to broaden the constructs that underlie such studies.

Two articles among the collection (Golombek and Johnson) expand the ontological base to also incorporate sociohistorical analytical frameworks. The authors conceive of teacher learning as embedded within and mediated by social practices that develop over periods of time. Both studies adopt a sociocultural theoretical perspective, using the Vygotskian concepts of *perezhivanie* (lived experiences united through cognition, emotion, and activity; Golombek) and *obuchenie* (teaching and learning as a collaborative activity; Johnson) to interpret their findings. Golombek's article illuminates the value of adopting a temporal analytic lens, which enables retrospectivity in the reframing of practice and a reshaping of notions of consistency between rhetoric and practice in the light of how emotion charges experience. Johnson highlights the centrality of unfolding discourses of interaction that occur in language teacher education, pointing to their critical role in the mediation of teacher learning. Her perspective of looking inside the practices of language teacher education in relation to dialogic interaction touches on the accountability of teacher educators for the quality and relevance of teachers' emerging knowledge and learning.

TABLE 6  
Classification of Current Special Issue Articles by Ontological Generation and Theoretical Frameworks Adopted

Ontological Generation	Studies that Adopt the Ontology	Theoretical Framework Used	Construct(s) Studied/Theorized
Social	Moodie & Feryok	Holistic/ecological view (implied)	Commitment
	Crookes Coffey	Critical perspective Holistic/ecological view (implied)	Philosophies of teaching Embodied nature of language knowledge
	Kubanyiova	Holistic/ecological view (implied)	Language teachers' possible selves
Sociohistorical	Golombek	Vygotskian sociocultural framework	Emotional dissonance & <i>perezhivanie</i>
	Johnson	Vygotskian sociocultural framework	<i>Obuchenie</i>
Complex, chaotic systems	Svalberg	Complexity theory	Teachers' cognitions about grammar
	Feryok & Oranje	Dynamic systems theory	Teacher beliefs/ understandings of culture

The two articles that can be said to orient toward the fourth ontological generation of language teacher cognition as a complex, dynamic system are those by Svalberg and Feryok and Oranje. Svalberg seeks incidences of cognitive conflict in her analysis of the diary entries and interactions of teacher students in her course, which seem to equate with the function of *attractors* in complex systems (Larsen-Freeman & Cameron, 2008) that cause disturbances in states of existing belief and knowledge. Thus, renegotiated and newly emergent cognitive systems begin to be formed. Svalberg's article also alerts language teacher cognition researchers to the need for longitudinal empirical work that can capture emergent states temporally, linking such work with the sociohistorical perspectives previously discussed. Feryok and Oranje contest the projection of cognition as an established state and propose an agentive, embodied, transient, and socially contextualized conceptualization that incorporates dynamic relationships among fluctuating cognitive states, environmental conditions, and competing emotions (cf. Burns & Knox, 2011). Their case study of a German teacher confronting new curriculum objectives sheds light on the nature of the complex realignments of cognition that occurred in the processes of (re)adoption and (re)adaptation. The study reconfirms the need for this field of research to continue to seek theoretical and analytical frameworks that can capture the forces of stabilization and destabilization that are shown in both these papers to characterize

language teaching cognition and learning more fully.

Table 6 shows our classification of these eight articles in relation to the ontological generations presented earlier: only the second, third and fourth are invoked, since none of the studies adopted an individualist ontology. The table also summarizes the constructs studied or theorized in these articles, as well as the theoretical frameworks used.

#### FROM HERE: RETHINKING THE LANGUAGE-TEACHING MIND

In introducing this special issue, Kubanyiova and Feryok suggest three shifts in how language teacher cognition is now being studied. These include embracing the social turn that has taken hold generally in the study of teaching and learning and in teacher education, recognizing that a bottom-up approach to research that starts with teachers and what they do will help to identify ecologies of practice, and considering the pivotal role of context in these studies. These shifts are now already in evidence in what we have conceptualized as the second, or social, ontological generation and the third, or sociohistorical, ontological generation. There seems to be agreement that the language-teaching mind is, like all forms of thinking, part and parcel of people in activity in a particular time and place. The work of the third ontological generation has been intent on capturing the fullness of context in

the social sense of place and social activity and of time in both an immediate and an historical sense.

While the role of place and time in the third generation is accessible conceptually, it is complex from a research standpoint. Together, the social activity of the classroom and the historical timing contribute the sociohistorical context of the teacher's cognition. This context actually assumes the role of text in a research sense; it can be documented and analysed as part of what and how the teacher is thinking. Omitting this context strips the thinking of its meaning. Any of the teacher's actions—or indeed thoughts—that are taken out of its social and historical context lose this aspect of meaning. To summarize this relationship, we can say that in the sociohistorical ontology, the context becomes a text that accompanies the text of the teacher's cognition; it is thus a context that weaves together the teacher's actions and thoughts.

To advance these emergent lines of inquiry, and to understand language teachers' cognitions as situated, dynamic, mediated, and inherently complex, shifts us toward a complex, chaotic systems ontology, which we have called the fourth ontological generation. There are challenges in this movement, however. The current ontology shifts teacher cognition from something in and of itself to cognition as the space between, as the glue that connects various emergent forms of activity. While, apart from the individualist ontology, the other ontologies also point in this direction, they argue for a level of stability between the cognition and its setting in place and time. The challenge in the fourth ontology is that it pushes the language-teaching mind to become a function of emerging relationships rather than an element in those relationships. Thinking becomes in relation to rather than about. Most present research methodologies, drawn as they are from psychology and anthropology, lend themselves—indeed point to—having an object of study, whether it is external and observable (like teacher and student classroom interactions and behaviours) or internal (as in thinking decisions, beliefs, narratives, and so on). As these dichotomies begin to dissolve in an ontological focus on connections and relationships in the third and fourth generations, attention shifts from the objects themselves—what the teacher thinks—to how that cognition is interwoven in place, time, and relationship.

While this fourth generational move is conceptually attractive, it is methodologically very complicated. To study the language-teaching mind as emergent and relational calls for—and will likely

inspire—new forms of examination: broadening concepts of data and approaches to its analysis; complexifying those analyses and displays; and adjusting thinking about conventional warrants of validity, generalizability, and reliability. Taking on new constructs will both facilitate and drive these changes. The fact that data that capture cognition involve language is a central part of the challenge and readjustment. That all data are essentially representations—whether numerical or linguistic—has been widely acknowledged (e.g., Polkinghorne, 1983); however, researchers have often been less sophisticated about data as language, particularly when asserting the connection to thinking. Similarly, we have tended to primarily employ qualitative approaches to data analysis—whether grounded, a priori, or ethnographic—and familiar narrative genres such as case studies and small-scale qualitative studies to relate findings. In essence, as we would argue this review shows, we have been maintaining the familiar in how we have researched it, even as we have posited and explored new ways of thinking about the language-teaching mind.

This approach has served to underscore, whether intentionally or not, notions of thinking as individual or as individual in social context, and of the language-teaching mind as being housed in particular language teachers. Even collective views still reference the individual, in the aggregate. The more radical view, which is being signalled by the fourth ontological generation, is that thinking may be relational and interstitial. Rather than weaving together elements from social and pedagogical context and from individual history and collective background and experience, language teacher cognition may actually be about how these things (and other things) do or do not relate in the doing of language teaching. This view of the language-teaching mind should lead us toward new forms of data, perhaps as patterns rather than as nodes of information, of analysis that blends procedures within complementary methodological approaches (Green, Camilli & Elmore, 2012), and of accounts that combine narratives of cases with overarching patterns and trends across individuals.

It is, of course, difficult to predict these directions, but one thing seems clear. These ontological generations of the language-teaching mind have moved the research community in the direction of the lived complexity of the work of language teaching, how that work is learned, and how it is carried out. The present challenge is how to think beyond our current empirical structures and categories to capture this mental work. To

paraphrase Yeats's observation, we may no longer be able to separate the dancer from the dance.

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 NOTES
 

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<sup>1</sup> Parts of this section and its argument are drawn from Freeman (2016).

<sup>2</sup> To categorise each book in Tables 2, 3, and 4, the following coding system is used: either *collection* or *single author*; then *conceptual*, *empirical*, or *conceptual & empirical*.

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