Theory and Practice of Second Language Acquisition
vol. 4 (2), 2018, pp. 109–127

Achilleas I. Kostoulas, Sarah Mercer
University of Graz, Austria

Reflections on Complexity: TESOL Researchers Reflect on Their Experiences

Abstract

Complex Dynamic Systems Theory (CDST), or complexity, is increasingly being used as a theoretical framework in Applied Linguistics. In this article, we present the reflections of researchers in Teaching English to Speakers of Other Languages (TESOL) about how they have made use of complexity in their work. The aim of this article is to take stock of how it is being used in the field, the challenges and benefits it provides, as well as inspiration for future work from this theoretical perspective. In the first part of the article, we present a concise overview of CDST, focusing specifically on three salient features: its holistic lens, its non-linear perspective on causality, and its focus on emergence and self-organization. We also outline how complexity perspectives have been used to inform research in a variety of applied linguistics topics. We then move on to present narratives provided by nine academics who have employed CDST in their work, which we synthesize with a view to showing how the theory has gradually developed in TESOL. Early encounters of the field with CDST were usually serendipitous, but the theory has so far proved to be useful, both on account of its descriptive power and because of its phenomenological validity. A common theme in the narratives of these experiences of complexity researchers is that complexity is associated with a steep learning curve, compounded by terminological opacity, and conceptual challenges. However, their responses also indicate optimism regarding the potential of the theory to inform research in TESOL and applied linguistics more generally.

Keywords: Language Education, TESOL, Complex Dynamics Systems Theory

Introduction

Recent research in language and language learning has increasingly made use of Complex Dynamics Systems Theory (CDST), or complexity, as a theoretical lens to understand phenomena that cannot be meaningfully fragmented

or whose behavior cannot be reduced to a singular cause, which display internal organization but are not centrally co-ordinated, and which behave in somewhat unpredictable but not random ways. This theoretical frame has allowed researchers in Applied Linguistics in general, and the field of Teaching English to Speakers of Other Languages (TESOL) in particular, to account for the processes of language acquisition, classroom learning, and the psychologies of learners and teachers in ways that highlight the intricate interconnectedness of diverse psychological elements, interpersonal interactions and micro/macro-societal structures. It has also provided insights into the ways in which similar phenomena are manifest at different timescales, and challenged our understanding of constructs such as agency and structure.

A key milestone in the adoption of CDST in the study of language and language learning was the publication of *Complex Systems and Applied Linguistics* by Diane Larsen-Freeman and Lynne Cameron (2008). In this monograph, Larsen-Freeman and Cameron outline CDST, provide multiple examples of how it can be used to study different linguistic phenomena, and put forward a set of guidelines for complexity-informed research. The impact of this monograph has been such that subsequent years saw a dramatic increase in the number of empirical studies and theoretical treatises in which complexity was explicitly invoked or present in the background. To name but a few examples, CDST has been used as a model for the description of language (e.g., Beckner et al., 2009), first language acquisition (e.g., Hohenberger & Peltzer-Karpf, 2009) and second language acquisition (e.g., Spoelman & Verspoor, 2010; Verspoor, De Bot & Lowie, 2011). It has also been used to describe processes in language education (e.g., King, 2015; Kostoulas, 2018; Mercer, 2016; Stelma et al., 2015), classroom interaction (e.g., Kostoulas & Stelma, 2016) and lack whereof (King, 2013). Moreover, it has been usefully brought to bear on the description of a range of psychological constructs related to language learning, such as the self-constructs of language learners (Mercer, 2011a) and teachers (Henry, 2016), agency (Mercer, 2011b), learner motivation (Sampson, 2016), and cognition (Feryok, 2010).

Prompted by the upcoming ten-year anniversary of Larsen-Freeman and Cameron's (2008) landmark publication, we decided it is an appropriate time to take stock of how we—the key authors of this paper—and other scholars working in the field of Teaching English to Speakers of Other Languages (TESOL) have been using complexity in our academic work. To do this, we reflected on the ways we have been using complexity, and also invited a number of colleagues to share their reflections around four key questions: what attracted us to this perspective in the first place, what we find useful about working from this perspective, the challenges we face in doing so, and the future directions we feel could be explored. In this paper, we present our collective understandings of complexity, which we have brought together in a deliberately more informal

way. Our intention, as authors, is not to systematically map out the field, or to provide definitive answers about how CDST is to be best used; rather, we view this paper as an opening move in a conversation, and as an invitation to readers—whether they are engaged in research or in language teaching—to reflect on how complexity might be of similar value to their own work or not.

What is Complex Dynamic Systems Theory?

Before we present our own evaluations of the merits and challenges involved in working with complexity perspectives, we will briefly outline Complex Dynamic Systems Theory (CDST) for the benefit of those readers less familiar with it. Such a discussion does not aim to offer a comprehensive account of CDST; for that, interested readers are referred to overviews by Byrne and Callaghan (2013), Larsen-Freeman and Cameron (2008), and Kostoulas (2018). Instead, we will limit ourselves to presenting three core assumptions around which the theory is built: its holistic lens, its non-linear perspective on causality, and its focus on emergence and self-organization.

Complex Dynamic Systems Theory challenges the assumption that problems can be solved by breaking down entities into ever-smaller researchable units. Instead, complexity theorists view the social world as a network of interrelations between entities, which can be best understood when viewed as a whole. Holistic perspectives are preferred in CDST because fragmentary approaches would break the connections between the components of the system, and these connections are central to understanding the phenomena that interest us (Cilliers, 2001). In linguistics, for instance, a complexity-informed study of a discourse event might account for the interrelationships between discourse elements, but it would also seek to explain how the mental processes associated with individual language use connect to linguistic structures that have a social presence (Larsen-Freeman & Cameron, 2008). Similarly, in TESOL, such an outlook might help us to trace connections between classroom events and the emergence of classroom routines or professional cultures (Kostoulas & Stelma, 2016).

Secondly, CDST calls into question linear causality as a way of interpreting phenomena in language and language learning. As language teachers, we intuitively know that the same teaching approaches rarely lead to the exact same outcomes. We also see that sometimes substantial effects on learning can be traced back to disproportionately small events, which were not significant enough to be noticed or reliably measured at the time they occurred. Given the tight interconnections between components that make up complex systems,

changes in one part of the system can have various effects on other parts of the system and the system as a whole. The effects are not entirely predictable, although they are not completely random either. This perspective on cause and effect helps us to better understand processes such as language acquisition that are typified by both regularity and unpredictability, progression, and regression.

Thirdly, CDST attempts to account for how order and structure is created in the absence of central design and coordination. Key to this is the notion of emergence; a process through which complex dynamic systems produce activity that is qualitatively different from the activity of their components. Similar processes can be observed in the evolution of languages, where the activity of multiple people engaged in communication leads to the creation of new discourses, and even novel linguistic patterns. For example, recent research in English as a Lingua Franca, which seeks to understand how such patterns come into being, has increasingly used insights from CDST as an explanatory frame (e.g., Mauranen, 2012; Seidlhofer, 2011).

The state of complexity theory in the field is now very different from what it was when Larsen-Freeman and Cameron published their seminal 2008 monograph, as the scope of its use in the study of language, language acquisition, and language education is broadening, and a community of researchers is emerging, who may differ in their research agendas and priorities, but who share the common epistemological perspective and the common discourse of complexity. It is this development that has motivated us to write this article and bring together the reflections of some of that community of researchers. We do not do so in order to systematically map out the field, but rather reflect critically on our shared trajectories, past and future, in the hope of inspiring others wishing to embrace this theoretical frame.

Our Reflections on Complexity and TESOL

In this article, our focus is on outlining how complexity-inspired work has been employed in TESOL. We want to bring center stage the personal reflections and evaluations of individuals who have chosen to work from a complexity perspective in TESOL, our own area of specialization within Applied Linguistics. To that end, we reached out to multiple TESOL academics who have employed a complexity lens in their recent publications, and asked them to provide us with written narratives, using the following questions as prompts:

1. How did you become interested in complexity theories?
2. What do you find useful about working with this perspective? What types of questions do you think it can best address, compared to other perspectives?

3. What challenges do you think it poses?
4. What directions would you like to take with it in the future?

In the sections that follow, we present our synthesis of the responses provided by eight scholars (including ourselves) who responded to our invitation. We approached these texts holistically, using methods loosely informed by narrative inquiry (Earthy & Cronin, 2008). Specifically, we preserved the original spelling and structure of responses and the voice of the participants, so as to prevent the fragmentation and de-contextualization of their responses. However, we have reassembled and regrouped some responses according to our questions for reasons of readability, and we also shortened some responses for length.

First Encounters

While some of us were exposed to complexity in the context of our studies and research in language education, for most of us, our initial interest in complexity came from engaging with ideas that were being developed outside the field.

> I first encountered Complexity Theory (CT) some time ago quite by accident. A stranger in a bookstore thrust a copy of James Gleick's *Chaos: Making a New Science* [(1987)] into my hands, along with the comment, "You will enjoy reading this." I bought the book. I found that Gleick's book had nothing to do with language, but as I was reading it, it was easy to make connections with language. After all, perhaps nothing is as complex, nonlinear, and dynamic as language. These thoughts led to my early foray (Larsen-Freeman, 1997), speculating on the application of CT to Applied Linguistics issues. (Diane Larsen Freeman)

> I was initially intrigued by Chaos theory when I first encountered it in the 1980s, but I didn't then see its applicability outside mathematics and the natural sciences. (Agneta Svalberg)

> My first encounter with the Complexity Theory literature was James Gleick's book *Chaos*, which I picked up from a used book stall around the University. That was useful history, and affectively it left me with the feeling that I was learning something new—which was my reason for doing a PhD in the first place. (Juup Stelma)

> Perhaps influenced by my father who was a geography teacher, in my secondary school days I had been fascinated by the interactions between earth systems and the way that everything seemed connected. However, it was not until my postgraduate studies that I re-encountered similar ideas in the form of dynamic systems theory applied to language learning. (Richard Samson)

Even among those of us whose first encounters with complexity were more closely related to our work in language and language learning, this first contact was often serendipitous.

> In the 1st year of doing my PhD I went along to a research presentation by my supervisor in which he talked about complexity and used dynamic systems theory to interpret some results from his study. I remember at the time thinking, "This complexity business sounds terribly difficult. I really hope he doesn't ask me to adopt it in my own work." Sure enough, he did! (Jim King).

> I had been working on the self in SLA and had taken a grounded approach to exploring how it functioned and was structured as part of my PhD. I came across the ground-breaking book by Larsen-Freeman and Cameron later and was amazed to discover the incredible resonance with what I had found. All the same characteristics were there, but I just did not have the theoretical frame or language to talk about it that way. This was interesting in that I found complexity without the formal theoretical lens. (Sarah Mercer)

> It was like a shot of Ritalin to the system when in 2009 I was introduced almost by accident in an email exchange with a senior academic to a book about complexity theory. I had suddenly found a way to think, talk, and write about things in a way that spoke to the core of what I felt and who I was as a teacher. As I've continued to explore complexity more deeply the resonances have only strengthened; there is no going back for me. (Phil Hiver)

It seems that the reasons why our first encounters with complexity were as productive as they proved to be was because of the intuitive appeal of the theory, particularly for those of us who had a practical background in language teaching.

> As a classroom teacher, it just made sense, a lot more sense than much research that I was reading, of what I experienced day-in day-out of being part of language learning class groups. (Richard)

> It was and has a tight connection with the phenomenological reality of the language classroom that resonates so strongly and thus makes it such a convincing frame for me to work with. (Sarah)

> I came to academia/research from a background in language teaching. Being a teacher meant that the daily realities of the language classroom were the filter I used in approaching new information or theories. I knew intuitively and even experientially that my success, and the success of my students, involved the coming together of many elements and was contingent on various things over time, but I didn't yet have a way of articulating this reality or reasoning about how and why this might be the case. (Phil)

Coupled to this intuitive appeal, some of us felt that there was a definite *Zeitgeist* that helped the new theory to take hold in our field:

> …had I read the book [Gleick, 1987] a decade earlier, I might not have made the connection to our field as readily. Over the years, though, I had grown increasingly dissatisfied with what I perceived to be a piecemeal approach to understanding second language acquisition. I felt that we would benefit from a relational systems approach, although I might not have called it that then. (Diane)

> I remember [Zoltán] Dörnyei speaking about the need for a complexity-informed understanding of motivation—I think it was 2003 or thereabouts—and Martin Hammersley (ethnography of education)—and David Byrne—and Paul Meara—and more. But whilst everyone seemed to suggest the need for Complexity Theory, no one had anything concrete to offer—I guess it was early days. (Juup)

Whatever the pathways and motivations that led us into complexity, this encounter almost invariably involved a fundamental shift in the way we perceive reality:

> I think "complexity" is a threshold concept in the sense that it changes how you see the world irreversibly. (Agneta)

> [Complexity] developed within me a new way of seeing the world around me. This did not happen overnight […] it took time to purge linear and reductive thinking from my mind. […] As Complexity Theory started to take hold in mind, this affected and continues to affect how I approach more and more tasks in my life, both academic, professional and personal.

> I guess it has made me more secure both personally and as an academic. I can understand a wider range of problems, situations and theories. In short, Complexity Theory has been empowering and emancipating, and this feeling extends to the present. (Juup)

> In the absence of a better way of describing it, it just makes sense, and once you are sensitised to complexity, you begin seeing it everywhere. (Achilleas Kostoulas)

Now several years later, new scholars exploring complexity will find more readily available. Working in TESOL means they are likely to also recognize its real-world applicability and also find it representing somewhat of a paradigm shift.

Attractions and Affordances

As hinted by some of the responses above, one of the reasons CDST has appealed to many is that this change of perspective enables us to describe the phenomena that interest us in ways that are not reductive, and also to see interconnections between what Diane described as '*the BIG picture*' (original emphasis) and more situated phenomena.

> I have always thought that complexity lends itself well to questions of a grand scope (e.g., "What does the future of language learning look like?" OR "How will multilingualism change societies in centuries to come?") that attempt to get at something big about the real world and the role of language and learning within it. Complexity theory is equally well suited to descriptive-level work and explanatory work in this sense. Conversely, because it prioritizes a fractal view of life and its phenomena, smaller events and timescales are also just as important. This makes it a rigorous and flexible way of approaching questions will be of real significance for many players. (Phil)

> I would like to better understand how change on different timescales interact and affect each other but this is in itself complex and requires time in order to longitudinally explore trajectories in an ongoing dynamic sense […] It also sensitises me to the bigger picture even if I am zooming in on one fragment of a larger whole. It cautions me to avoid over-simplistic and decontextualised perspectives. Essentially, it makes me humble. (Sarah)

> Concepts within complexity theories such as 'interdependence,' 'affordance,' 'mutuality,' 'emergence,' 'nesting' (of systems within systems) are tools which enable me to deal with reality without over-simplifying it. (Agneta)

Another appeal of complexity, which seems particularly relevant to working in TESOL, is that helps us to develop nuanced understandings of human psychology and human behavior, which go beyond mechanistic descriptions.

> It is ideally suited for questions about human processes, and about states which are not totally stable. I would think that any social system (e.g. language, language learning, engagement with language, and also economic, political, family and other social systems) is more complex than natural systems such as the weather or systems in physics. The presence of human agents, and volition in particular adds enormously to the complexity. […] So, it seems to me we need to take a complexity view when we ask questions related to attitudes, beliefs, motivation, self-concept… (Agneta)

> I think it is especially well suited to understanding human complexity. People, their psychologies and interactions with others are naturally complex and simplistic views will always fall short of capturing the essence of what it means to be human… (Sarah)

Many of us noted that we recognize our lived realities in the theoretical descriptions that complexity helps us to generate. In other words, the mental representations that complexity affords us seem to have a certain validity, which we variously labeled as phenomenological, ecological or ontological.

> I had never liked post-modern thinking, which is a path many travel on away from reductionism. (Juup)

> Fundamentally, the joy is in being better able to represent the real-life complexity as I phenomenologically perceive it without losing too much of its authenticity. (Sarah)

> There is genuinely a sense of working with people and phenomena in a way that is authentic—in ways some refer to as "ecologically valid." There is no need to shy away from the inherent messiness, interconnectedness, and complex dependency of so much of what we do as L2 researchers and practitioners. (Phil)

> Complexity theories […] provide me with a way of understanding the social world which I find ontologically comfortable. (Achilleas)

Interestingly, several of us perceive CDST as having potential to connect with other useful theoretical perspectives and even function as connective tissue between them:

> [Complexity] is compatible with so many ways of thinking and doing things (socio-cultural and critical perspectives of teaching and learning), it has the potential for even wider appeal. (Phil)

> [Complexity] helps me to make links between the somewhat diverse elements that make up my professional field (applied linguistics, educational psychology and the sociology of education)—I am not sure exactly how to make this work, but I think that complexity can provide a unifying meta-narrative for the field. (Achilleas)

> For me one of the key benefits of […] complex dynamic systems theory is that I can use it as a kind of supra-theory which allows for other apposite theories and frameworks to be adopted in my work. I really like the theoretical flexibility that complexity affords. (Jim)

> My understanding of Complexity Theory gave me a head start on understanding and using Ecological Theory, and I was quickly up and running. Also, my interpretation of Ecological Theory was probably more dynamic as a result. […] I think this is how I see Complexity Theory going forward in our field … it may well work as an informing theory, feeding into the dominant TESOL discourses. […] In fact, Complexity Theory works as a 'background theory' for me, making my ecological account of process and context in TESOL more convincing and coherent. (Juup)

Challenges to Overcome

A common theme in our shared reflections was that engaging with complexity involves a steep learning curve, which is compounded by the fact that the conceptual toolkits of complexity are often used in different ways by different authors. Similar sentiments were echoed by many of us:

> My supervisor suggested a number of books, like Davis and Sumara (2006) and Byrne (1998), both of which I hated because they challenged my powers of understanding rather too much. (Achilleas)

> I think complexity is also difficult to understand well. Indeed, I have spent several years studying it and am not yet convinced I have fully grasped its implications and potential. (Sarah)

> At the same time as being hugely liberating, complexity research is also very challenging. (Agneta)

However, as Phil reminds us, "those who are patient enough and persevere in exploring what complexity means and how it may be useful for our field never regret doing so" and that "nothing this worthwhile comes without at least some struggle." While this difficulty arguably "adds to its attraction" (Agneta), it can also mean that "sometimes people use or, indeed, dismiss it without fully appreciating what it is" (Sarah).

Most visibly, many of the challenges associated with understanding complexity relate to its challenging technical vocabulary. As is the case with every discipline, technical language is sometimes necessary in order to designate constructs and processes that are specific to CDST. However, there was a shared feeling that the language of complexity-informed accounts has often acted as a barrier to understanding:

> Another key concern I have is the use of jargon. In our field, I feel that […] frameworks need to be widely comprehensible to be properly useful. Whilst we maybe need to engage with new language to describe new phenomena, we must not use overly complex language merely to obfuscate or inflate academic egos. (Sarah)

> [Another problem is] an unnecessary fascination with impressive-sounding technical terms. For instance, the idea that systems have a usual or preferred state is fairly unchallenging but it is rendered less accessible by the obscure term 'attractor.' (Achilleas)

> One of the biggest challenges I find […] is that complex dynamic systems theory can seem impenetrable to many students and fellow researchers because it is so jargon-heavy. There's no doubt that the lexicon of complex systems turns many people off… (Jim)

> I doubt, then, that the full vocabulary of Complexity Theory will ever become mainstream. (Juup)

Another, somewhat deeper problem is that complexity involves the challenge of perceiving reality as a mesh of systems, which overlap and interconnect

inextricably, but also need to be bounded if they are to become conceptually and empirically manageable.

> You have to set boundaries to work with it and what we define as a system is merely a perception. I think sometimes it is easy to forget that and imagine the system is something real and tangible as opposed to something we perceive. We must remain conscious of the bigger picture and the system's position within that larger frame of perception. (Sarah)

> It is sometimes difficult to decide where the borders of an open system are. One is forced, for practical reasons if nothing else, to impose borders on the system and to make what sometimes feels like arbitrary decisions on which factors to consider. (Agneta)

A corollary to the epistemological move associated with developing a complexity outlook is that this change of perspective also requires changes in the ways in which we make sense of the world.

> One of the main challenges I have encountered first hand is that thinking and acting from a complexity perspective does not come naturally to most people. There is a tendency to slip back into other more habitual modes of thought and of action. With time, however this does become easier… (Phil)

> Part of this difficulty is, I think, unavoidable as it concerns challenging some of the core ideas of our ontology, such as linear causality, i.e., the belief that events can be linked to causes in a straightforward way. (Achilleas)

Added to these concerns, disseminating the insights that complexity inspires is not always unproblematic. In part, this challenge connects to the reluctance in some quarters of the scientific community to accept complexity as a legitimate and fruitful way of making sense of language and language learning. In Juup's words:

> I did finally complete my PhD, and it made overt use of Complexity Theory […] However, I only scraped a pass (or such was my feeling). What stuck in my mind is how the examiners competed in who could be more critical of my approach […] and I started to see another side of what I was getting into. Complexity Theory was taking me away from the mainstream research approaches and community of TESOL. This impression was reinforced subsequent to the PhD, when I struggled to publish much (in hindsight, there were other reasons for this as well as me doing Complexity Theory). […] I did work with Lynne Cameron on other things, and although Complexity

> theory was always there for us, it did not overtly appear in what we published.

There is also a concern that existing academic conventions do not always help to make the best use of what complexity has to offer.

> In most current representative forms for the dissemination of academic work (papers, monographs, presentations) the dynamism and interactive nature of the development of interpretations is nullified. Let me be more specific: Even as I'm writing this, the act of writing and seeing my thoughts come up as text on a screen is altering my thinking. I can (and no doubt will) go back over what I've written a number of times, but at some point this text will become a set artefact (if it becomes a published form). But my thinking and interpretations do not stop there. They are continually evolving such that the words on this paper (or screen, as the case may be) form part of the history of my thinking, but may not be representative of my ideas after this has been published. This lack of dynamicity is all the more troublesome considering the (necessarily) protracted nature of academic publishing. (Richard)

There is also a sense of a need to engage with the potential concern, among more practically-oriented audiences, that complexity cannot directly inform teaching and learning. Agneta notes that "complexity research cannot on its own answer questions about learning effects […] on the contrary, it throws up many more questions" and although for her (and arguably all of us) "it puts you on a different path" towards understanding research problems, this is not a perspective that everybody is comfortable with.

> In a classroom, a practitioner's understanding that learning is a complex and dynamic process is not easily distilled down to a toolbox of response options—which is often the short cut and easy way out many look for. Instead they will need to develop an adaptivity of thought and action for the large number of potential situations they may come up against. This necessitates being comfortable with not always having the right answers, or even that there may not be one per se. (Phil)

While the insights that complexity can afford are not always directly translatable into practical prescriptions for teaching, it is unlikely that the teaching profession will benefit from yet another set of theory-driven prescriptions. Rather, one of the values of complexity perspectives stems perhaps from their function "as a foil whereby teachers can clarify their own principles and beliefs," or

as heuristic devices that "challenge teachers to think in new ways" (Larsen-Freeman & Cameron, 2008, p. 197).

Finally, a problem noted in some of the narratives was the fact that complexity can be, and at times has been employed in gratuitous ways that can damage its legitimacy.

> There is at times a somewhat shallow application and understanding […]. These applications draw on metaphors, images, properties or processes in dynamic or complex systems to conduct research without being based on the understandings upon which these tools are founded. (Richard)

> A complexity framework needs to be used only when the theory is appreciated in terms of its nuances, is helpful to the task at hand and is utilised in a way that contributes positively to understandings more broadly and not merely for perfunctory academic prowess. […] it is important to remember that not everything can be a complex dynamic system but rather it must fulfil certain criteria to be classified as such. And there are no simplistic ways of working with the framework. It must only be used if it adds to our understanding. (Sarah)

All these challenges notwithstanding, complexity can be beneficial to research and practice in TESOL, and, in the final section of this paper, we turn our attention to possible ways in which it can inform our field.

Looking Ahead

The thoughts about the future directions complexity can take reflect our diverse specific research interests, but they also reveal a shared confidence that complexity can help to advance our understanding in respect to a number of research agendas.

> I would like to see links explicitly made between complexity and how languages are taught and learned successfully, between complexity and research methodology, between complexity and the big questions or issues in our field (SLA/TESOL). For me the first of these (classroom practice) is a current area of interest, and this ties into my interest in the psychology of language learning. (Phil)

> An area that I feel offers great potential […] is to consider the language learning classroom as a complex system […] As learners interact with materials and the other humans in these educational spaces they form the classroom context, which in turn feeds back to adapt their own behaviours. (Richard)

> My particular interest is in the conscious language learning process, but also what happens before and outside this process to facilitate or hinder it. (Agneta)

Echoing views also advanced by de Bot, Lowie, Thorne, and Verspoor (2013), it was also suggested that CDST could serve to connect different disciplines, and possibly help to bridge the perceived dichotomy between teaching practice and research in language and learning.

> On the other hand, teams of researchers could approach the same central topic from different angles, depending on their individual research interests and expertise. One could envisage a team (perhaps international) all working with the same data set, or overlapping data sets but approaching the analysis of the data with different, interlinked, research questions in mind to produce a really in-depth, holistic understanding of a particular issue. (Agneta)

> One direction of future research that has a lot of appeal to me personally involves exploring how complexity can help to generate more cohesion in the theoretical foundations of the field. I am thinking now of Stern (1983) who argued that the field needs a solid foundation which includes a theory of language teaching, a theory of linguistics, a theory of sociology, a theory of psychology and a theory of education […] I would like to argue that the field also needs a meta-theory that brings all of the above together, and to me at least complexity is the only theory that can fulfil this role. (Achilleas)

> For myself, I would also like to see the practical contributions of this framework strengthened. As I think this intuitively resonates so strongly with practitioners, I would be keen to explore links between practitioners and academics working together with this shared frame. It has the potential to serve as a shared frame of reference and could foster dialogue when used appropriately. (Sarah)

The potential of CDST to function as connective tissue between the disciplines that inform TESOL and also with teaching practice, is an idea that we began to tentatively explore in the Manchester Roundtable on Complexity Theory and

English Language Teaching, held at the University of Manchester in April 2015, which was attended by many of the participants whose views are recorded in this paper. This was further developed in a conceptual paper that came out of the event, where the argument was put forward that CDST can provide a shared discourse space, "defined by a shared vocabulary and common ways of thinking, which can be used by practitioners and researchers in TESOL together, in our joint quest to develop new ways of understanding and improving our language learning and teaching experiences" (Kostoulas et al., 2018, p. 256). Looking towards the future, we expect to see these synergies becoming more common, stronger, and even more useful.

Concluding Remarks

These narratives reveal these researchers' belief in the potential of CDST to generate understandings of language and language learning that are intuitively convincing, phenomenologically valid, analytically powerful, theoretically generative, and, hopefully, ultimately useful for practice. What is even more encouraging is that, despite the challenges outlined, there is a sense of a growing awareness and appreciation of what complexity can offer.

> Then, in 2014, when I attended the PLL conference in Graz, Austria, and then later the 2014 Leeds BAAL SIG event, I realised that there was a renewed interest in Complexity Theory in TESOL. Looking back, it was almost as if Complexity Theory had gone underground for a number of years, and then after this period of gestation it had re-emerged. And, of course, I met others who were passionate about Complexity Theory. In some ways, it resembled the 'buzz' around this theory that I had seen when I was a PhD student, but with one difference. There were now a number of leading figures in TESOL who are writing and using Complexity Theory in more concrete ways, and with more authority than in that earlier period. (Juup)

> As a community of people who are interested in complexity, I think we are now at a time where a 'critical mass' is developing that can make such work possible. We are at an exciting time when discourse spaces are being created, where we can exchange insights about complexity (the exchange of narratives in this article is just one example), and while being aware of the scepticism that is voiced, I am also optimistic that our shared understandings are becoming more robust. (Achilleas)

However, as Sarah cautions:

> We must remain grounded in working with this lens and exploit the real-world potential and phenomenological authenticity it offers, avoiding the risk of becoming academically remote and convoluted. We must also ensure it has something to offer so that we do not get trapped in an academic endeavour which leaves practitioners saying, so what? Tell me something I don't already know.

When describing language development, Peltzer-Karpf and Hohenberger noted that it "does not take a linear path but comes in phases of intermittent turbulence, fluctuation, and stability, along a 'chaotic itinerary'" (2009, p. 481). We believe that the ways in which TESOL has engaged with complexity have been very similar: As the reflections outlined above show, our encounters with complexity also followed a chaotic itinerary punctuated by false starts, bursts of optimistic growth, stability, and turbulence. In this article, we have tried to show some of this dynamism, as seen from the perspective of a growing community of TESOL scholars with a shared interest in CDST. We are aware that ours is a partial account, both because of our enthusiasm about the potential of complexity, and because of limitations inherent in our deliberately informal approach. However, we hope to have been able to share what complexity means for us, as a community of researchers, and how an increasing corpus of research has began to shape expectations about the explanatory and practical potential of complexity. Whether these expectations will be fulfilled remains to be seen in the future. It is our hope that readers will take up our invitation to reflect on what complexity can mean for them and their work and perhaps take inspiration from the narratives of those already engaging with this perspective.

References

Beckner, C., Blythe, R., Bybee, J., Christiansen, M. H., Croft, W., Ellis, N. C., … & Schoenemann, T. (2009). Language is a complex adaptive system: Position paper. *Language Learning, 59*(sl), 1–26.

Byrne, D. (1998). *Complexity theory and the social sciences: An introduction*. London: Routledge.

Byrne, D., & Callaghan, G. (2013). *Complexity theory and the social sciences: The state of the art*. London: Routledge.

Cilliers, P. (2001). Boundaries, hierarchies and networks in complex systems. *International Journal of Innovation Management, 5*(2), 135–147.

De Bot, K., Lowie, W., Thorne, S. L., & Verspoor, M. (2013). Dynamic system theory as a comprehensive theory of second language development. In M. d. P. G. Mayo, M. J. G. Mangado, & M. M. Adrián (Eds.), *Contemporary approaches to second language acquisition* (pp. 199–220). Amsterdam: John Benjamins Publishing.

Davis, B., & Sumara, D. J. (2006). *Complexity and education: Inquiries into learning, teaching, and research*. Mahwah, NJ: Lawrence Erlbaum Associates.

Earthy, S., & Cronin, A. (2008). Narrative analysis. In N. Fielding (Ed.), *Researching social life* (3rd edn., pp. 420–439). Thousand Oaks, CA: SAGE.

Feryok, A. (2010). Language teacher cognitions: Complex dynamic systems? *System, 38*(2), 272–279.

Gleick, J. (1987). *Chaos: Making a new science*. New York: Viking.

Henry, A. (2016). Conceptualizing teacher identity as a complex dynamic system: The inner dynamics of transformations during a practicum. *Journal of Teacher Education, 67*(4), 291–305.

Hohenberger, A., & Peltzer-Karpf, A. (2009). Language learning from the perspective of nonlinear dynamic systems. *Linguistics, 47*(2), 481–511.

Kostoulas, A. (2018). *A language school as a complex system*. Berlin: Peter Lang.

Kostoulas, A., & Stelma, J. (2016). Intentionality and complex systems theory: A new direction for language learning psychology. In C. Gkonou, D. Tatzl, & S. Mercer (Eds.), *New directions in language learning psychology* (pp. 7–23). Cham: Springer.

Kostoulas, A., Stelma, J., Mercer, S., Cameron, L., & Dawson, S. (2018). Complex systems theory as a shared discourse space for TESOL. *TESOL Journal, 9*(2), 246–260.

King, J. (2013). *Silence in the second language classroom.* Basingstoke: Palgrave-MacMillan.

King, J. (Ed.). (2015). *The dynamic interplay between context and the language learner.* Basingstoke: Palgrave Macmillan.

Larsen-Freeman, D. (1997). Chaos/complexity science and second language acquisition. *Applied Linguistics, 18*(2), 141–165.

Larsen-Freeman, D., & Cameron, L. (2008). *Complex systems and applied linguistics.* Oxford: Oxford University Press.

Mauranen, A. (2012). *Exploring ELF: Academic English shaped by non-native speakers.* Cambridge: Cambridge University Press.

Mercer, S. (2011a). Language learner self-concept: Complexity, continuity and change. *System, 39*(3), 335–346.

Mercer, S. (2011b). Understanding learner agency as a complex dynamic system. *System, 39*(4), 427–436.

Mercer, S. (2016). Complexity and language teaching. In G. Hall (Ed.), *The Routledge handbook of English language teaching* (pp. 473–485). London: Routledge.

Peltzer-Karpf, A. (2012). The dynamic matching of neural and cognitive growth cycles. *Nonlinear Dynamics – Psychology and Life Sciences, 16*(1), 61–78.

Sampson, R. J. (2015). Tracing motivational emergence in a classroom language learning project. *System, 50*, 10–20.

Seidlhofer, B. (2011). *Understanding English as a lingua franca*. Oxford: Oxford University Press.

Spoelman, M., & Verspoor, M. (2010). Dynamic patterns in development of accuracy and complexity: A longitudinal case study in the acquisition of Finnish. *Applied Linguistics, 31*(4), 532–553.

Stelma, J., Onat-Stelma, Z., Lee, W.-J., & Kostoulas, A. (2015). Intentional dynamics in TESOL: An ecological perspective. *Teachers College, Columbia University Working Papers in TESOL & Applied Linguistics, 15*(1), 14–32.

Stern, H. H. (1983). *Fundamental concepts of language teaching: Historical and interdisciplinary perspectives on applied linguistic research*. Oxford: Oxford University Press.

Verspoor, M., de Bot, K., & Lowie, W. (Eds.). (2011). A *dynamic approach to second language development: Methods and techniques*. Amsterdam: John Benjamins Publishing.

Achilleas I. Kostoulas, Sarah Mercer

Reflexionen über Komplexität: Erfahrungen der TESOL-Forscher

Zusammenfassung

Theorie komplexer dynamischer Systeme (CDST von *Complex Dynamic Systems Theory*) ist eine immer häufige verwendete theoretische Grundlage in angewandter Linguistik. Der vorliegende Beitrag schildert Erfahrungen der TESOL-Forscher, die nach dem Modell gearbeitet haben. Besprechen werden dabei Nutzen und Herausforderungen für Lehrerarbeit und potenzielle Anwendung des Modells in Zukunft. Der erste Teil des Beitrags handelt von CDST-Grundlagen, deren drei bedeutende Merkmale besonders berücksichtigt werden: holistische Einstellung, nichtlineare Perspektive der Kausalität, Fokussieren auf Auftreten und Selbstorganisation. Zum Forschungsmaterial wurden die von neun wissenschaftlichen Mitarbeitern verfassten Abhandlungen zur CDST-Anwendung in ihrer Arbeit. Die Ergebnisse zeigen, dass die zunächst mit Zurückhaltung aufgenommene CDST-Theorie mit der Zeit ihr wirkliches Potential offenbarte. Die Befragten waren zu künftiger Anwendung der Theorie in Forschungen zur Erlernung des Englischen und im Bereich der angewandten Linguistik optimistisch eingestellt.

Schlüsselwörter: Zweitspracheunterricht, Fremdsprachenunterricht, Theorie komplexer dynamischer Systeme