

Intentionality and Complex Systems Theory: A New Direction for Language Learning Psychology

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Abstract This chapter examines the combined potential of the constructs of intentionality and Complex Systems Theory, as a new theoretical direction for language learning psychology. The chapter begins with theoretical discussion of the properties of complex systems. This leads to the definition of a Complex System of Intentions, a conceptual model for understanding intentionalities that are present at individual, small group and societal levels, as well as their interrelations. Following that, key properties of the system are illustrated by juxtaposing empirical data from two research projects in Norway and Greece. First, we document the emergence of a ‘performance intentionality’ in learners’ interaction in an English L2 classroom in Norway. Next, we discuss how a ‘competition intentionality’ in a private language school in Greece emerged from interaction with the state school system, and we document its effects on language learning activity. In both cases, a data-driven analysis is used to demonstrate the emergence of the intentionalities and their generative effects, i.e., the ways in which they recursively shaped the system from which they had emerged. We conclude by revisiting the organisational openness of the system, and the processes of emergence and morphogenesis that were traced in the data, and by connecting them to Complex Systems Theory, while exploring the implications of a complexity outlook for language learning research.

Keywords Intentionality · Complex systems theory · Language learning · Greece · Norway

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1 Introduction

This chapter looks into phenomena of language learning psychology such as the relation between agency and structure, and the emergence of spontaneous behaviours among language learners, and it puts forward a conceptual model, which we call a Complex System of Intentions, for the interpretation of such phenomena. This model is underpinned by two strands of thinking that can inform language learning psychology. The first strand refers to conceptual work on intentionality (Stelma, 2011, 2014a; Stelma & Fay, 2014; Young, DePalma, & Garrett, 2002), which can provisionally be described as the ‘purpose’ in social activity. The second strand of thinking relates to the increasing readiness in language education to look towards Complex Systems Theory (CST) as a lens for the interpretation of psychological, linguistic and social phenomena (Beckner et al., 2009; Larsen-Freeman, 2013; Larsen-Freeman & Cameron, 2008; Meara, 2006; Mercer, 2013), and as a unifying framework that might connect different approaches to understanding language learning (de Bot, Lowie, Thorne, & Verspoor, 2013; Larsen-Freeman, 1997; Spivey, 2007).

We begin this chapter with an overview of CST, which leads to the presentation of what we term a Complex System of Intentions. Following that, the model is operationalised in analyses of empirical data from two language learning settings. First, data from a language classroom in Norway are used to illustrate how intentionality emerged in learner pairs engaged in task work, and how the emergent intentionality was constrained by the system’s structure. Next, data from a language school in Greece are presented showing how intentionality that was manifested on a social level impacted language learning activity in the school, and how bottom-up phenomena emerged in spite of top-down pressures. At the end of the chapter, we revisit the notion of a Complex System of Intentions, and discuss its properties with relation to the empirical data presented, to illustrate its analytical potential, as well as its implications for the study of language learning.

2 Complexity and Complex Systems

Despite increasing interest in CST, there is at present no single authoritative definition of what the theory encompasses. That said, CST, or complexity, can be broadly defined as an ontological and epistemological outlook that is sensitive to the ways in which non-linear, emergent and holistic phenomena come into existence, without any form of central control, from the interactions of large numbers of entities, or system constituents.

A system, in a general sense, is a collection of entities that exhibit certain behaviours on account of their system membership. For example, students and teachers behave in certain ways because they are part of the school system; celestial bodies in the solar system have certain trajectories because they exert gravitational

pull on each other. Complex systems, on the other hand, are more difficult to define, because they are organisationally open. This means that their components interact with, and are influenced by, agents that operate outside the systems' 'boundaries'. Because of the difficulty in separating a system from its surroundings using logical or topographical criteria, it seems preferable to 'frame' systems functionally (i.e., in terms of what the system 'does', or 'what it is for'), while bearing in mind that "the boundary of the system is neither purely a function of our description, nor is it purely a natural thing" (Cilliers, 2001, p. 141).

A defining feature of complex systems is that they allow for the emergence of unexpected patterns of behaviour that transcend individual constituents. Typically, complex systems comprise multiple, interconnected entities, such as agents, processes, influences and even nested sub-systems. Larsen-Freeman and Cameron (2008) exemplify the heterogeneity of complex systems noting that a traffic system consists of pedestrians, drivers and different types of vehicles, policy makers, as well as roads and traffic laws that constrain and channel traffic in specific directions. Since system constituents differ in their attributes and possibly even in category membership, and as they are connected to each other in intricate ways, it seems difficult to attribute their collective behaviour to any individual constituent or combination of constituents. For instance, reading comprehension cannot be readily explained with reference to the mechanics of holding a document, eye movement, the typography of the text or the biochemistry of the reader's brain. Rather, reading comprehension emerges from the way in which these constituents interrelate. Such phenomena, which cannot be reduced to individual components, are termed emergent. Later in this chapter, we will argue that intentionality is an emergent phenomenon.

The last property of complex systems that we examine is their embeddedness, by which we refer to the ways in which they are enmeshed in broader system structures. Put differently, large systems tend to contain nested systems among their constituents. This relation has sometimes been described hierarchically. For example, it has been suggested that discourse can be understood as a hierarchy of systems, in which discourse events are embedded within conversations, which form part of broader information exchanges (Larsen-Freeman & Cameron, 2008). Similarly, mathematics has been described as a hierarchy ranging from subjective understanding, to curriculum structures, to mathematical objects (Davis & Sumara, 2006). An alternative conceptualisation involves viewing social structures as "nested but interpenetrating systems" operating on different levels (Byrne & Callaghan, 2014, p. 45). Regardless of how this structure is conceived, what is important to note is that the relationship between higher- and lower-order systems is mutually shaping: that is, the architecture of higher-order systems emerges from lower-order activity, and higher-order structures can constrain the degrees of freedom in lower-order systems.

Despite its provenance in the natural sciences (Lorenz, 1972; Prigogine & Stengers, 1984; von Bertalanffy, 1950), CST seems intuitively compelling as a framework for explaining a range of social and psychological phenomena. Thus, recent years have seen the publication of several treatises, which have brought

complexity-inspired thinking to bear on the social sciences (e.g., Byrne, 1998; Byrne & Callaghan, 2014; Cilliers, 1998; Reed & Harvey, 1992). However, due to the paradigmatic differences separating the natural and social sciences, the application of complexity to an area such as the psychology of language learning is not entirely straightforward. The challenge is compounded by our own insistence of viewing psychology of language learning not simply as a decontextualised cognitive phenomenon, but rather as a phenomenon that at the same time is deeply social.

One approach is to use complexity as a metaphor that can assist and enrich understanding of the psychological and social aspects of language learning (Larsen-Freeman & Cameron, 2008). However, Larsen-Freeman and Cameron (2008) caution that the metaphorical approach risks compromises in theoretical commitment, and advocate the development of scientifically rigorous domain-specific theories. The latter approach is beginning to happen in language learning psychology, including for example work on learner agency and self-concept (Mercer, 2011, 2012), language learning motivation (Dörnyei, 2014; Dörnyei, MacIntyre, & Henry, 2015; King, 2011), willingness to communicate (MacIntyre & Legatto, 2011), and language anxiety (Gregersen, MacIntyre, & Meza, 2014; MacIntyre & Gregersen, 2012). The present exploration of the combined potential of intentionality and CST is similarly an attempt to develop domain-specific theory within the field of language learning psychology.

3 A Complex System of Intentions

Our starting point is a conceptualisation of language learning as a complex phenomenon that takes place within a network of interconnected systems, as illustrated in Fig. 1. We suggest that language learning can be viewed from different perspectives, focusing on its content (what?), purpose (why?) or methods (how?), and that these perspectives are conceptually served by the definition of a linguistic, intentional and pedagogical system, respectively. Each of these systems is conceptualised as being stratified, and for the purposes of analytical convenience we distinguish between individual, small group, and societal levels of activity. To illustrate, a complexity-informed research agenda with a linguistic outlook might define linguistic phenomena with reference to individual linguistic competence, linguistic repertoires shared by a community, or language as a whole. Similarly, a pedagogical perspective might look into activity at the level of individual habits, shared practices, or professional paradigms.

The intentional system, or Complex System of Intentions, on which this chapter focuses, relates to the purposes of language instruction. We suggest that different aspects of the intentional system pertain to intentionalities of individual language learners, to the collective intentionalities that develop in the interaction of learner groups (e.g., during task work), and to intentionalities embedded in the values and policies of larger communities (e.g., professional or national cultures). The intentionalities that emerge in each of these levels are, in some respects, different. On the

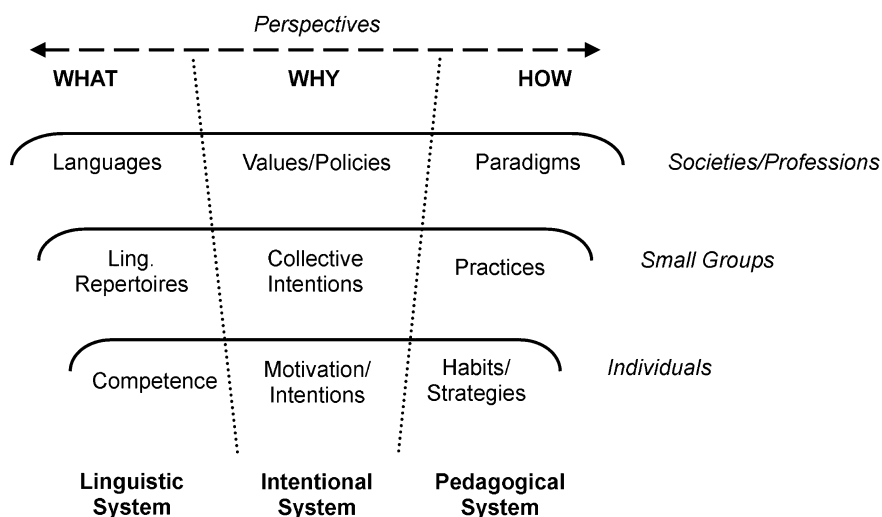


Fig. 1 Language learning as a network of complex systems

individual level, intentions are ‘identified with’, or at the very least have some basis in individual psychology. A shared identification with, and psychological basis for, intention may also pertain on the small group level, but collective psychological processes (associated with group dynamics) may alter the degree to which this is the case for all individuals concerned. Finally, intentionality embedded in the values and policies of larger communities might be identified with, but it is mostly present through what Searle (1983) calls *derived intentionality*, such as expectations communicated by teaching materials, curricula, examination specifications, or policy documents. While aware of such differences, we adopt a functional definition of intentionality: intentionality motivates language learning activity, and the source of this motivating ‘effect’ may be either more individual (i.e., agentive) or more social, depending on the level of analysis.

Intentionality, we argue, is an emergent phenomenon, which comes to existence from the co-activity of multiple system constituents, such as needs, beliefs, aspirations and affordances that are present in a system. For example, Kostoulas (2014b) demonstrates how the societal expectation (in Greece) that language learners should be highly proficient in grammar, coupled with extensive grammar presentations and multiple practice activities in learning materials, contributes to the emergence of an intentionality associated with practicing language form. Similarly, Stelma (2011) describes the emergence of increasingly intentional use of information technology among doctoral researchers, as an outcome of expectations by their supervisory teams, their School and University, national and international entities, as well as the resources that were made available by all of the above. We use the term *shaping influences* to describe all the constituents that contribute to the emergence of intentionality (Stelma, 2011), and we refer to their interaction as the *intentional dynamics* of a system (Young et al., 2002).

Consistent with the pragmatic definition of intentionality by Searle (1983), we argue that intentions, whilst shaped by previously realised objects, situations and events, are uniquely ‘directed at’ objects, situations and events, some of which are not yet realised. We call this the *generative* property of intentionality, i.e., its potential to ‘do’ or ‘create’ something additional or new. For instance, Stelma and Fay (2014) discuss how the emergence of intentionality among novice researchers led to development of researcher competence. Similarly, intentionality linked to the South Korean government’s policy of globalisation has been associated with the expansion of the private English language teaching (ELT) sector in South Korea (Stelma, Onat-Stelma, Lee, & Kostoulas, 2015). Due to its generative properties, intentionality can affect changes in the system from which it emerged, and thus become ‘sedimented’ into artefacts and practices associated with the system. In other words, intentionality enables action in the world and, through intentionally shaped action, intentionality becomes an embedded part of its environment. Drawing on Byrne and Callaghan (2014), we describe the process through which intentionality is sedimented in the structure of the system as *morphogenesis*.

Put together, emergence and morphogenesis connect the three levels of the intentional system shown in Fig. 1, i.e., the individual, small group and social levels, through processes of reciprocal determination. On the one hand, the system’s structure may constrain its degrees of freedom, by setting boundaries within which intentionality is likely to emerge. This process sometimes takes the form of top-down influences or constraints (Young et al., 2002). On the other hand, intentionality, once present, may alter the structure of the system, thus influencing its future activity bottom-up. In the two sections that follow, we demonstrate these processes through empirical data from research in language learning settings in Norway and Greece.

4 The Emergence of a Shared Intentionality

In this section, we focus on how a ‘lower-order’ Complex System of Intentions may emerge from local moment-to-moment interaction. To illustrate such local emergence of a Complex System of Intentions, we use data from a Norwegian Primary English language classroom (see Stelma, 2003). The data represent discourse between pairs of 11–12 year-old learners who were composing role-play dialogues, as instructed by their teacher, which they later performed to the whole class. The discussion includes reference to repeated iterations of this task sequence over the course of a year, and our analysis identifies three broad phases in the development of a particular intentionality from the local Complex System of Intentions: (1) an *emergence* phase, seeing the gradual appearance of a shared intentionality, (2) a *stable* phase, during which the learners’ behaviour was shaped by the shared intentionality, and (3) a *self-organised criticality* phase, when the shared intentionality ceased to be pedagogically useful, at which point the teacher stepped in to ‘perturb’ it.

During the emergence phase the learners’ activity was mainly shaped by the teacher’s intentions for the task. In an early task iteration, the teacher asked the learners to compose

a dialogue, where a student was making excuses to her teacher for being late. A variety of role-play dialogues were composed, of which Extract 1 is a representative example.

Extract 1: Veronica and Karen's role-play dialogue

'Teacher': why are you late for class?
 Victoria: I I I don't know
 'Teacher': I want a answer
 Victoria: I played football and ehm I don't ehm .. ehm hear the bell
 'Teacher': That's the rudest answer I ever heard
 Victoria: But it is true
 'Teacher': But where do you play football?
 Victoria: I I I I I
 played football outside the school

Across different pairs and over time, this dialogue-writing activity gave rise to increasingly rich learner meaning-making, including popular culture as well as idiosyncratic Norwegian cultural practices shaping the role-plays. Extract 2 illustrates this: the name and character of Erik was inspired by Eric Cartman, one of the rambunctious children from the South Park television series (see full discussion in Stelma, 2014a). This was combined with a reference to orienteering (map and compass), a traditional Norwegian pursuit that is often evoked in occasions of intra-national self-deprecating humour.

Extract 2: Tim and Morton's role-play dialogue

'Teacher': why are you late for school Erik?
 Erik: ehm ... uhm
 I went to the wrong school
 .. yeah
 that's right
 'Teacher': Erik
 how did you manage to go to the wrong school?
 Erik: ehm
 ... well
 'Teacher': answer me
 Erik: ehm
 I lent my map and my compass to a friend on that school
 'Teacher': but you said that you .. go to the wrong school
 Erik: I did go (.) go to the wrong school
 before I went .. t- to the other school
 to pick up my map
 'Teacher': I give up

Sentiments expressed in the classroom discourse seemed to reinforce the humorous effect achieved by the references to popular and Norwegian culture. In advance of

Tim and Morton's performance of the dialogue (Extract 2) to the whole class, the teacher exclaimed: "*ja ... vi er klare ... publikum er klare* [yes ... we are ready ... the audience is ready]", and just after the performance she added: "*yeah excellent ... kjempebra ... jeg har lyst til å høre litt mer jeg ... for det her var gøy* [great ... I want to hear some more ... because this was fun]". These references to 'the audience' and saying she wanted to hear more 'because this was fun' seem to have validated the learners' incorporation of humour.

In the subsequent iterations of the task sequence (3, 6 and 9 months later), different scenarios were presented by the teacher (following the textbook used by the class). In these subsequent iterations, the learner pairs became increasingly preoccupied with creating entertaining role-plays. The emergence of this intention to be entertaining can be traced in the learners' interactions.

Extract 3: Learner references to composing entertaining dialogues

112	Morten:	ehm noe kulere [something cooler]
113	Tim:	hmh?
114	Morten:	noe morsom noe liksom [something fun kind of]
438	Dennis	... we ehm ... vi må finne på noe skikkelig sprøtt [we have to come up with something really wacko]

From these local actions and references the characteristics of a new phase—an identifiable Complex System of Intentions affecting the learners' classroom activity seemed to emerge. That is, an emergent shared intentionality, which we might call a *performance intentionality*, constrained the degrees of freedom for learner activity, with learners' pursuing action possibilities shaped by this intentionality. At the time, the second author of this chapter noted in his fieldwork journal that "*det er nesten som rollespillaktiviteten har tatt på seg ett eget liv* [it is almost as if this role-play task has taken on a life of its own]". In Stelma (2014a), where this intentionality is explored in more detail, it is described as including "formulating entertaining dialogue, practising the dialogues, paying attention to how to stage the performances, and gradually also the emergence of 'realia' used in the performances" (p. 12). This shared, emergent intentionality may be said to have constrained the range of activity in this classroom, as theoretically possible alternative courses of action were not pursued.

Over the repeated iterations of the task sequence, the performance intentionality became ever more recognisable. As the performance intentionality was strengthened, it began to put pressure on the learners. A sense of competition emerged, with learner pairs wishing to create ever more entertaining dialogues for their classmates. Also, the learners increasingly incorporated dramatic physical actions when performing their dialogues to the class. As repeated iterations of local activity gradually added energy to the developing Complex System of Intentions, the system reached a poised state akin to 'self-organised criticality'. Self-organised criticality has been metaphorically illustrated with reference to a sand pile to which grains of

sand are continuously added. After the sand pile reaches a certain height, its slopes cannot sustain more grains, so when further grains of sand (i.e., energy) are added to the pile, avalanches of unpredictable sizes are created (Bak & Tang, 1989). The equivalent of ‘avalanches’ in this classroom were the increasingly unpredictable behaviours of the learners, and the associated emotional pressures resulting from the expectation to be ever more entertaining. The tensions finally seemed to outweigh the earlier pedagogical usefulness of the performance intentionality.

At this poised state, the teacher initiated a frank conversation with the learners, giving them an opportunity to put voice to their experience. When asked what a good role-play was, the learners agreed that it had to be a ‘fun’ role-play, with one learner adding that it would be dull to sit through several role-plays unless they were ‘fun’. One learner made the related observation that it was better as an experience to perform if the classmates were visibly entertained. At this point, the teacher suggested a distinction between ‘clowny fun’ and ‘interesting fun’, adding that it was better to do it “*orntlig* [properly]”. The use of the word ‘properly’, a loaded term evoking the ethos of learning and expected school behaviour, may have constrained the learners from disagreeing. However, one learner suggested, partly side-stepping the point, that if someone performed a ‘serious’ role-play, it would be interpreted as being ‘nerdy’ or “*skolelysaktig*” (direct translation is ‘school-shining-like’). This is a common expression to describe someone a bit ‘too willingly’ putting in ‘shining’ performances in the school context. Another learner suggested that it was difficult to be funny in a proper way in English, indicating his more limited expressive range in English as a foreign language, and thereby addressing the teacher’s distinction more directly. Finally, a group of learners suggested that it would be easier to create ‘interesting fun’ if there was more freedom in the kind of dialogue they could compose (rather than simply responding to the teachers’ explicitly specified scenarios).

To recap, this section described how a performance intentionality emerged, bottom-up, from the interactions of language learners. The intentional dynamics from which this intentionality emerged included diverse shaping influences, such as the teacher’s pedagogical intentions, assumptions about theatrical norms (“the audience is ready”) and socially (un)acceptable behaviour (“*skolelysaktig*”), shared cultural references (e.g., orienteering, Eric Cartman), and the task prompts in the learners’ coursebooks. The way in which the performance intentionality subverted the teachers’ pedagogical intentions, through the learners’ creative reinterpretation of the task prompts, highlights the unpredictability of emergent behaviour, which is a hallmark of activity in complex systems. It is also interesting to note that, although intentionally-driven activity by the learner pairs was embedded in a broader web of intentionalities, which included societal expectations about “proper” (*orntlig*) learning, and the derived intentionality of the task prompts, these influences did not, initially, constrain the emergent intentionality. Rather, it seemed that, for a while at least, the performance intentionality had stabilised as part of the classroom activity, and it became part of the system’s structure, thus constraining learners’ choice. The top-down constraining influence of intentionalities is explored in greater depth in the following section.

5 Sedimented Intentionality

Having presented an example of intentionality emerging among learner pairs, we now move on to a discussion of intentionality in a broader setting. In this section, we describe how an intentionality associated with a higher level of the intentional system may shape language learning activity in the lower system levels. The data in this section have been drawn from a case study of a private language school in Greece (Kostoulas, 2014a). To provide context, in Greece there is a burgeoning industry consisting of private language schools that provide evening courses to supplement the state school language learning provision, which is perceived as inefficient (Angouri, Mattheoudakis, & Zigraka, 2010; Karavas, 2010). The state and private sectors are in what can be described as a co-adaptive relation, as each system responds to changes in the other. Within this context, it is important for private language schools to show that they offer demonstrably higher standards of teaching, compared to the state school (and commercial competitors), in order to remain financially viable.

In Kostoulas (2014a), several intentionalities that shaped language learning activity in the private school were identified. One of these, the *competition intentionality*, which is the focus of this section, pertained to the way in which teachers, learners and stakeholders in the private language school compared their provision to that of commercial competitors and the state school system. It can roughly be defined as a collective desire to provide rigorous academic instruction, and to achieve demonstrably better results than other private schools and the state school sector. In the paragraphs that follow, we relate this intentionality to the intentional dynamics from which it emerged, and we describe how it was sedimented into artefacts and practices in the language school. We also discuss how it generated instructional policies that seemed to constrain educational practice, and also ways in which this top-down influence was subverted.

Multiple shaping influences contributed to the emergence of the competition intentionality, including societal beliefs and expectations regarding the state education system and private language instruction. There were recurring themes in the data suggesting widespread dissatisfaction with the state education system, which was variously described as “*waste of time*” and “*irrelevant*” to the learners’ needs. In the words of one language learner, “*all the students [at the state school] are naughty and don’t pay attention [...] and the teachers can’t do their job properly*”. A corollary to these beliefs was the expectation that private language schools should provide rigorous academic instruction. This expectation was indexed in the way private language schools, in general, were described in learner questionnaires. It was suggested that lessons in private schools involved “*much studying, but we*

[students] learn many things”, and that they were typified by “*very good analysis of [linguistic] phenomena, [with] multiple examples and exercises*”. These expectations seemed to impact the way in which the private language school in question operated.

Another major shaping influence that contributed to the emergence of the competition intentionality was a culture of accountability among teachers in the language school, roughly defined as a sense of responsibility for the students’ performance in English, in the language school and outside it. This was expressed in interviews, of which Extract 4 is a typical example:

Extract 4—Concerns about accountability

Amy: Μου είπε η μάνα από ένα A/P ότι το κορίτσι το έβαλε η δασκάλα στο σχολείο της να γράφει τεστάκια με present continuous και have got,	Amy: The mother of an A/P [a beginner] told me that the teacher at [state] school made the girl write tests with present continuous and ‘have got’,
Achilleas: Δεν προβλέπεται!	Achilleas: That’s not proper procedure!
Amy: Έτσι μου είπε εμένα πάντως κι έμεινα κάγκελο. Τι κάνεις μετά, δηλ- της εξηγείς ότι πως εμάς μας ενδιαφέρει να μάθει να μιλάει πρώτα, σωστά;	Amy: That’s what she told me anyway, and I was stunned. What should one do then? Explain that we [the private school] are interested in teaching her [the learner] to speak first, right?

There are several points of interest in this extract. One is the implicit expectation, in the mother’s request, that the language school should help the child attain the objectives set by the teacher of the state school ELT class. The extract also illustrates a related concern, by Amy, that if her learners performed poorly in the state school, this would reflect badly on *her* perceived professionalism. The resultant feeling of dismay led her to request affirmation, from the interviewer (the first author), that she should adhere to the communicative principles that underpinned ELT both in the language school and state ELT, even though the teacher in the state school seemed to deviate from them. A similar concern was expressed in a different interview, in which a teacher explained why she had felt compelled to deviate from the assigned syllabus in order to help some of her learners prepare for an upcoming state school examination.

Extract 5—Additional concerns about accountability

Achilleas:	Τώρα εγώ θα κάνω το δικηγόρο του διαβόλου, αλλά γιατί να επα- γιατί να μην κάνει την επανάληψη εκείνη, κι εσυνείς να συνεχίσετε κανονικά με το με βάση το πρόγραμμα;	Achilleas:	Now, I'll take on the role of the devil's advocate ... why couldn't [the state school teacher] do the revision, and you could go on normally, according to [your] syllabus?
Rose:	Ναι αλλά αν γράψει κανείς ξέρω γω δώδεκα, μετά εγώ θα, εμένα, για εμένα θα λένε ότι δεν ξέρουν τα παιδιά ούτε τα βασικά.	Rose:	Yes, but if someone gets a, I don't know, twelve [out of 20, a low mark], then I will-, me, it will be me [rather than the state school teacher] who will be discussed, they will say that the kids don't even know the fundamentals [of the language].

Extract 5 indicates that, in addition to meeting their own curricular objectives, private language schools seemed to be expected to prepare learners for state education. That is to say, poor performance in the state school system could be perceived as an indication that the private language school was failing to effectively teach the language. This feeds into the competition intentionality, with private language schools needing to be demonstrably superior to what is offered by the state education system.

Although the competition intentionality was manifest in multiple artefacts (e.g., learning and testing materials, syllabus documents), as well as the policies and learning routines at the language school, for the purposes of this chapter we restrict ourselves to a discussion of vocabulary learning practices. These were impacted by the competition intentionality in two ways: through the expansion of the lexical strand of the syllabus, and through the development of a rigid monolingual policy.

A striking feature of the syllabus in the language school was that vocabulary instruction was considerably more intensive than what was envisaged in the learning materials. For instance, the distinction between productive and receptive vocabulary (Melka, 1997) tended to be dropped. Instead, all the lexical items that were encountered in the learning materials were defined, exemplified, assigned for learning, and tested. Extract 6 describes part of a typical lesson, reconstructed from observation notes.

Extract 6—A typical reading lesson

The teacher nominated students to take turns reading different paragraphs in the text. At the end of each paragraph, the teacher asked the learners if there were any unknown words, and when there were unknown words, she first elicited responses [i.e., definitions] from other students and, failing that, provided a definition in English. Some

learners requested confirmation by providing the Greek equivalent, and the teacher either nodded or provided an alternative definition [in English].

Sometimes, the emphasis placed on explaining new lexical items seemed to be at the expense of the development of other skills, as shown in Extract 7:

Extract 7—Fieldnotes extract

I followed up with Martha, on account of the concerns she had previously expressed regarding reading comprehension. Today she did Lesson 6, which is also a reading lesson. The principal difficulty, she said, was caused by the large number of words that are unknown [to the learners]. She believes that students tend to fixate on these words, and as a result they fail to understand the meaning of the text.

In this example, the teacher seemed frustrated by the challenges the learners faced with reading comprehension, which seemed to result, in part, from the fact that the reading flow was repeatedly interrupted by the need to define or translate large numbers of lexical items. In addition to being manifest in practice, the competition intentionality was present, in derived form, in syllabus documents, which outlined ambitious learning objectives regarding lexical range, and in testing materials, which presupposed extensive vocabulary range.

The second way in which the competition intentionality manifested itself was through the development of a monolingual policy, which aimed at maximising the learners' exposure to English. Within the language school, this policy and the rigour with which it was enforced were perceived as major points of differentiation from both the state school system and commercial competitors, and they were thought to provide learners with a considerable competitive advantage. Traces of the monolingual policy are in evidence in Extract 6, which documents the teacher's reluctance to provide Greek semantic equivalents for the newly-encountered lexical items. Elsewhere in the data, many teachers repeatedly and explicitly claimed that they only used English to explain new words (e.g., "*if they don't know [the word] I will explain it in English*"). Moreover, the language school produced extensive monolingual wordlists to accompany the coursebooks, and distributed them among the learners at considerable expense, even though similar bilingual resources were commercially available. The wordlists contained headwords, grammatical information and a definition, in English, for nearly all the newly encountered lexis in the textbooks, plus additional lexical items that were considered useful. Although these definitions sometimes proved more challenging to understand than the actual headword, learners were regularly tested in their ability to define words using English, a fact that often resulted in rote-learning. Much like the intensification of vocabulary learning, the monolingual educational policy of the language school illustrates how the competition intentionality became embedded in social routines and artefacts, which influenced subsequent activity in the system.

Nevertheless, the top-down constraints generated by the competition intentionality were not deterministic. Rather, the large number of lexical items to be learnt, coupled with the inefficiency of dealing with such vocabulary monolingually, resulted in the spontaneous development of coping strategies by the learners. For example, Greek

seemed to be used as a confirmation strategy (see Extract 6) and whispered exchanges in Greek often took place during lessons, as the learners engaged with the new lexis. In addition, many learners tended to gloss their textbooks and monolingual wordlists with Greek semantic equivalents to the new lexis, and others purchased commercially available ‘companions’ to the textbook, which contained bilingual wordlists. Much of this activity tended to take place furtively, especially when the first author was present, due to the priority attached to the monolingual policy. However, its existence points at the unexpected finding that an intentionality can ‘totter’ under its own weight, in a way that reminds us of the self-organised criticality generated by the performance intentionality in the previous section.

As an example of collectively shared construct, the competition intentionality offers insights into how intentionality operates in a higher level of a Complex System of Intentions. Much like the performance intentionality (Sect. 4), the competition intentionality emerges from intentional dynamics that bring together some of the expectations, beliefs and resources (i.e., shaping influences) in the system. These included societal perceptions (e.g., pertaining to the role of private language schools) and local influences (the school’s accountability culture). Unlike the Norwegian case, however, at this level of collective behaviour, it is difficult to claim that all the individuals involved personally identified with the intentionality. Rather, the competition intentionality was present, in residual form, in the resources used at the language school, and in routinised procedures. This ‘derived’ intentionality (Searle, 1983) tended to constrain activity in the system, or at least to privilege certain forms of activity (e.g., monolingual instruction, extensive lexical tuition), which in turn recursively reinforced the intentionality. However, the effects of the intentionality sometimes put strain on the system, evident in the subverting actions of learners, and this strain, in some cases at least, resulted in destabilising the intentionality.

6 Discussion

After the discussion of empirical examples of intentionality relevant to language learning psychology, we now revisit the notion of complex systems of intentions that was presented in Sect. 3, with a view to demonstrating that CST provides a useful conceptual frame for studying intentionality. To that end, we look into the salient properties of complex systems, as outlined in the literature review, which we relate to the empirical data.

Consistent with CST, in both cases that we presented, the systems from which intentionality came into existence were organisationally open. While the origin of the performance intentionality in the Norwegian classroom could be traced to the interactions between individual pairs of learners engaged in a language learning task, the trajectory of the intentionality was influenced by shared cultural values. For example, it seemed to be sustained by the learners wishing to avoid being identified as ‘nerdy’ (*skolelystaktig*), and it was later ‘perturbed’ by the teacher evoking shared understandings of ‘proper’ (*ornlig*) learning. In the data from

Greece, the competition intentionality was similarly influenced by societal perceptions about the educational norms in private language education, i.e., the expectation for rigorous instruction that exceeded the provisions in the state school system. An important epistemological implication of this organisational openness is that it seems counterintuitive to study intentional phenomena in isolation from their context(s). As an epistemological outlook that is, by definition, attuned to contextual influences, complexity offers useful insights into such phenomena.

Both the performance intentionality in the Norwegian classroom and the competition intentionality in the Greek school were emergent complex phenomena, by which we mean that they came into existence through bottom-up processes, without the benefit of central organisation, and often led to unexpected effects. This property is easier to observe in the Norwegian data, where the performance intentionality is described as a product of spontaneous learner interaction that “took on a life of its own”. Although the Greek data only offer hints about the genesis of the competition intentionality, which had already become a semi-permanent feature of the language school’s activity, they do show how the intentionality was sustained by the intentional dynamics in the system. Moreover, and interestingly, the data show how coping strategies emerged to counteract some effects of the competition intentionality. In both cases, it could be said that the intentionality was generated as various shaping influences came together through a process of emergence, which resulted in unexpected behaviour that recursively fed back into the system (Stelma, 2014b). Such emergent processes challenge epistemological assumptions about linear causality, and we believe that CST helps us move beyond the limitations of such assumptions.

Finally, the two cases illustrate the process of morphogenesis, i.e., the way in which intentionality becomes sedimented in the structure of the system and influences future behaviour. The performance intentionality became sedimented in the Norwegian learners’ interaction as an expectation to produce entertaining role-plays, from which—after a while—it seemed difficult to deviate. In the terminology of complexity, the learners’ behaviour seemed to settle in an ‘attractor state’, i.e., a more or less regular, though not entirely predictable, pattern of behaviour (Larsen-Freeman & Cameron, 2008, pp. 49–55). In the Greek data, morphogenesis was described with reference to the routinised teaching practices and learning materials to which the competition intentionality contributed. As the competition intentionality became sedimented in policy and artefacts, it reinforced the attractor regime in which the system’s activity was constrained. The attractors created by the two intentionalities are similar in terms of their genesis (in the broader system’s intentional dynamics) and their ability to shape activity, but they differ in their resilience. In the interaction between learner pairs, activity seemed more volatile, as the intentionality and resultant attractor emerged comparatively quickly and dissipated similarly fast when the teacher decided to perturb it. By contrast, activity in the language school, a broader social structure, seemed to operate on a slower time-scale. The Complex System of Intentions that we put forward, which capitalises on the potential of complexity to explain the interaction between higher- and lower-order systems, offers useful insights into the genesis and effects of such attractor regimes.

In summary, in this chapter we have developed the notion of ‘Complex System of Intentions’ as a framework for analysing language learning situations. This conceptual model draws on previous work on intentionality (Stelma, 2011, 2014a; Stelma & Fay, 2014; Stelma et al., 2015) aimed at understanding how activity is driven, and how actions and artefacts are brought into existence through intentional activity. Moreover, we view intentionality as taking place within a complex system, which helps to relate intentionalities to their social contexts. Additionally, CST provides us with insights into the reciprocal determination between higher and lower levels of activity, such as individual action and social values and policies, and in doing so, helps us bridge the dichotomy between agency and structure. Lastly, our conceptualisation of a Complex System of Intentions, as part of a broader system of language learning that includes complexity-informed linguistic and pedagogical systems, indicates how connections might be traced between various approaches to studying language learning, thus hinting at the potential of complexity to function as ‘connective tissue’ in language learning psychology theory.

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