

Processability Approaches to Language Acquisition Research & Teaching

Widening Contexts for Processability Theory

Theories and issues

EDITED BY
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Howard Nicholas
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7

Widening Contexts for Processability Theory

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Processability Theory (PT) as developed by Manfred Pienemann is a prominent theory of second language acquisition. PT serves as a framework for a wide range of research covering issues such as L2 processing, interlanguage variation, typological effects on SLA, L1 transfer, linguistic profiling and L2 assessment, stabilisation/fossilisation and teachability. The PALART series serves as a platform for making current research within the PT framework and its application to measurement and teaching, as well as the interdisciplinary discussion of PT, accessible to both researchers and graduate students in the field. PALART is designed to provide a thematic platform for the presentation of current high-quality work within the PT framework. The thematic scope of the series reflects the wide scope of theoretical, empirical and practical aspects of PT.

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Volume 7

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Theories and issues

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Contextualising issues in Processability Theory

Anke Lenzing, Howard Nicholas and Jana Roos

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In the present volume, the following issues in SLA are addressed within the framework of Processability Theory (PT): language production and comprehension processes, typological differences, developmental sequences across languages and issues in instruction and teachability. Between them, the chapters in this book demonstrate the vibrancy of PT but also reveal challenges that work within this framework will need to engage with. The different chapters engage with diverse issues affecting language development. The issues include modelling and documenting the learner's processing of input, the nature of the learner's interlanguage system in relation to languages of widely varied types as well as the trajectories followed by learners in their elaboration of additional languages. These elaborations include consideration of what is meant by language and institutional engagements with language development, either through teaching or assessment.

The common thread in all of these issues is reference to PT. The innovation in the approach taken in this volume is how PT is stretched and sometimes questioned. Some chapters look at PT from the outside or use it to connect their own work to the work of others. Other chapters look from within PT to new connections with other bodies of thought. Areas of research new to PT such as literacy, the nature of feedback to learners and heritage language attrition are engaged with. Issues addressed include:

- whether comprehension follows the same developmental sequence as production (see the chapters by Buyl and by Spinner & Jung (Section 1))
- whether the same processing mechanisms underlie grammatical encoding and decoding (see the chapters by Lenzing, by Buyl and by Spinner & Jung (Section 1))
- whether linguistic constructs that are presented as unitary (e.g. passive, case, relative clauses) are single constructs in the acquisition process (see the chapters by Lenzing (Section 1), by Artoni and by Magnani (Section 2) and by Nottbeck (Section 3))

- how claimed universal stages of L2 development (and possibly attrition) are manifested in typologically diverse languages (see the chapters by Artoni and by Magnani (Section 2), by Zhang and by Kawaguchi & Yamaguchi and by Hjelde et al. (Section 3))
- whether it is possible to build relationships between the acquisition of features of morphology and syntax and other aspects of language (e.g. features of discourse or larger models of the communicative repertoire) (see the chapters by Nicholas & Starks and by Zhang (Section 3))
- how processes of interaction (either in general as part of discourse or via feedback to learners) contribute to acquisition/learning of language (see the chapters by Li & Iwashita and by Roos) or literacy (see the chapter by Steele & Oliver) (Section 4)
- how the insights offered by emergence and mastery criteria of acquisition relate to one another (see the chapter by Baten (Section 4))
- whether there is a consistent place for acquisition perspectives on morphology and syntax in communicative approaches to language assessment (see the chapter by Heinonen (Section 4))

The chapters engage with a variety of typologically different languages. These include Chinese (Zhang), (varieties of) English (Baten; Buyl; Lenzing; Li & Iwashita; Kawaguchi & Yamaguchi; Nicholas & Starks; Nottbeck; Roos; Spinner & Jung; Steele & Oliver), Italian (Magnani), Norwegian (Hjelde et al.), Russian (Artoni; Magnani) and Swedish (Heinonen).

The framework of PT was established in 1998 and has since then continuously been extended. A number of approaches to second language development have preceded the conceptualisation of PT. Research in the field of SLA engaging with developmental sequences and learner variation from a processing perspective has a long tradition. Since the early 1980s a number of related theoretical approaches focussing on these phenomena in SLA have been put forward. Some of these partly overlap and/or were developed by the same researchers. However, this does not mean that the underlying assumptions about how acquisition takes place or about the processes that are involved are necessarily the same. In some of these approaches, a clear development of a previous theoretical approach can be observed. In other cases, the assumptions about the relevant mechanisms or components clearly differ between theoretical approaches. As a consequence, we need to differentiate the ideas of the approaches preceding PT from one another as well as from PT itself, or, as Pienemann (2005: 71) puts it, “there is a substantial difference between PT and ideas that precede it.”

In the research tradition of investigating developmental sequences in L2 acquisition as well as individual learner variation, the Multidimensional Model (MM)

(Meisel et al., 1981), which was developed through the work of the ZISA project on the acquisition of German as a second language in the 1980s, was one of the first attempts to determine developmental sequences and was distinctive because it sought to systematically distinguish between developmental aspects and inter- and intra-learner variation. It defined developmental sequences in ways that would both permit extensions across languages and engage with the idea that what learners would do ‘at the same point in their acquisitional trajectory’ would differ. The MM thus constituted a “descriptive framework for dynamic processes in L2 development” (Pienemann, 2005: 72) and provided a description of “the process of learning itself instead of merely analysing its outputs” (Meisel et al., 1981: 109). A further innovation was to use a different acquisition criterion than that of accuracy, which had been used in the majority of previous studies (see Hytlenstam, 1977 for an exception). In the MM, the *emergence criterion* was introduced as a key concept in capturing the point of acquisition of specific L2 features. The operationalisation of acquisition in terms of the emergence criterion enables us to determine “**when** a specific morphological or syntactic structure can be considered to have actually been acquired by the learner [**bold original; AL**]” (Lenzing, 2013: 151). According to the emergence criterion, a linguistic structure is considered to be acquired if it occurs productively in a learner’s interlanguage, which means that the learner is in principle able to produce the structure. The focus on emergence instead of accuracy initiated a shift in perspective in SLA research:

[...] the ZISA project was one of the first to relinquish the prevailing target-language orientation of the 1970s [...]. [I]n most North American and European SLA research of the 1960s and 1970s, the focus was either on errors defined in terms of the mature L2 system, or alternatively, on items held to be acquired when they were supplied 80 or 90 percent accurately in obligatory contexts (or some variant thereof). Studying acquisition, in other words, mostly meant assessing how far learners were from the finishing line or studying them as they crossed it. The ZISA group explicitly rejected this approach, redefining acquisition (of a form) as the first appearance of a form in an IL [interlanguage].

(Larsen-Freeman & Long, 1991: 283)

Pienemann (1998) builds on Meisel et al.’s (1981) approach to determine acquisition in terms of emergence in viewing the emergence of linguistic features in a learner’s interlanguage as an indicator of the learner’s stage of acquisition. In PT, the emergence of specific linguistic features reflects the learner’s acquisition of the relevant processing procedures.

When applying the emergence criterion to actual learner data, it is important to distinguish between structures that are used productively and thus assumed to be acquired, and formulaic utterances that are argued to be stored as holistic

units in the mental lexicon. Operationalising this criterion is complex and, to an extent, arbitrary. As noted in Clahsen et al. (1983: 96), a limit of five contexts was arbitrarily selected as the minimum required to establish whether a feature could be considered as acquired.

Um nicht doch auf einzelne Belege angewiesen zu sein, haben wir uns dafür entschieden, das Minimum von wenigstens fünf möglichen Verwendungskontexten beizubehalten. Liegen die Werte darunter, werden sie im folgenden in Klammern angegeben und bei der Diskussion nicht als erworben betrachtet. [...] Es soll damit aber nicht verschwiegen werden, daß die Grenze von fünf möglichen Kontexten willkürlich gewählt ist [...].

In this respect, the operationalisation of the emergence criterion is different for syntax and for morphology. In the initial operationalisation of the emergence criterion within PT, a syntactic structure is considered to be acquired when the learner's speech sample contains at least three different realisations of the respective structure (see Pienemann et al., 2006: 78; Pienemann & Lenzing, 2015: 109). In the area of morphology, the structure has to occur with both lexical and morphological variation in the learner data. The morpheme under consideration (e.g. the 3rd Person Singular -s) has to occur with different lexical items (e.g. goes, plays, walks). At the same time, the lexical verb has to occur with different inflectional suffixes (e.g. go(zero), goes, going). Current research in the PT framework does not always adhere to the initial operationalisation of the emergence criterion, which results in differences in the determination of the point of emergence of linguistic features in the data. This diversity is also reflected in the studies in this volume.

In the MM, determining the acquisition of specific linguistic features allowed researchers to track developmental patterns in L2 development. These features were related to a number of linguistic rules that learners are assumed to have acquired at a particular point in the acquisition process. In terms of methodology, a key innovation was the use of implicational scaling – the ordering of linguistic features in a specific way so that the presence of one feature in an interlanguage sample implies the presence of another feature. In this way, systematic patterns in a learner's interlanguage can be established.

As variational features in a learner's interlanguage could not be identified a priori, however, a major limitation of the MM was its lack of falsifiability. Thus, the distinction between developmental and variational features constituted a problematic aspect of the model.

The Strategies Approach (Clahsen, 1984) is conceptually different from the MM (see Pienemann, 2005: 73) and was developed in an attempt to go beyond describing developmental sequences in learner language in order to explain them. The approach focused on the development of word order in German as an L2. Its key

mechanism was the *shedding* of specific universal processing strategies at different stages of language development. Following Larsen-Freeman and Long (1991: 272), “‘development’ viewed from this perspective really consists of the *shedding of strategies*, or of the gradual removal of the constraints they impose on what is processable”. According to the Strategies Approach, the ability to process increasingly complex structures depends on the accruing ability to move and reorder elements in a sentence, as Clahsen (1984: 221) states with regard to the area of syntax: “As far as syntax is concerned, processing complexity results from re-orderings and restructurings of various levels of underlying linguistic units.”

The Strategies Approach was also subject to criticism, two major points being (1) its limitation to phenomena related to “word order permutation” and (2) “its undefined relationship to grammatical representation” (Pienemann, 2005: 73).

A separate proposal that drew on both the MM and the Strategies Approach to identify how developmental sequences in SLA might constrain possibilities for learning in instructional settings is the Teachability Hypothesis (Pienemann, 1984). In terms of the chronology of the approaches, it can be seen as a predecessor of PT. Its core prediction is that “stages of acquisition cannot be skipped (through teaching intervention) because of the cumulative nature of the processing strategies” (Pienemann, 2005: 73). Crucially, the Teachability Hypothesis defines specific constraints on teachability, which do not affect all aspects of L2 acquisition in the same way. The Teachability Hypothesis relates to the individual learner’s developmental readiness. Pienemann argues that through instruction, “variation can be altered, speed can be accelerated” (2005: 72). Although initially based on the MM and the Strategies Approach, the key ideas of the Teachability Hypothesis were not contradicted by the later development of PT. The Teachability Hypothesis is an application for instruction based on earlier insights from SLA that “was later (Pienemann, 1998) put on a PT basis” (Pienemann, 2005: 73).

A further prominently cited approach was the Predictive Framework by Pienemann and Johnston (1987). They attempted to extend the Strategies Approach to (1) morphological features and (2) to English as an L2. However, the Predictive Framework was “only short-lived” (Pienemann, 2005: 73) as it exhibited a number of limitations. First and foremost, it lacked an underlying grammatical framework. Related to this, because it was based on the Strategies Approach, it lacked typological plausibility, as the proposed speech processing strategies were closely connected to L2 German and could not be applied to other languages without further reflection.

The limitations of the previous approaches and “especially the lack of falsifiability in the MM and the inability of the Strategies Approach to link up to grammatical knowledge and its lack of typological plausibility” (Pienemann, 2005: 73) finally led to the design of PT. Core innovations associated with PT include

1. the processability hierarchy with five hierarchically ordered and implicationally related processing procedures. The core assumptions underlying language processing are based on Levelt's (1989) model of language generation.
2. the adoption of an explicit plausible grammatical formalism in order to model core aspects of language generation. The formalism chosen is Lexical-Functional Grammar (for an introduction to aspects of LFG that are relevant to PT, see e.g. Lenzing, 2013, *forthc.*, for a general overview see e.g. Asudeh & Toivonen, 2010; Bresnan, 2001). Its integration as a typologically and psychologically plausible theory of grammar allows for an extension of PT to typologically different languages and the incorporation of a range of syntactic and morphological structures on the basis of feature unification processes.
3. the concept of Hypothesis Space to accommodate both development and variation.

It is important to understand these aspects of the history of PT in order to see how attempts to engage more widely with PT from multiple perspectives both fit within and challenge the traditions that have shaped it. Some expansions will fit comfortably within the existing assumptions of PT. Others will take PT into unfamiliar territory and call for reflection on how ideas are translated from one context to another. Yet others have the capacity to challenge some of PT's assumptions. Each kind of relationship offers the potential for different kinds of widening for PT and mutual learning between theoretical approaches to SLA.

References

- Asudeh, A., & Toivonen, I. (2010). Lexical-functional grammar. In B. Heine & H. Narrog (Eds.), *The Oxford handbook of linguistic analysis* (pp. 425–458). Oxford: Oxford University Press.
- Bresnan, J. (2001). *Lexical-functional syntax*. Malden, MA: Blackwell.
- Clahsen, H. (1984). The acquisition of German word order: A test case for cognitive approaches to second language acquisition. In R. Andersen (Ed.), *Second languages* (pp. 219–242). Rowley, MA: Newbury House.
- Clahsen, H., Meisel, J., & Pienemann, M. (1983). *Deutsch als Zweitsprache: Der Spracherwerb ausländischer Arbeiter*. Tübingen: Gunter Narr.
- Hyltenstam, K. (1977). Implicational patterns in interlanguage syntax variation. *Language Learning* 27(2), 383–410. <https://doi.org/10.1111/j.1467-1770.1977.tb00129.x>
- Larsen-Freeman, D., & Long, M. (1991). *An introduction to second language acquisition research*. London: Longman.
- Lenzing, A. (2013). *The development of the grammatical system in early second language acquisition. The Multiple Constraints Hypothesis*. Amsterdam: John Benjamins.
- Lenzing, A. (*forthc.*). *The production-comprehension interface in second language acquisition: An integrated encoding-decoding model*. London: Bloomsbury.

- Levelt, W. J. M. (1989). *Speaking. From intention to articulation*. Cambridge, MA: The MIT Press.
- Meisel, J. M., Clahsen, H., & Pienemann, M. (1981). On determining developmental sequences in natural second language acquisition. *Studies in Second Language Acquisition* 3(2), 109–135. <https://doi.org/10.1017/S0272263100004137>
- Pienemann, M. (1984) Psychological constraints on the teachability of languages. *Studies in Second Language Acquisition* 6(2), 186–214. <https://doi.org/10.1017/S0272263100005015>
- Pienemann, M. (1998). *Language processing and second language development. Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M. (2005). Discussing PT. In M. Pienemann (Ed.), *Cross-linguistic aspects of Processability Theory* (pp. 61–83). Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30.04pie>
- Pienemann, M., & Johnston, M. (1987). *Factors influencing the development of language proficiency*. Adelaide, Australia: National Curriculum Resource Centre, Adult Migrant Education Program.
- Pienemann, M., & Lenzing, A. (2015). Processability Theory. In B. VanPatten & J. Williams (Eds.), *Theories in second language acquisition: An introduction* (2nd ed., pp. 159–179). New York, NY: Routledge.
- Pienemann, M., Keßler, J.-U., & Liebner, M. (2006). Englischerwerb in der Grundschule: Untersuchungsergebnisse im Überblick. In M. Pienemann, J.-U. Keßler, & E. Roos (Eds.), *Englischerwerb in der Grundschule. Ein Studien- und Arbeitsbuch* (pp. 67–88). Paderborn: Schöningh.

Language production and comprehension processes

PT has been primarily a theory of constraints on interlanguage production, but it is now widening its focus to include attention to issues governing the processing of input. This is motivated, in part, by the observation that no (inter)language production steps can occur without some information from the surrounding environment having been processed. The investigation of L2 comprehension/L2 input data (the two may not be identical) from a PT perspective raises a number of crucial questions that need to be addressed in order to be able to contribute to a deeper understanding of the underlying acquisition mechanisms. A key question in this concern is which aspects of the comprehension (input analysis) process are potentially governed by the mechanisms proposed in PT. Related to this question are the issues of whether there is a single set of mechanisms or an interface between related processes underlying comprehension and production and, if so, how such a set or relationship functions.

A related issue is the extent to which PT as a theory can engage with the multiple sources of information that are available to a learner seeking to understand a specific utterance. In particular, this concerns whether/how to distinguish semantic and morpho-syntactic aspects of second language processing (and in turn, these aspects from wider aspects of communicative behaviour). The initial question that arises is whether the role of morphology and syntax (the central domain of PT) can be separated out from the role of other contributors to the interpretation of an utterance. If this can be done, then it may be possible to make a closer comparison between the developmental stages that have so far been defined through production and any stages that can be defined in relation to input processing. However, this step will require consideration of how to define some of the features of discourse that PT is beginning to consider in more detail and to distinguish them from various semantic and pragmatic features.

A further issue in the investigation of the comprehension process from a PT perspective is developing an appropriate acquisition criterion for L2 comprehension. The traditional PT criterion of emergence is based on features of production. This cannot be applied in studies of comprehension in a one-to-one fashion. Further, when viewing comprehension as a holistic process involving many different

contributing elements, it may be that judgements in relation to a single linguistic feature could not define acquisition during comprehension. In this case, the only way in which the skill (level) of comprehension might be measured is in terms of the degree of accuracy of comprehension/judgement. This would be a radical departure from a current key feature of the assumptions underpinning PT. This approach raises additional issues. The degree of accuracy of comprehension is unlikely to reflect any mechanisms uniquely associated with comprehension. On the other hand, if measures of comprehension can be developed or research can be designed so that the comprehension/judgement can be made exclusively dependent on a specific grammatical feature, then it may be possible to separate syntactic and semantic contributions to comprehension and to conceptualise how comprehension and production of particular features are related. The chapters in this section are a beginning in this process and therefore focus on selected dimensions of language, foregrounding the semantic and morpho-syntactic aspects (although some larger issues are considered as background).

The three chapters in this section focus on the issue of modelling the interface between grammatical encoding and decoding, the question of whether L2 comprehension develops according to the same sequence as production as well as the question of how (or whether) progress in comprehension can be captured through the use of an (emergence) acquisition criterion.

The first chapter by Anke Lenzing begins with theoretical considerations and proposes an integrated model of grammatical encoding and decoding that includes specific requirements for both processes. In this model, Lenzing adopts the notion of a single processor in both grammatical encoding and decoding (*shared grammatical workspace*) by Kempen (2000) and Kempen et al. (2012) and uses an analysis of data from the L2 acquisition of the passive (in comprehension and production) to support this integrated view. Although mainly focusing on morpho-syntactic processing, she also addresses the influence of semantic factors involved in L2 comprehension.

The chapter by Patti Spinner & Sehoon Jung looks at production and comprehension data from an empirical perspective. The authors investigate whether the ability to produce and to comprehend specific morpho-syntactic features emerges simultaneously in L2 learners and whether the order of emergence is in line with the predicted sequence of acquisition spelled out in PT. They compare the performance of L2 learners in oral speech production and in a self-paced reading task. Based on the analysis of the data in relation to the learners' PT stages, they conclude that there is no direct relationship between L2 receptive and productive processes.

The chapter by Aafke Buyl investigates receptive processing from a PT perspective. Buyl uses a timed written grammaticality judgement task to explore whether receptive processing of specific morphological structures occurs in the

same sequence as proposed by PT for production. One focus in her data analysis is an exploration of different kinds of acquisition criteria in comprehension, including different kinds of accuracy scores. Her data do not show any developmental systematicity and thus do not support the view that receptive processing is governed by the same PT procedures as production.

Even though the findings by Lenzing, by Spinner and Jung and by Buyl outlined in the three chapters are divergent, they show ways in which it is possible to explore relationships between comprehension and production processes. In addition they identify some of the methodological and conceptual differences in working on this relationship. There is clearly more room for work on the nature of potential interfaces between production and reception and on clarification of appropriate methods to investigate the issue.

Towards an integrated model of grammatical encoding and decoding in SLA

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In this chapter, I consider the interface between production and comprehension in second language acquisition (SLA). I argue that the two processes rely on (partially) shared resources and propose an integrated encoding-decoding model of SLA. The core of the model is a single syntactic processor underlying both second language (L2) grammatical encoding and decoding. The model also includes a means of accounting for the interaction of shared grammatical resources and key semantic aspects such as lexical semantics and event probability on the comprehension process. My claims are tested in an empirical study focussing on the L2 acquisition of English passive constructions by 24 learners with an L1 German background at different stages of L2 acquisition. The results of the data analysis provide support for the notion of a single syntactic processor in L2 acquisition.

1. Introduction

This chapter focuses on a key issue in SLA research, namely the relation between grammatical encoding and decoding in L2 acquisition. Insights into these processes can contribute to a better understanding of underlying acquisition mechanisms.

In the past, production and comprehension have largely been studied separately and most psycholinguistic research has addressed only one of the two processes – either comprehension or production (e.g., Chapman & Miller, 1975; Clark & Malt, 1984; Ruder & Finch, 1987). This is related to the assumption in both linguistics and cognitive psychology that comprehension and production processes occur in two different modules with two different types of operations (for details see Kempen et al., 2012: 347; Pickering & Garrod, 2007: 105).

However, the two-systems approach has recently been challenged by advocates of a more integrated view of language processing. This position has received support from psycholinguistic and neurobiological research providing evidence of an overlap in comprehension and production mechanisms (e.g., Garrett, 2000; Kempen

et al., 2012; Menenti et al., 2011; Pickering & Garrod, 2007, 2013; Segaert et al., 2012). Although these integrated accounts differ in their theoretical perspectives on this issue, they all view the two processes – comprehension and production – as intertwined.

In this chapter, I argue for an integrated perspective on comprehension and production processes in SLA. The integrated encoding-decoding model I propose has two theoretical cornerstones. The first cornerstone comes from the notion of a shared grammatical workspace as developed by Kempen et al. (2012) and is further supported by recent research in neuroimaging (Segaert et al., 2012). The second cornerstone is the theoretical perspective on SLA of Processability Theory (PT) (Pienemann, 1998; Pienemann et al., 2005) and the Multiple Constraints Hypothesis (MCH) (Lenzing, 2013, 2015).

In order to show how the notion of a shared grammatical workspace can be applied to SLA and be combined with the key assumptions of PT and the MCH to form an integrated encoding-decoding model in SLA, I will first present the key ideas of Kempen et al.'s unitary approach to syntactic processing and outline the core claims underlying PT and the MCH. In a second step, I will present a sketch of the integrated encoding-decoding model. To outline the nature of the acquisition task, I then discuss the varied influences on the comprehension and production of passives and formalise these in relation to features of the English passive in terms of PT and Lexical-Functional Grammar (LFG) (e.g., Bresnan, 2001). I then present the results of an empirical study of the L2 acquisition of the passive by L1 German learners of English at different stages of L2 acquisition.

2. A Shared Grammatical Workspace in language processing

The notion of a unitary system of syntactic processing was initially put forward by Kempen (2000) and then elaborated and tested by Kempen et al. (2012). Kempen (2000) pictured the system as follows:

Suppose that [...] our cognitive system has a single processing mechanism for syntax assembly that is used for *constructing* syntactic structures (grammatical encoding in sentence production) as well as for *reconstructing* syntactic structures (parsing, grammatical decoding in sentence comprehension).

In proposing a single processing mechanism for the assembly of syntactic structures, Kempen clearly acknowledges that differences exist between syntactic encoding and decoding. The envisaged shared system relies on two different types of information in the two different “processing contexts” (Kempen, 2000: 38). In encoding, the information is derived from the lexico-syntactic information associated with the

related conceptual structure or message. In decoding, the information is derived from the strings of words occurring in the input (Kempen, 2000: 38). However, despite this directional difference, Kempen argues that both processes share a number of characteristics. These include, but are not limited to, a sensitivity to conceptual factors, direct mapping between conceptual and syntactic relations, and incremental processing. Additionally, Kempen (2000: 39) points out that both processes have similar empirical profiles, i.e., “parsing and formulating have been found to react similarly to experimental manipulations” (for details see Kempen, 2000).

The integrated approach was further refined by Kempen et al. (2012), who proposed a “shared grammatical workspace” (Kempen et al., 2012: 346), arguing that “grammatical encoding and decoding could be accomplished by SHARED processing resources – by a single exemplar of all, or all important, parts of the cognitive resources.” (Kempen et al., 2012: 348). Kempen et al.’s main claim is that in a shared workspace architecture with one processing mechanism for both modalities, grammatical encoding and decoding cannot take place (truly) simultaneously. Simultaneous encoding and decoding can only take place if each modality is subserved by a distinct process, an architecture that Kempen et al. (2012: 349) refer to as the “dedicated-workspaces hypothesis”.

Evidence for their hypothesis of a shared workspace comes from two experimental studies in which participants carried out grammatical multi-tasking in overlapping timespans. The results of the two studies support the notion of a unitary system for syntactic processing. Further support for their unitary view of syntactic coding comes from two neuroimaging studies (Menenti et al., 2011; Segaert et al., 2012) using functional magnetic resonance imaging (fMRI). Both studies focused on potential overlaps in neuronal infrastructure in comprehension and production. Their results provide support for a unitary view of syntactic processing (Menenti et al., 2011: 1180; Segaert et al., 2012: 1669).

I now turn to the core notions of the processability perspective on SLA that forms a central part of the integrated encoding-decoding model that I propose.

3. The perspective on SLA – Processability Theory & the Multiple Constraints Hypothesis

PT (see e.g., Pienemann, 1998; Pienemann et al., 2005; Pienemann & Lenzing, 2015) and its extension, the MCH (Lenzing, 2013) make the central claim that the architecture of the human language processor determines the developmental path that learners follow in the course of L2 acquisition (Pienemann, 1998: 4).

Like PT, the MCH is based on LFG and addresses the question of what kinds of linguistic resources are available to beginning L2 learners. The MCH includes

a number of testable hypotheses concerning the constraints of the mental grammatical system in the L2 initial state. The key claim of the MCH is that the initial restrictions on the mental grammatical system affect both syntactic and semantic representations such that beginning L2 learners can only draw on a restricted set of linguistic resources. The proposed constraints are formalised in LFG and apply to the different levels of linguistic representation (argument structure, functional structure and constituent structure). The MCH is illustrated in Figure 1 and the constraints at the different levels of representation are briefly summarised below:

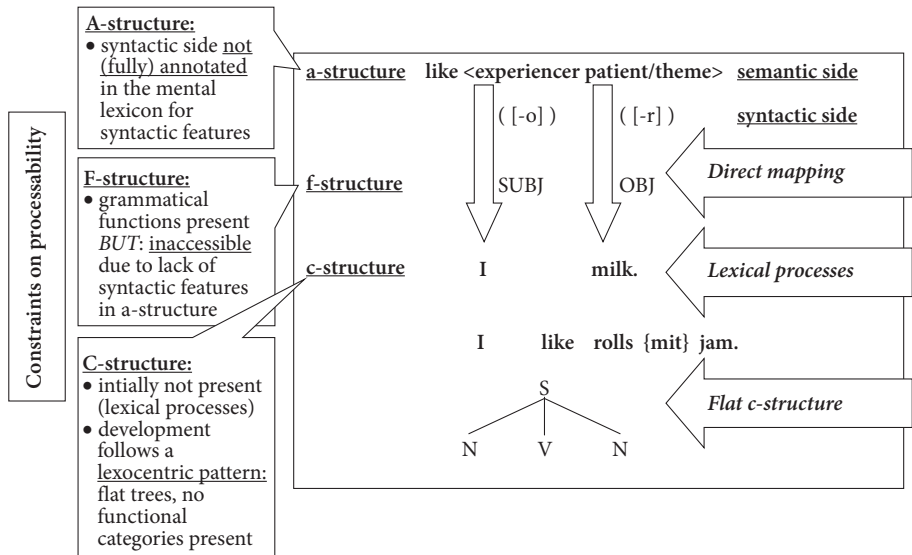


Figure 1. The Multiple Constraints Hypothesis (taken from Lenzing, 2013: 8)

1. Argument structure

The MCH makes precise predictions about the initial restrictions on both the semantic and the syntactic side of a-structure. On the semantic side, the constraints restrict the types of argument roles present in the L2 learners' lexical entries. The syntactic side of a-structure is initially not fully annotated for its syntactic features. In LFG, the syntactic features at a-structure level are essential to the mapping operations relating arguments to grammatical functions. The partial annotation of the syntactic side of a-structure results in the inability of beginning L2 learners to map arguments onto grammatical functions. As a result, L2 learners in the initial state rely on direct mapping operations from arguments to surface form (see Lenzing, 2013: 8).

2. Functional structure

In line with the assumption that grammatical functions are primitives in LFG, the MCH claims that the universal grammatical functions encoded at f-structure level are present in the L2 learners' mental grammar right from the beginning. However, the lack of syntactic features in a-structure means that grammatical functions are not accessible. It is the successive annotation of a-structure for syntactic features in the course of L2 development that makes the grammatical functions accessible (see Lenzing, 2013: 9).

3. Constituent structure

In the MCH I proposed that in the L2 initial state, c-structure is not present in the mental grammatical system. The utterances of early L2 learners are not generated by c-structure processes but instead reflect lexical processes. Following the predictions of PT, c-structure emerges gradually and develops step-wise from a simplified c-structure with a lexocentric pattern to a more hierarchical endocentric one (see Lenzing, 2013: 9).

4. The lexicon

The MCH claims that the lexicon is gradually annotated (e.g., for the lexical item's syntactic category, such as noun or verb). This includes the hypothesis that initially, not all verbs are annotated for the type and number of arguments they take (see Lenzing, 2013: 9).

In LFG, two core processes align the semantic and syntactic information that is present at the different levels of linguistic representation: Feature unification and mapping. In the L2 initial state, these processes cannot be carried out, as essential information is missing. Instead, the constraints on the system result in lexical processes and direct mapping operations from a-structure onto surface form, bypassing f-structure.

One further core claim of the MCH is that the L2 mental grammatical system develops in line with the predictions of PT. The initial constraints are relaxed successively in the course of L2 development such that learners have more and more linguistic resources available as learning progresses (see Lenzing, 2013).

4. An integrated perspective on encoding and decoding in SLA

To date, the main focus of research within the PT framework has related to L2 production. Although in principle, the theory holds that “at any stage of development the learner can produce and comprehend only those second language (L2) linguistic forms which the current state of the language processor can handle” (Pienemann & Lenzing, 2015: 159), the issue of comprehension has only recently begun to receive more attention. The studies investigating receptive processes from a processability perspective have restricted themselves to the question of whether the acquisition of the L2 comprehension of grammatical features follows the same sequence as in L2 production (Buyl, 2015; Buyl & Housen, 2013, 2015; Keatinge & Keßler, 2009; Spinner, 2013; Spinner & Jung, 2017). The studies yielded mixed results. Whereas the results from both Keatinge and Keßler (2009) and Buyl and Housen (2013, 2015) indicate that there is a similar sequence in the acquisition of both modalities, the studies by Spinner (2013), Spinner and Jung (2017) and Buyl (2015) do not support this claim, as no systematicity in the comprehension data could be observed.

However, what has so far been lacking in the examination of potential interfaces between the two modalities within the PT framework is an attempt to model their exact relation based on (1) psycholinguistic insights and evidence and (2) a detailed LFG analysis of the processes involved. In this chapter, I aim to fill this gap. Focussing on syntactic encoding and decoding, I sketch out a theoretically-motivated model of the interface of receptive and productive processes in SLA, which combines the notion of a shared grammatical workspace (Kempen, 2000) with the general architecture of PT and its extension, the MCH. A more detailed presentation of the model and its underlying assumptions can be found in Lenzing (forthc.).

The following hypotheses shape the model:

- There is a single syntactic processor underlying both grammatical encoding and grammatical decoding processes in L2 acquisition. This processor develops stepwise in accordance with the predictions of PT.
- The L2 learners’ mental system for both grammatical encoding and decoding is initially highly constrained at the different levels of linguistic representation postulated in LFG (Bresnan, 2001), as proposed in the MCH (Lenzing, 2013).

This integrated encoding-decoding model is illustrated in Figure 2. It is based on aspects of PT and Levelt’s (1989) Blueprint for a Speaker, which constitutes the model of sentence generation underlying PT, as well as on Kempen et al.’s notion of

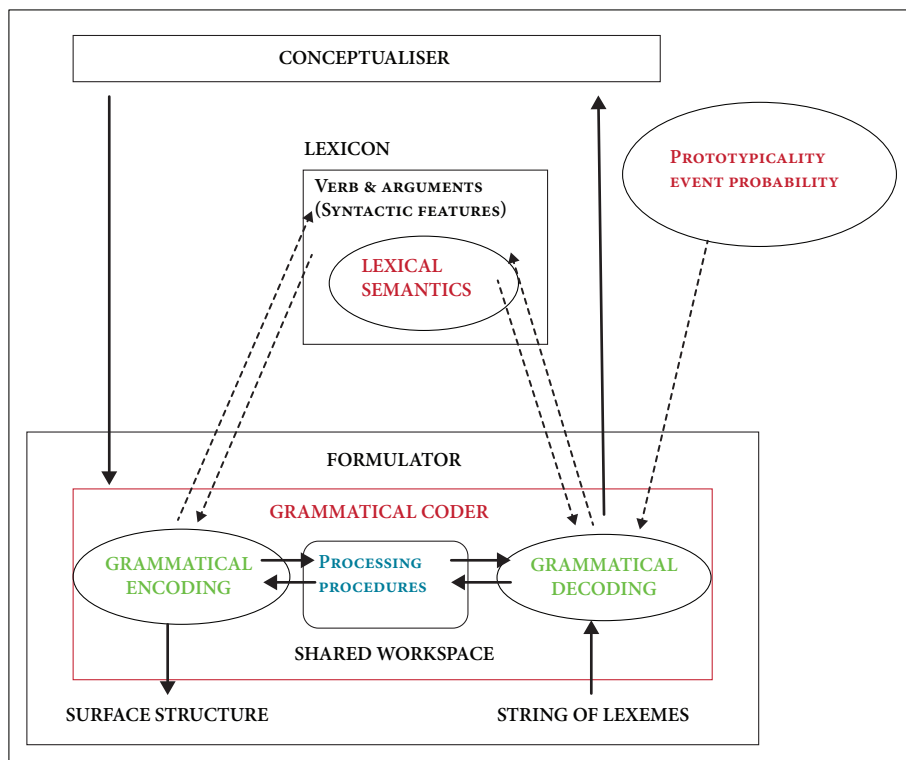


Figure 2. An integrated encoding-decoding model in SLA (Lenzing, forthc.) (based on aspects of Kempen et al. 2012; Levelt 1989; Pienemann, 1998)

a shared grammatical workspace.¹ The core of the model consists of the *grammatical coder*, in which both syntactic encoding and decoding take place. The model accounts for the directional difference of encoding and decoding as indicated by the arrows in Figure 2: In grammatical encoding, the conceptual message is transformed into a surface structure, and in grammatical decoding, a string of lexemes (including other potentially perceivable information) in the language produced by others is transformed into a conceptual message. Adopting the notion of the shared

1. The integrated encoding-decoding model differs in one crucial aspect from Levelt's (1989) model of sentence generation. In contrast to Levelt, who conceptualised the comprehension system as a component separate from the formulator, I posit a shared grammatical coder for both encoding and decoding operations. In his later work, Levelt (1999, 2000) also considers the possibility of a shared system, but does not elaborate on this in great detail.

workspace (Kempen et al.), I argue that in L2 acquisition, both modalities draw on essentially the same syntactic processing resources. These resources include the processing procedures postulated in PT as well as the two core processes in LFG to align syntactic and semantic information, namely feature unification and mapping operations. In keeping with the core claim of PT, I hypothesise that the processing procedures are acquired step-wise in the course of SLA and that this gradual acquisition holds for both comprehension (i.e., decoding) and production (i.e., encoding). I further claim that L2 learners draw on the same mental grammatical system in both encoding and decoding processes that is constrained as specified in the MCH.

Naturally, in both (L2) production and comprehension learners also draw on semantic/pragmatic information. This is particularly important for comprehension. Semantic/pragmatic cues form an essential part of the resources humans draw on in comprehension and they are of crucial importance in the early stages of L2 comprehension, when the L2 syntactic processor is still underdeveloped.

In the integrated encoding-decoding model sketched out in Figure 2, two semantic/pragmatic resources that have been shown to influence the L2 comprehension process are *lexical semantics* and *event probability*.² According to VanPatten (1996: 36),

[l]exical semantics refers to the constraints on a situation imposed by the semantics of the verb involved. [...] An event probability refers to the likelihood that a given situation exists in the real world, even though lexical semantics allows it.

As an example of lexical semantics, VanPatten (1996: 36) refers to the verb *kick*, which requires an animate agent that has legs to do the kicking action. Sentences such as *The fence kicked the horse* (VanPatten 2015: 121) and *He kicked her with his ear* (VanPatten, 1996: 36) are, therefore, semantically anomalous. In the first sentence, the agent is not animate and in the second sentence, the animate agent has no legs.

The following two sentences illustrate the concept of event probability:

- (1) The dog bit the postman.
- (2) The postman bit the dog.

Although both sentences are semantically possible in terms of lexical semantics (in both cases, the agent is animate and is capable of biting), the event described by the first sentence is far more plausible than the one in the second sentence.

2. A third semantic aspect that is incorporated in the model is the one of *prototypicality*. The influence of prototypicality on the L2 comprehension process is discussed in some detail in Lenzing (forthc.).

Figure 2 shows that the two types of knowledge are located in different kinds of stores: Information about lexical semantics is stored in the lexicon, as it constitutes part of lexical knowledge. Knowledge about event probabilities forms part of the speaker’s declarative world knowledge. I argue that this knowledge about event probabilities is stored in a similar way as the kind of knowledge Levelt refers to as *situational knowledge* and *encyclopedic knowledge* (Levelt, 1989: 9ff.).

In sentence comprehension, both lexical semantics and event probabilities play a major role and have been shown to override syntactic processing. This kind of *shallow processing* where language users rely on semantic cues instead of detailed syntactic processing, applies in both first and second language acquisition (see Bates et al., 1984; Slobin, 1966 for L1 acquisition and Clahsen & Felser, 2006 and VanPatten, 1996, 2015 for L2 acquisition), but has also been observed in native speaker sentence processing (e.g., Ferreira et al., 2002; Sanford & Sturd, 2002). These findings indicate that in addition to syntactic processing constraints, semantic/pragmatic resources needed to be included in the empirical study presented in this chapter.

I now turn to issues in the acquisition of the passive in comprehension and production, to background the empirical study presented in the second part of the chapter.

5. The acquisition of the passive in comprehension and production

The passive requires non-linear argument-function mapping in both comprehension and production (see Figure 3) and presents options for distinguishing the processing of semantic and syntactic cues.

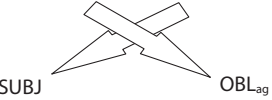

a- to f-structure mapping	Structures	Example
Non-default mapping. (single clause passive)	a-structure	play <agent patient/theme>
	f-structure	
	c-structure	 <p><i>The guitar was played by John.</i></p>

Figure 3. The English passive: Non-linear argument-function mapping (taken from Lenzing, 2013: 103)

As this example illustrates, in passive constructions, the agent (John) is not mapped onto the subject, as is the case in default SVO constructions in English. Instead, the patient/theme is mapped onto the subject and the agent is mapped onto the oblique function (see Lenzing, 2013: 102; Levelt, 1989: 192; see also Bresnan, 2001). According to PT's Unmarked Alignment Hypothesis (Pienemann et al., 2005: 229), at the beginning of the L2 acquisition process, the correspondence between the three levels of linguistic representation (a-structure, f-structure and c-structure) is linear and learners rely on default linear mapping between arguments and grammatical functions as well as constituents and grammatical functions. As outlined earlier in the MCH, I argue that initially, grammatical functions are not accessible and that learners have to rely on direct mapping operations from arguments to surface form. Since the passive requires non-linear mapping operations between arguments and grammatical functions, it is claimed to be acquired at a later stage in the acquisition process (Pienemann et al., 2005: 240). In comprehension, the notion of initial default linear mapping is compatible with VanPatten's First Noun Principle and the related claim that L2 learners initially interpret the first noun in the sentence as the agent/subject (VanPatten, 1996: 34). There is a long tradition of research that shows that initially, both L1 and L2 learners tend to interpret passive sentences as active constructions, assigning the agent to the subject function (see e.g., Bever, 1970; Hill, 1998; Ingram, 1974; Lempert, 1978; Maratsos, 1974 for L1 and VanPatten, 1984, 2015; Wang, 2011 for L2 acquisition). However, as pointed out above, semantic aspects crucially influence the comprehension process, including the comprehension of passive structures. Hence, the default assignment of the agent role to the subject can be overridden by semantic-pragmatic factors, meaning that for certain passive constructions comprehension may not be delayed by grammatical processing issues.

In passive constructions, a distinction is made between reversible and non-reversible passives. Reversible passives are passive constructions where both the subject (patient/theme) and the object NP (agent) are animate, as in (3).

- (3) The girl was hugged by the boy.

In these constructions, an exchange of agent and patient/theme would result in a meaningful sentence (*The girl was hugged by the boy – The boy was hugged by the girl*). In the case of non-reversible passives, as in (4), however, this kind of exchange is not possible.

- (4) The fence was kicked by the cow.

In (4), the patient/theme in subject position is not animate, and therefore this kind of role reversal is constrained by lexical semantics (*The fence was kicked by the*

cow – **The cow was kicked by the fence*). Research in L1 acquisition shows that non-reversible passive constructions are acquired earlier than reversible passives (e.g., Bates et al., 1984; Hakuta, 1982; Slobin, 1966).

Event probabilities also have a major influence on the initial comprehension of passive constructions. This is illustrated in examples (5)–(8):

- (5) The baby was carried by the father.
- (6) The father was carried by the baby.
- (7) The boy was kissed by the girl.
- (8) The girl was kissed by the boy.

Sentences (5) and (6) constitute cases of high and low event probability. It is far more likely that the baby would be carried by the father (5) than the other way around (6). Examples (7) and (8) display a ‘neutral’ event likelihood. Both events are equally likely to take place. Research in L1 acquisition reveals that passives with high event likelihood are understood before passives with ‘neutral’ event likelihood (e.g., Bloom, 1974; Clark, 1980; Chapman & Kohn, 1978). Consequently, the passive construction in (5) would be understood before the ones in (7) and (8). VanPatten (2015: 120f.) points out that the same effects exist in L2 comprehension.

As a result, the initial comprehension of non-reversible passives and passives with biased event probability will reflect semantic processing since the L2 learner will not have to rely on full syntactic processing to interpret the sentence. This means that the comprehension of non-reversible passives and passives with biased event probability will occur at an earlier stage than the comprehension of reversible passives and needs to be controlled for in researching unitary syntactic processing.

5.1 The passive in LFG and PT

When investigating the acquisition of the passive voice in L2 English from a processability perspective, the question arises as to whether it is possible to assign the passive to one particular stage of acquisition or whether different aspects of passive constructions are acquired at different points in time and thus at different stages of L2 acquisition. In contrast to a wealth of studies in L1 acquisition, research on the passive in L2 acquisition is relatively scarce (see e.g., Marinis, 2007; Marinis & Saddy, 2013; Tomlin, 1995, 1997) with much of the research focusing on the effects of instruction on the L2 acquisition process (see e.g., Izumi & Lakshmanan, 1998; Spada & Tomita, 2010). The studies generally acknowledge that the passive voice is more complex than active constructions and therefore more difficult to process/acquire. Within the PT framework, studies related to the acquisition of

the passive have been conducted by Wang (2011), Keatinge & Keßler (2009) and Kawaguchi (2008).

These studies and their empirical basis reveal a development in the acquisition of the passive from linear to non-linear argument-function mapping. However, the theoretical considerations underlying the three studies all focus primarily on the Unmarked Alignment Hypothesis (Pienemann et al., 2005).

I argue here that more differentiation is needed when engaging with passive constructions within a PT framework. In order to be able to make predictions about the acquisition of the passive, the underlying processing mechanisms have to be precisely specified and formalised in terms of LFG's mapping operations and feature unification.

A further claim I will make is that the passive cannot be assigned to a single PT stage, as the different processes involved in the production and comprehension of passive constructions are acquired at different stages of acquisition. What is more, not all processes can be explained in terms of the processes assumed to underlie the PT stages (feature unification and mapping operations).

I hypothesise that the initial restrictions constraining the L2 syntactic processor result in the following sequence of both encoding and decoding (see Lenzing, *forthc.*):

1. Shallow processing:
 - the first noun phrase is assigned the role of agent/experiencer
 - syntactic features are missing in the lexicon
2. Non-linear argument-function mapping:
 - the first noun phrase can be assigned the role of patient/theme
 - syntactic features become involved in unification processes of argument-function mapping
3. Morpho-syntactic processing:
 - the c-structure level becomes involved
 - both feature unification and form-function relationships play a role.

I also claim that there are different processes involved in the production and comprehension of the passive. There is differentiation between grammatical encoding and decoding because different minimal requirements apply rather than because of differences in processing procedures. In this chapter, I propose specific minimal requirements for the production (encoding) and the comprehension (decoding) of the passive. The minimal requirements for both processes are formalised in terms of PT and an LFG-based analysis of the passive. Comprehension is assumed to occur before production because of different minimal requirements, which are outlined below.

5.2 Minimal requirements in production and comprehension

In order to be able to *produce* passive constructions, specific requirements have to be met at the different levels of linguistic representation. At a-structure level, this applies to the annotation of the syntactic side of a-structures for the syntactic features that are essential to map arguments onto grammatical functions. In the MCH, I argue that this process occurs in the lexicon (see also Lenzing, *forthc.*). The requirements at f-structure level are linked to those of a-structure: Passive constructions constitute a case of non-linear argument-function mapping as the patient/theme needs to be mapped onto the subject and the agent onto the oblique function. Passives cannot be realised by means of direct mapping processes but require access to grammatical functions at f-structure level. As outlined in the MCH above, I hypothesise that initially, L2 learners lack full annotation of the syntactic side of a-structure, resulting in an inability to map arguments onto grammatical functions. Finally, at the level of c-structure, the target-like production of the passive requires the ability to process verb phrases (VPs). For morphology, L2 learners additionally need to acquire the language-specific form-function relationships. This applies to the target-like verb morphology in the passive including irregular verb forms (see Pienemann, 1998: 154).

Following these assumptions, I argue that the target-like *production* of the passive requires the following processes and procedures:

1. Non-linear argument-function mapping (gradual process, not before stage 3)
2. Feature unification within the verb phrase (stage 4)
3. Form-function relationships (gradual process, beginning at stage 4).

Whereas some of the processes involved in passivisation can be captured in terms of underlying processing procedures, others depend on the gradual annotation of the L2 learner's mental lexicon and cannot be explained in terms of PT's processing procedures. The latter applies to the first prerequisite for the production of the passive, namely the non-linear mapping between arguments and grammatical functions. I hypothesise that this operation depends on the annotation of the syntactic side of a-structure and that this annotation constitutes a gradual process. The non-linear mapping operation requires the annotation of the syntactic side of a-structure for its relevant syntactic features. The MCH hypothesises that the process of annotating the L2 lexicon for the syntactic features at a-structure level occurs gradually. I also claim that this process is part of individual learner variation and not explicable by the acquisition of the processing procedures spelled out in PT. I argue that this process does not occur before the learners have reached stage 3 of

acquisition when learners have not only assigned lexical items a syntactic category but are also able to process phrases.

The second process involved in the production of the passive is related to the processing of verb phrases. This requires the verb phrase procedure at stage 4. The form-function relationships involved in the production of the verb morphology cannot be explained by the processing procedures postulated in PT. Instead, Pienemann (1998: 156) argues that these processes constitute a case of learning that is different from the exchange of grammatical features. Therefore, I argue that the form-function relationships are acquired gradually from stage 4 onwards, as learners have to acquire the verb phrase procedure before they can acquire the form-function relationships.

The minimal requirements required for the *comprehension* of passive constructions differ slightly from those for their production. As sketched out above, semantic-pragmatic factors play a substantial role in comprehension and thus, I assume that these factors can override syntactic processing in comprehension (e.g., in cases of non-reversible passive constructions and passives with high event probabilities). When these factors do not shape comprehension, L2 learners require non-linear argument-function mapping. As in production, I assume that the acquisition of non-linear mapping is a gradual process. For full syntactic processing of passive constructions in comprehension – when no semantic cues are present – learners need the verb phrase procedure (stage 4) to be able to carry out feature unification operations. What is not necessarily required in comprehension is the acquisition of form-function relationships for verbal morphology.

In what follows, I present the empirical study that aims to test the proposed developmental schedule for the acquisition of the English passive and the related minimal requirements for production and comprehension.

6. The study – Research design and results

The empirical study presented here is part of a larger study focussing on different aspects of the L2 acquisition of passive constructions (see Lenzing, *forthc.*). It is cross-sectional in design and investigates the production and comprehension of the passive by 24 school-based learners in relation to their L2 developmental stage. The data collection took place at three different schools with learners from three different grades (5, 8 & 9). The learners' age range was between eleven and 15 and they had received four, five and six years of instruction respectively.

The data collection focused on the following three aspects: (1) the learners' developmental stage, (2) their oral speech production of passive constructions and (3) their comprehension of passive constructions.

6.1 Tasks for data elicitation

In order to be able to determine the learners' stages of acquisition, three different communicative tasks were used. These tasks provided a context for spontaneous oral speech production and were additionally aimed to elicit specific morpho-syntactic structures, such as different types of question forms or the '3SG-s'. All tasks included an *information gap* (see e.g., Pica et al., 1993) and the overall task design was based on previous work within the PT framework (Lenzing, 2013; Pienemann & Mackey, 1993; Pienemann, 1998; Roos, 2007) (for more details see Lenzing, *forthc.*).

Two tasks were used in the study to elicit oral production data of passive structures. The first one was based on the so-called *fish film* (Tomlin, 1995, 1997), an online computer-animated film initially designed to investigate the relation between visual attention and grammatical subject assignment. As the *fish film task* focuses on the active-passive alternation, it has been used in studies within the PT framework focussing on the passive in L2 acquisition (e.g., Wang, 2011). The film consists of a number of trials with two fish of varying colours that swim towards each other. When they reach one another, one fish swallows the other one. One of the fish is visually cued by an arrow above it, and participants are asked to describe the event focussing on the fish the arrow had indicated. In this way, the film elicits both active and passive constructions. However, although the fish film has been successfully employed in a number of studies focussing on the elicitation of passive constructions, it has a significant limitation in relation to the purpose of this study: It does not allow for lexical variation in the verb. In order to incorporate lexical variation in the production data of the passive, I employed a second task, the so-called *passive film task*. It consists of a number of film clips showing different events. Its design is based on the fish film in that I used an arrow as a cue to focus on either the patient or the agent in the event. The participants were asked to describe the event by focussing on the entity the arrow had indicated. As some of the learners were at lower stages of acquisition, the verb they were supposed to use was shown in the lower right-hand corner of the screen. The *passive film task* consisted of nine trials focusing on passive constructions and four distractor items triggering active sentences.

As the investigation of comprehension processes within the PT framework is a relatively recent phenomenon, the most appropriate kind of methodology is a work in progress. Issues that have to be taken into consideration in task selection include potential guessing effects and the potential influence of declarative knowledge. Previous studies in the PT framework that have looked at comprehension processes have used different kinds of data elicitation methods. For instance, Buyl and Housen (2015) elicited data using the *ELLAS Grammar Test*, a picture-selection task developed within the *Early Language and Intercultural Acquisition Studies* (Kersten

et al., 2010; Steinlen et al., 2010). Spinner's (2013) study on comprehension employed an audio grammaticality judgement task.

In this study, the learners had to enact sentences that were presented to them aurally. This methodology is based on L1 acquisition studies investigating the comprehension of the passive by young children (see e.g., Bates et al., 1984; Lempert, 1978). Another common methodology in investigating sentence comprehension is the use of sentence-picture matching tasks (e.g., Maratsos et al., 1985 for L1 and Buyl & Housen, 2015 for L2 acquisition). Watermeyer (2010) demonstrated that both sentence-picture matching tasks and tasks where participants enacted sentences yield similar results in children aged five years and older.

The passive comprehension task in this study contained twelve passive sentences and four distractor sentences in active voice. The researcher read out a sentence to the learners and they were asked to enact the sentence they heard with selected Playmobil© figures. In addition, they pointed to the Playmobil© figure that carried out the action to avoid unclear cases. A picture of each Playmobil© scene was taken for analysis.

In order to account for both semantic and syntactic processing, I included the following four categories of passive constructions in the study:

- Symmetrical reversible passives ('neutral' event probability)
e.g., *The giraffe is followed by the zebra.*
- Biased reversible passives (low event probability in case of active interpretation)
e.g., *Tom is chased by the alligator.*
- Non-reversible passives (lexical semantics)
The cage is opened by Lisa.
- Passives with 3 arguments
James is saved from the tiger by Tom.

The assessment of the semantic properties of the test stimuli formed part of a larger study designed to assess the plausibility of trial sentences used in three related studies presented in Lenzing (forthc.). The results of the plausibility study showed that the semantic properties of the trial sentences can be considered to be appropriate (see Lenzing, forthc. for details).

6.2 Data analysis

The data analysis sought to relate the learners' developmental stages to their production and comprehension data for English passive constructions. One key methodological principle in this analysis is implicational scaling. Implicational scaling is used in SLA research as a means to identify developmental patterns in L2 acquisition (see Rickford 2002). The core idea underlying implicational scaling is that variables can be ordered in such a way that the presence of a variable x in a data sample implies the presence of a variable y , but not vice versa.

Implicational scaling has two independent starting points in scientific research, which result in (at least) two different traditions. Implicational analyses were first used by the social scientist Guttman (1944) in social and psychological assessment. Independently, DeCamp (1971) introduced the method to linguistics in his study on Jamaican Creole development. Implicational analyses have since been used in a large number of studies of both sociolinguistic variation (e.g., Akers, 1981; Bailey, 1973a, b; Bickerton, 1971, 1973; Labov, 1973; Lameli, 2004; Rickford, 1991; Sankoff, 1973) and second language acquisition (e.g., Andersen, 1978; Bayley, 1999; Di Biase, 2008; Ellis, 2008; Itani-Adams, 2007; Kawaguchi, 2016; Lenzing, 2013; Meisel et al., 1981; Nagy et al., 1996; Pienemann, 1998; Trofimovich et al., 2007; Trudgill, 1986).

Implicational scaling is exemplified in Table 1, which illustrates an implicational matrix of a fictitious data set obtained in a cross-sectional study:

Table 1. Sample implicational scale cross-sectional study

Feature	Learner 1	Learner 2	Learner 3	Learner 4
a	1	1	1	1
b	0	1	1	1
c	0	0	1	1
d	0	0	0	1

In this example matrix, the learners are presented horizontally and the linguistic features are listed vertically. The features in Table 1 are ordered implicationally, i.e., the presence of feature d in the data implies the presence of the features a, b and c, but not vice versa.

However, as observed by Guttman (1944: 140) and Hatch and Lazaraton (1991: 205), perfect scales such as in Table 1 do not necessarily occur with real data. Therefore, the questions arise as to (1) *when* an implicational scale can be considered to be valid and (2) how to treat *deviations* from perfect scales. It is the latter point where the two traditions mentioned above propose different solutions, which has repercussions for the interpretation of the data.

Deviations from the ideal pattern are captured by the coefficient of reproducibility (CR), which was introduced by Guttman (1944, 1950) and subsequently used in sociolinguistics and SLA research (e.g., Rickford, 2002: 149). This coefficient is calculated by dividing the total number of errors identified in the matrix by the total number of opportunities for errors. According to Hatch and Lazaraton (1991: 210), the CR should be higher than .96 in order for a scale to be considered valid. A second coefficient, the coefficient of scalability (CS) was introduced by Menzel (1953) to address a limitation of the CR, namely its sensitivity to extreme marginal distributions of items and categories. Generally, a scale with a CS of .60 is considered to be valid (Hatch & Lazaraton, 1991: 212).

Although there seems to be a consensus as to *when* an implicational scale is considered to be valid, approaches differ in the way they treat *deviations* from a perfect scale. Two approaches to error assessment have been proposed in the literature. They differ in their understanding of what is considered an error in an implicational scale. These are the Minimisation of Error Approach (Guttman, 1950) and the Goodenough-Edwards Technique (Edwards, 1948; Goodenough, 1944). The Minimisation of Error Approach focuses solely on the items that deviate from the perfect pattern. It considers the number of errors in a scale as “the least number of positive responses that must be changed to negative or negative responses that must be changed to positive in order for the observed pattern to be transformed into an ideal response pattern” (McIver & Carmines, 1981: 42). The Good-Enough-Edwards Technique, on the other hand, takes ideal patterns as a starting point. These patterns are based on the number of *positive* responses/items in the participant’s data set. In this form of error assessment, all responses/items that deviate from the assigned ideal pattern are classified as errors (McIver & Carmines, 1981: 44).

The differences in error assessment of the two approaches become evident when considering the example of a participant in a study on social attitudes (see Lenzing, *forthc.*; see also McIver & Carmines, 1981). The fictitious participant scored positively on two out of four items, which would yield the ideal response pattern (+ + / - -). However, as the participant’s response to the first item was negative, the observed pattern was (- + + -). The application of the Minimisation of Error Approach to the data results in a total of one error, as the first negative response is classified as an error. According to the Goodenough-Edwards Technique, however, the data set contains two errors, as it is compared to the abovementioned ideal data set and all deviations are regarded as errors. Thus, not only the first negative response but also the third positive response is counted as an error, as both would need to be changed to yield the ideal pattern (- + + -) → (+ + --).

The majority of studies in the linguistic tradition that use implicational scaling apply the Minimisation of Error Approach – both in sociolinguistics (Bickerton, 1973; Lameli, 2004; Rickford, 1979; Rickford, 1991) and in SLA (Andersen, 1978; Dittmar, 1980; Ellis, 2008; Keßler & Pienemann, 2011; Pienemann, 1998; Spinner, 2011; Trofimovich et al., 2007; Trudgill, 1986). In line with this, this approach was used in this study. However, within the PT framework, a number of recent studies have used the Goodenough-Edwards Technique (e.g., Buyl, this volume; Sayehli, 2013; Spinner, 2013; Spinner & Jung, this volume). As the application of different methods leads to different results concerning the scalability of the implicational matrices, care should be taken when attempting to compare results from the two approaches.

6.3 Results

As pointed out above, the data analysis focused on three different aspects, namely (1) the learners' developmental stages, (2) their production of passive constructions and (3) their comprehension of passive constructions.

6.3.1 *Stages of acquisition*

I determined the learners' developmental stages by means of distributional analyses of their individual oral speech production data. I applied the emergence criterion to their morphological and syntactic structures.³ The full distributional analysis appears in Table 2.

3. In this study, the emergence criterion is operationalised as follows: A syntactic feature is considered to be acquired by a learner if it occurs with variation at least three times in the respective learner's speech sample. A morphological structure is regarded as acquired if it occurs with both morphological and lexical variation in the learner data (see Pienemann, 1998, 2015 for more details).

Table 2. Distributional analysis morphological & syntactic features

Stage	Phenomena	School 1							
		P01	P02	P03	P04	P05	P06	P07	P08
6	Cancel Aux-2nd								
5	Neg/Aux-2nd-?								
	Aux-2nd-?	+2			+2	+1		+2	(+2)
	V2/INV				+1			+1	
	3 sg-s	+6	+4	+1	-5	+3		+4	+1
		-1	-3	-6			-6		-3
4	Copula S (x)	+5	+6	(+6)	(+5)	+2	+1		
	Wh-copula S (x)	+1	+9	(+3)	(+1)	+1	(+1)	+2	(+4)
					(+3)	(+1)		(+1)	
	V-particle								
3	Verb-First								
	Do-SV(O)-?					+1		(+2)	(+2)
	AuxSV(O)-?				+1	+1			
	Wh-SV(O)-?								
	Adverb-First	+17	+11	+1		+3	+2	+10	+8
	Poss (Pronoun)		+2	(+12)	+9			+1	+4
	Object (Pronoun)								
	Plural-s (Det + N agr.)	+3						+1	+4
									-1
	Have-Fronting	(+3)	+3	(+3)	+1		(+2)	(+9)	(+9)
2	S neg V(O)								
	SVO	+13	+15	+9	+8	+15	+11	+24	+17
	SVO-Question								
	-ed								+1
	-ing		+1			+3	+2		
						-1			
	Plural-s (Noun)	+3	+1						
	Poss-s (Noun)	+1							
1	Words	+23	+14	+4	+3	+6	+7	+11	+20

School 2							School 3								
M01	M02	M03	M04	M05	M06	M07	B01	B02	B03	B04	B05	B06	B07	B08	B09
+1							+1	+7				+2			+2
-1															
+1	+1			+2	+4	+1	+1	+7	+2	+2		+9	+1		+2
(+3)															
+1			+1					+2			+1	+1			
+1	+1	+1	+2	+7	+2		+8	+8	+4	+9	+5	+9	+3	+4	+7
-10	-3	-4	-7	-6	-7	-8		-2	-1		-5		-5	-7	-2
+3		+6	+6	+7	+7	(+6)	+16	+17	+22	+9	+16	+10	+5	+7	+8
+9	+2	+4	+4		+1	+7		+3	+2	+2		+6	+3	+2	+1
(+14)															
				+1		+1					+10		+1	+1	
+1		+4		+9	+4		+5	+2	+4	+6		+5	+11	+1	
	+1						+1	+2			+2				
+9	+1		+1						+1			+1	+5		
+13	+11	+9	+8	+6	+17	+12	+9	+9	+9	+9	+8	+10	+14	+14	+12
+6	+4	+7	+5			+4	+7	+3	+3	+2		+6	+13	+6	+13
		+1		+1				+2	+1	+1	+3	+4			
+1		(+2)			+1	+1	+5			+1	(+3)			+1	+1
+28	+2	+9	+8	+9	+3			+2			+1	+2	+2	+2	+6
+2				+1				+1	+1		+5	+2	+2		
	+1														
		+3	+2		+4	+1	+3	+5	+2	+2		+3	+2		+2
		-1											-1		
+5	+1	+2	+2	+3		+2	+5	+10	+2	+6	+6	+6	+6		+2
+6															
+24	+20	+11	+11	+11	+24	+4	+1	+2	+9	+2	+7	+5	+5	+13	+5

Table 3 provides a summary of the developmental stages of the learners in the study:

Table 3. Stages of acquisition

Stage	P01	P02	P03	P04	P05	P06	P07	P08	M01	M02	M03	M04
6	-	-	-	-	-	-	-	-	-	-	-	-
5	(+)	(+)	-	-	(+)	-	(+)	-	-	-	-	-
4	+	+	-	-	(+)	-	(+)	-	+	+	+	+
3	+	+	-	(+)	+	-	+	+	+	+	+	+
2	+	+	+	+	+	+	+	+	+	+	+	+
1	+	+	+	+	+	+	+	+	+	+	+	+

Stage	M05	M06	M07	B01	B02	B03	B04	B05	B06	B07	B08	B09
6	-	-	-	-	+	-	-	-	(+)	-	-	(+)
5	(+)	+	-	(+)	+	(+)	(+)	(+)	+	(+)	(+)	+
4	+	+	+	+	+	+	+	+	+	+	+	+
3	+	+	+	+	+	+	+	+	+	+	+	+
2	+	+	+	+	+	+	+	+	+	+	+	+
1	+	+	+	+	+	+	+	+	+	+	+	+

The results of the analysis are presented in the form of an implicational scale. The ‘+’ (acquired) in the respective cells indicates that a learner has acquired structures associated with a particular stage according to the emergence criterion, whereas the ‘-’ (not acquired) indicates that the necessary structures have not been acquired. In those instances where learners produce structures of a particular stage, but not in a sufficient number of contexts, the plus sign is enclosed within parentheses ‘(+)’.

Table 3 shows that three learners are at stage 2, three learners have acquired features of stage 3, 14 learners have acquired features of stage 4, three learners are at stage 5, and one learner has reached stage 6. Of the three learners at stage 2, one produces a limited number of stage 3 structures. Of the three learners at stage 3, two produce a limited number of stage 4 and stage 5 structures. Nine ‘stage 4’ learners produce a few stage 5 structures. Finally, two ‘stage 5’ learners also produce stage 6 structures, albeit in insufficient contexts to satisfy the emergence criterion.

Table 3 shows that the learners’ language development is implicational and all learners follow the same sequence of acquisition for specific morpho-syntactic features. None of the learners skipped stages.

6.3.2 Production data: Passive

The analysis of the oral production of passive constructions is summarised in Table 4.

Table 4. Summary oral production data passive

Stage	Learner	Production	
		Non-linear argument-function mapping (passive film)	Morpho-syntactic processing verb morphology (passive film)
6	B02	+ (9/9)	+ (8/8)
5	B06	+ (9/9)	(+) (7/8)
	M06	+ (9/9)	(+) (7/8)
	B09	+ (9/9)	(+) (2/8)
4	M03	+ (9/9)	+ (8/8)
	B03	+ (9/9)	+ (8/8)
	B07	+ (9/9)	+ (8/8)
	B01	+ (9/9)	+ (8/8)
	M01	+ (9/9)	(+) (6/8)
	M04	(+) (6/9)	(+) (6/8)
	B04	+ (9/9)	(+) (5/8)
	B08	+ (9/9)	(+) (5/8)
	M05	(+) (6/9)	(+) (5/8)
	B05	(+) (8/9)	(+) (4/8)
	M02	+ (9/9)	(+) (3/8)
	M07	(+) (8/9)	(+) (3/8)
	P01	+ (9/9)	- (0/8)
P02	(+) (7/9)	- (0/8)	
3	P07	+ (9/9)	- (0/8)
	P05	(+) (8/9)	- (0/8)
	P08	+ (9/9)	- (0/8)
2	P04	+ (9/9)	- (0/8)
	P03	- (0/9)	- (0/8)
	P06	- (0/9)	- (0/8)

The table contains information on the learners' stage of acquisition as per Table 3 (columns 1 & 2) as well as on their production of passive constructions (columns 3 & 4). For the passive constructions, the columns distinguish linear and non-linear argument-function mapping (column 3) from morphological marking of the verb (column 4), which serves as an indicator for morpho-syntactic processing. A '+' indicates that a structure was consistently produced by the learner, and a '(+)' indicates that the structure was not produced in all contexts. The figures given in the table denote how often a particular feature was supplied in a given context. A '-'

indicates that the feature was not supplied at all. The analysis in Table 4 is restricted to the data obtained in the *passive film task*, as there is no lexical variation in the data elicited by the *fish film task*.

The results of the distributional analyses of the production data in Table 4 reveal that (1) the acquisition of features of passive constructions takes place implicationally and (2) that the process follows the hypothesised developmental sequence (*linear argument-function mapping* → *non-linear argument-function mapping* → *morpho-syntactic processing*).

As can be seen in Table 4, two learners at stage 2 (learner P03 & P06) appear to rely exclusively on linear argument-function mapping. Learner P03 consistently produces active sentences, as in (9) and utterances with a reversed word order after a prompt by the researcher as in (10). Learner P06 also produces utterances with a reversed order that start with the patient/theme (11)–(13). In none of these cases is there further indication of passivisation, such as the occurrence of a preposition, an auxiliary or changes in verb morphology.

- (9) It's a blue fish and it's a food from the green fish. (*The blue fish is eaten by the green fish.*)
- (10) The woman eat a (#) carrot. (*The carrot is eaten by a woman.*)
Interviewer: {versuch mal mit der carrot anzufangen} (*try to start with the carrot*)
The carrot eat a woman.
- (11) The grey fish eat a white fish. (*The grey fish was eaten by the white fish.*)
- (12) Piano play the woman. (*The piano is played by the woman.*)
- (13) Carrot eat a woman. (*The carrot is eaten by the woman.*)

Therefore, these cases do not constitute cases of genuine non-linear argument-function mapping. Instead, the learner is cued to start with the entity the arrow points to and simply inserts the two arguments in the N V N construction.

P06 also produces four structures that cannot be unambiguously classified in terms of their underlying mapping operations. These are illustrated in (14) and (15) below:

- (14) The woman hug for the man. (*The woman is hugged by the man*)
- (15) The rabbit carry with the woman. (*The rabbit is carried by the woman*)

It could be argued that the use of a preposition indicates the ability to produce structures with non-linear argument function mapping. However, the analysis shows that P06 mainly applies the 'reverse-order' strategy in the task. What is more, the four structures she produces are semantically ill-formed and can only be understood by

taking the context into account. On this basis, I argue that these utterances do not constitute instances of productive non-linear argument-function mapping.

The third 'stage 2' learner (P04) produces utterances of non-linear argument-function mapping in all contexts, as in (16)–(18) below:

- (16) The piano was play from the woman (*The piano is played by the woman.*)
- (17) The rabbit is carry (*The rabbit is carried by the girl.*)
- (18) The man was pushes from the woman (*The man is pushed by the woman.*)

Thus, it could be assumed that non-linear argument-function mapping can be processed at stage 2. However, Table 3 shows that the data of learner P04 also contain a limited number of 'stage 3' structures. Although the limited number of these structures does not allow a valid claim as to the acquisition of these structures, it could indeed be the case that this learner is beginning to explore 'stage 3' structures.

The analysis shows that, as predicted, the acquisition of non-linear argument-function mapping takes place in a gradual fashion. With the potential exception of P04, non-linear argument-function mapping is not acquired by the learners before stage 3.

The structures produced by the 'stage 3' learners contain a preposition, which can be target-like or non-target-like, and, in most cases some form of the auxiliary. What is lacking at this stage is the morphological marking on the verb, as in (19) and (20). In some cases, 'stage 3' learners seem to experiment with verbal morphology and produce idiosyncratic verb forms, as in (21)–(22) (examples produced by learner P05):

- (19) The rabbit is carry from the mother. (*The rabbit is carried by the woman.*)
- (20) The piano play from the mother. (*The piano is played by the woman.*)
- (21) The book is showing from a child and a mother. (*The homework is shown to the woman by the girl.*)
- (22) The mother {oder} (or) the carrot eatings from the mother. (*The carrot is eaten by the woman.*)

The last stage in the acquisition of the passive, morpho-syntactic processing, occurs at stage 4 as illustrated in (23)–(24). However, this does not imply that all 'stage 4' learners produce instances of target-like verb morphology. As in the case of non-linear argument-function mapping, the acquisition of target-like verb morphology also takes place gradually (see (25), see also Table 4) (examples produced by learner B05).

- (23) The rabbit is cuddled by the girl.

- (24) The carrot were eaten by the woman.
 (25) The homework were shows from the girl to her mother.

The results are in line with the claims of the MCH concerning the initial constraints on the L2 mental grammatical system. This applies in particular to the restrictions at a-structure level. In the MCH, I argue that the syntactic side of a-structure has to be annotated for its syntactic features to allow for mapping processes between arguments and grammatical functions. This gradual process is reflected in the production data of the learners in the sequence: *linear argument-function mapping* → *non-linear argument-function mapping* → *morpho-syntactic processing*.

6.3.3 Comprehension data: Passive

The results of the analysis of the comprehension data are summarised in Table 5. A ‘+’ in a cell indicates that the learner’s interpretation of the passive construction with this particular verb was target-like. A ‘-’ in the cell marks those cases where the learner did not interpret the sentence correctly (i.e., assigning the patient role to the actor in the event). Where the agent of the event could not be unambiguously identified in the scene with the Playmobil© figures, the cell is marked with a ‘u’ (for unclear). Finally, in a number of cases the photo showed the correct interpretation of the sentence but the learner pointed to the wrong actor. These cases are labelled with a ‘(+)’, as it is not clear whether the learners understood the researcher’s request to point to the actor in the scene. When calculating the scalability of the table, the cells containing a ‘u’ were excluded from the analysis. These cells accounted for 2.12% of the data. The coefficient of reproducibility of Table 5 is .96 and the coefficient of scalability is .83. Therefore, Table 5 is considered to be a valid implicational scale.

An important question concerning the analysis of comprehension data is whether the notion of ‘emergence’ in L2 speech production can be simply applied to L2 comprehension. If emergence can be used in comprehension, how can it be measured appropriately? Pienemann (1998: 152) points out that in L2 speech production “emergence can be understood as the point in time at which certain skills have, in principle, been attained or at which certain operations can, in principle, be carried out.” Assuming that the same processing procedures underlie both L2 production and comprehension, I argue that the notion of emergence as denoting the point of acquisition of a particular processing procedure also applies to L2 comprehension. However, this does not mean that the same operationalisation of this acquisition criterion can be applied to both processes, as chance performance is a factor in elicited comprehension data that might distort the analysis. Studies investigating L2 comprehension from a PT perspective approach the operationalisation of emergence in different ways. Spinner (2013) used an acquisition criterion of 80% accuracy. Buyl and Housen (2015) investigated the effect of the application

Table 5. Distributional analysis comprehension passive (u = unclear, (+) = photo shows correct interpretation but learner points to wrong actor)

Stage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	P02	P05	P01	M05	P06	P03	P04	M04	M07	P07	P08	B08	M02	B09	B05	B07	B04	B03	B01	M03	M01	B06	M06	B02
	4	3	4	4	2	2	2	4	4	3	3	4	4	5	4	4	4	4	4	4	4	5	5	6
The giraffe is followed by the zebra.	-	-	+	-	-	-	-	-	-	-	-	+	-	-	+	+	+	+	+	+	+	+	+	+
James is hit by Tom.	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+
The tiger is boxed by the kangaroo.	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
The calf is kissed by the horse.	-	-	-	+	-	-	-	u	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+
Tom is chased by the alligator.	-	-	(+)	-	-	-	(+)	-	-	-	+	-	+	-	+	+	+	+	+	+	+	+	+	+
The rabbit is handed over to James by Lisa.	-	-	-	-	-	+	-	-	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	+
Lisa is taken to the pond by James.	-	-	-	u	-	-	-	u	+	+	+	+	u	+	+	+	+	+	+	+	+	+	+	+
James is saved from the tiger by Tom.	-	-	-	-	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	u
The horse is ridden by Lisa.	(+)	+	+	+	u	+	+	+	+	+	(+)	+	+	+	+	+	+	+	+	+	+	+	+	+
The horse is showered by Tom.	(+)	+	+	+	(+)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
The cage is opened by Lisa.	(+)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
The wheelbarrow is pushed by James.	(+)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

of different emergence/accuracy criteria to the data, ranging from one out of six to six out of six correctly comprehended structures. Buyl (this volume) elicited L2 comprehension data with a timed grammaticality judgement task that focused on morphological structures. Spinner and Jung (this volume) conducted a self-paced reading reaction time experiment. To measure acquisition, Buyl used implicational scaling and applied different accuracy criteria to the data. Spinner and Jung also conducted implicational analyses and plotted the individual learner data obtained in the reaction time experiment onto an implicational table.

In this study, the question of a suitable emergence criterion for the comprehension data is not directly addressed. I approach the issue indirectly by combining implicational scaling of the comprehended structures with a statistical analysis of correlations between comprehension data and PT stages derived from production data. No cut-off point is applied to the L2 comprehension data.

The results show (1) an implicational development of the acquisition of different verb types in the L2 comprehension of passive constructions and (2) a correlation between the number of comprehended passive constructions and PT production stages.

A potential explanation for the sequence of different types of verbs in the comprehension of passive constructions is a gradual progression from shallow or semantic processing to syntactic processing in the L2. One influence on this gradual acquisition is the prototypicality of the passive construction (see Meints, 1999 for the role of prototypicality in L1 acquisition), including semantic factors such as reversibility and event probability (for more details see Lenzing, *forthc.*). The four passive constructions that were comprehended by 23 of the 24 L2 learners and are therefore claimed to be acquired early are semantically non-reversible passives as in (26) and (27):

(26) The wheelbarrow is pushed by James.

(27) The cage is opened by Lisa.

On the other hand, those passives that were understood by ten and eleven L2 learners (who demonstrated capacity to produce structures from stages 4–6) respectively have ‘neutral’ event probability as in (28) and (29). These forms lack semantic cues so that the L2 learners in the study had to rely on syntactic processing in their comprehension.

(28) The giraffe is followed by the zebra.

(29) James is hit by Tom.

The implicational sequence in the acquisition of verb types in the comprehension of passive constructions correlates with the L2 learners’ stages of acquisition

according to the PT hierarchy. A Spearman's rank-order correlation was run to assess the relationship between the number of passive constructions comprehended by the learners and their stages of acquisition. The results show a strong positive correlation between the number of comprehended passives and the learners' PT stages, $rs(24) = .62, p = .01$ (two-tailed). This supports the claim that the procedures underlying the stages of acquisition are also involved in the comprehension process.

6.3.4 Relating comprehension and production data

In Table 6, the results of the complete data analysis are summarised. The table relates the comprehension and production of passives to the learners' PT stages of acquisition.

Table 6. Overall results: PT stages, comprehension & production of passives

Stage	Learner	No. of comprehended structures	Production	
			Non-linear Argument-function mapping (passive film)	Morpho-syntactic processing (verb morphology)
6	B02	(+) (11/12)	+ (9/9)	+ (8/8)
5	B06	+ (12/12)	+ (9/9)	(+) (7/8)
	M06	+ (12/12)	+ (9/9)	(+) (7/8)
	B09	(+) (10/12)	+ (9/9)	(+) (2/8)
4	M03	+ (12/12)	+ (9/9)	+ (8/8)
	B03	+ (12/12)	+ (9/9)	+ (8/8)
	B07	+ (12/12)	+ (9/9)	+ (8/8)
	B01	+ (12/12)	+ (9/9)	+ (8/8)
	M01	+ (12/12)	+ (9/9)	(+) (6/8)
	M04	(+) (5/12)	(+) (6/9)	(+) (6/8)
	B04	+ (12/12)	+ (9/9)	(+) (5/8)
	B08	(+) (9/12)	+ (9/9)	(+) (5/8)
	M05	(+) (5/12)	(+) (6/9)	(+) (5/8)
	B05	(+) (11/12)	(+) (8/9)	(+) (4/8)
	M02	(+) (8/12)	+ (9/9)	(+) (3/8)
	M07	(+) (7/12)	(+) (8/9)	(+) (3/8)
	P01	(+) (6/12)	+ (9/9)	- (0/8)
	P02	(+) (4/12)	(+) (7/9)	- (0/8)
3	P07	(+) (6/12)	+ (9/9)	- (0/8)
	P05	(+) (4/12)	(+) (8/9)	- (0/8)
	P08	(+) (7/12)	+ (9/9)	- (0/8)
2	P04	(+) (6/12)	+ (9/9)	- (0/8)
	P03	(+) (6/12)	- (0/9)	- (0/8)
	P06	(+) (4/12)	- (0/9)	- (0/8)

Table 6 shows that whereas there are no instances of production of structures from a given stage without comprehension of structures from the same stage, there are some cases of comprehension without production. These cases are the two 'stage 2' learners P03 and P06. They comprehend some of the non-reversible passive constructions, which can be processed semantically. Learner P03 additionally comprehends two ditransitive forms (see Table 5).

In order to assess the relationship between the number of comprehended structures and the number of produced structures with non-linear argument-function mapping as well as produced structures that show evidence for morpho-syntactic processing, a correlation analysis was run on the data. As not all variables were normally distributed, as assessed by Shapiro–Wilk's test ($p = .002$ for comprehended structures and $p < .001$ for produced structures), the non-parametric Spearman's rank-order correlation was used. There was a strong positive correlation between the number of comprehended passives and the passives with non-linear argument-function mapping, $rs(24) = .64$, $p = .01$ (two-tailed) as well as a strong positive correlation between the number of comprehended passives and the number of passives with target-like verbal morphology, $rs(24) = .82$, $p < .001$ (two-tailed).

The correlations between comprehended structures and produced structures serve as a further indication of a relation between processing in the two modalities. Although there is not a one-to-one relation between the number of comprehended structures and the number of produced structures in every individual learner, the strong positive correlations between the number of comprehended structures and both non-linear argument-function mapping and morpho-syntactic processing in production further indicate that the two processes do not occur independently of each other.

The results presented so far are in line with the core claims of the integrated encoding-decoding model presented in Section 4. What is missing in the dataset is clear evidence for syntactic processing in sentence comprehension. Although the implicational acquisition of passives with different verb types indicates a development from semantic to syntactic processing, the methodology used in this study does not allow for firm conclusions about exactly when syntactic processing of the passive is acquired in sentence comprehension. In a further empirical study discussed in Lenzening (forthc.), a sentence-matching reaction time experiment tapped into syntactic processing in sentence comprehension. The results of the overall analysis described there support the developmental sequence of the passive proposed in this chapter and serve as further evidence for the integrated encoding-decoding model outlined above (see Lenzening forthc.).

7. Conclusion

In this chapter I investigated the interface between comprehension and production in SLA with particular focus on grammatical encoding and decoding processes. I sketched out an integrated encoding-decoding model that is based on the notion of a shared grammatical workspace (Kempen et al., 2012) as well as PT (Pienemann, 1998) and the MCH (Lenzing, 2013). The core claims of the model are that (1) there is a single syntactic processor underlying grammatical encoding and decoding processes in L2 acquisition, that (2) this processor develops stepwise following the predictions of PT and that (3) L2 learners draw on the same mental grammatical system in grammatical encoding and decoding.

I proposed the following developmental sequence of the varied aspects of passive constructions in L2 acquisition:

1. linear argument-function mapping
2. non-linear argument-function mapping
3. morpho-syntactic processing

I also outlined specific minimal requirements for the production and the comprehension of passive constructions. These include syntactic processes and semantic aspects such as reversibility and event probability.

The results of the data analysis provide support for the proposed developmental sequence and the role of the minimal requirements for production and comprehension. In particular, the analysis shows that in production, the L2 acquisition of the passive proceeds along the proposed developmental sequence from linear to non-linear argument-function mapping to morpho-syntactic processing. In comprehension, the results reveal an implicational acquisition of particular verb types in passive constructions, which correlates with the L2 learners' stages of acquisition according to the PT hierarchy. Relating the production and comprehension data, the analysis shows strong positive correlations between the number of comprehended structures and the number of produced structures (for both argument-function mapping and morpho-syntactic processing).

The study is limited in that the methodology employed does not allow for firm conclusions concerning syntactic processing in L2 comprehension. This limitation is addressed in Lenzing (forthc.). Despite these limitations, the overall results of the study presented here lend strong support to the integrated encoding-decoding model.

References

- Akers, G. (1981). *Phonological variation in the Jamaican continuum*. Ann Arbor, MI: Karoma.
- Andersen, R. W. (1978). An implicational model for second language research. *Language Learning* 28(2), 221–282.
- Bailey, C.-J. N. (1973a). *Variation and linguistic theory*. Arlington, VA: Center for Applied Linguistics.
- Bailey, C.-J. N. (1973b). The patterning of linguistic variation. In R. Bailey & J. Robinson (Eds.), *Varieties of present-day English* (pp. 156–187). New York: Macmillan.
- Bates, E., MacWhinney, B., Caselli, C., Devescovi, A., Natale, F., & V. Venza. (1984). A cross-linguistic study of the development of sentence interpretation strategies. *Child Development* 55(2), 341–354. <https://doi.org/10.2307/1129947>
- Bayley, R. (1999). The primacy of aspect hypothesis revisited: Evidence from language shift. *Southwest Journal of Sociolinguistics* 18(2), 1–22.
- Bever, T. G. (1970). The cognitive basis for linguistic structures. In J. Hayes (Ed.), *Cognition and the development of language* (pp. 279–362). New York, NY: Wiley.
- Bickerton, D. (1971). Inherent variability and variable rules. *Foundations of Language* 7(4), 457–492.
- Bickerton, D. (1973). The nature of a creole continuum. *Language* 49(3), 640–669.
- Bloom, L. (1974). Talking, understanding, and thinking. In R. L. Schiefelbusch & L. L. Lloyd (Eds.), *Language perspectives: Acquisition, retardation and intervention* (pp. 285–311). Baltimore, MD: University Park Press.
- Bresnan, J. (2001). *Lexical-functional syntax*. Malden, MA: Blackwell.
- Buyl, A. (2015). Studying receptive grammar acquisition within a PT framework. In K. Baten, A. Buyl, K. Lochman, & M. Van Herreweghe (Eds.), *Theoretical and methodological developments in Processability Theory* (pp. 139–168). Amsterdam: John Benjamins.
- Buyl, A., & Housen, A. (2013). *Testing the applicability of PT to receptive grammar knowledge in early immersion education. Theoretical considerations, methodological challenges and some empirical results*. In A. Flyman Mattson & C. Norrby (Eds.), *Language acquisition and use in multilingual contexts* (pp. 13–27). Lund: Lund University Press.
- Buyl, A., & Housen, A. (2015). Developmental stages in receptive grammar acquisition: A Processability Theory account. *Second Language Research* 31(4), 523–550. <https://doi.org/10.1177/0267658315585905>
- Chapman, R. S., & Kohn, L. L. (1978). Comprehension strategies in two- and three-year-olds: Animate agents or probable events? *Journal of Speech and Hearing Research* 21(4), 746–761. <https://doi.org/10.1044/jshr.2104.746>
- Chapman, R. S., & Miller, J. F. (1975). Word order in early two and three word utterances: Does production precede comprehension? *Journal of Speech, Language, and Hearing Research* 18, 355–371.
- Clahsen, H., & Felser, C. (2006). Grammatical processing in language learners. *Applied Psycholinguistics* 27(1), 3–42. <https://doi.org/10.1017/S0142716406060024>
- Clark, E. V. (1980). Here's the top: Nonlinguistic strategies in the acquisition of orientational terms. *Child Development* 51(2), 329–338.
- Clark, H. H., & Malt, B. C. (1984). Psychological constraints on language: A commentary on Bresnan and Kaplan and on Givón. In W. Kintsch, J. R. Miller, & P. G. Polson (Eds.), *Methods and tactics in cognitive science* (pp. 191–214). Hillsdale, NJ: Lawrence Erlbaum Associates.
- DeCamp, D. (1971). Toward a generative analysis of a post-creole speech continuum. In D. Hymes (Ed.), *Pidginization and creolization of languages* (pp. 349–370). New York: Cambridge University Press.

- Di Biase, B. (2008). Focus-on-form and development in L2 learning. In J.-U. Kefler (Ed.), *Processability approaches to second language development and second language learning* (pp. 197–219). Newcastle UK: Cambridge Scholars Publishing.
- Dittmar, N. (1980). Ordering adult learners according to language abilities. In S. Felix (Ed.), *Second language development* (pp. 205–231). Tübingen: Narr.
- Edwards, A. (1948). On Guttman's scale analysis. *Educational and Psychological Measurement* 8(3–1), 313–318.
- Ellis, R. (2008). Investigating grammatical difficulty in second language learning: Implications for second language acquisition research and language testing. *International Journal of Applied Linguistics* 18(1), 4–22.
- Ferreira, F., Bailey, K. G. D., & Ferraro, V. (2002). Good enough representations in language comprehension. *Current Directions in Psychological Science* 11(1), 11–15.
<https://doi.org/10.1111/1467-8721.00158>
- Garrett, M. (2000). Remarks on the architecture of language processing systems. In Y. Grodzinsky & L. Shapiro (Eds.), *Language and the brain: Representation and processing* (pp. 31–69). San Diego, CA: Academic Press. <https://doi.org/10.1016/B978-012304260-6/50004-9>
- Goodenough, W. H. (1944). A technique for scale analysis. *Educational and Psychological Measurement* 4(3), 179–190.
- Guttman, L. A. (1944). A basis for scaling qualitative data. *American Sociological Review* 9(2), 139–150.
- Guttman, L. A. (1950). The basis for scalogram analysis. In S. A. Stouffer, L. A. Guttman, E. A. Suchman, P. F. Lazarsfeld, S. A. Star, & J. A. Clausen (Eds.), *Studies in social psychology in World War II: Vol. 4. Measurement and prediction* (pp. 60–90). Princeton, NJ: Princeton University Press.
- Hakuta, K. (1982). Interaction between particles and word order in the comprehension of simple sentences in Japanese children. *Developmental Psychology* 18(1), 62–76.
<https://doi.org/10.1037/0012-1649.18.1.62>
- Hill, F. (1998). Acquisition of the passive. *Kansas Working Papers in Linguistics* 23(2), 63–70.
- Hatch, E., & Lazaraton, A. (1991). *The research manual: Design and statistics for applied linguistics*. Rowley MA: Newbury House.
- Ingram, D. (1974). The relationship between comprehension and production. In R. Schiefelbusch & L. Lloyd (Eds.), *Language perspectives: Acquisition, retardation, and intervention* (pp. 313–334). Baltimore, MD: University Park Press.
- Itani-Adams, Y. (2007). Lexical and grammatical development in Japanese-English bilingual first language acquisition. In F. Mansouri (Ed.), *Second language acquisition research: Theory-construction and testing* (pp. 173–198). Cambridge: Cambridge Scholars Press.
- Izumi, S., & U. Lakshmanan (1998). Learnability, negative evidence and the L2 acquisition of the English passive. *Second Language Research* 14(1), 62–101.
- Kawaguchi, S. (2008). Language typology and Processability Theory. In J.-U. Kefler (Ed.), *Processability approaches to second language development and second language learning* (pp. 89–112). Newcastle upon Tyne: Cambridge Scholars.
- Kawaguchi, S. (2016). *Question constructions, argument mapping, and vocabulary development in English L2 by Japanese speakers: A cross-sectional study*. In J.-U. Kefler, A. Lenzing, & M. Liebner (Eds.), *Developing, modelling and assessing second languages* (pp. 35–64). Amsterdam: Benjamins.

- Keatinge, D., & Kefler, J.-U. (2009). The acquisition of the passive voice in L2-English: Perception and production. In J.-U. Kefler & D. Keatinge (Eds.), *Research in second language acquisition: Empirical evidence across languages* (pp. 69–94). Newcastle upon Tyne: Cambridge Scholars.
- Kefler, J.-U., & Pienemann, M. (2011). Research methodology - how we know about developmental schedules. In M. Pienemann, & J.-U. Kefler (Eds.), *Studying Processability Theory. An introductory textbook* (pp. 83–96). Amsterdam: John Benjamins.
- Kempen, G. (2000). Could grammatical encoding and grammatical decoding be subserved by the same processing module? *Behavioral and Brain Sciences* 23(1), 38–39.
<https://doi.org/10.1017/S0140525X00402396>
- Kempen, G., Olsthoorn, N., & Sprenger, S. (2012). Grammatical workspace sharing during language production and language comprehension: Evidence from grammatical multitasking. *Language and Cognitive Processes* 27(3), 345–380.
<https://doi.org/10.1080/01690965.2010.544583>
- Kersten, K., Rohde, A., Schelletter, C., & Steinlen, A. K. (Eds.). (2010). *Bilingual preschools, Volume 1: Learning and development*. Trier: Wissenschaftlicher Verlag Trier.
- Labov, W. (1973). The boundaries of words and their meanings. In C.-J. Bailey, & R. W. Schuy (Eds.), *New ways of analysing variation in English* (pp. 340–373). Washington DC: Georgetown University Press.
- Lameli, A. (2004). Hierarchies of dialect features in a diachronic view – implicational scaling of real time data. In B.-L. Gunnarsson, L. Bergström, G. Eklund, S. Fridell, & L. H. Hansen (Eds.), *Language variation in Europe. Papers from the second international conference on language variation in Europe (ICLaVe 2), Uppsala-University, Sweden, June 12–14, 2003* (pp. 253–266). Uppsala: University Press.
- Lempert, H. (1978). Extrasyntactic factors affecting passive sentence comprehension by young children. *Child Development* 49(3), 694–699. <https://doi.org/10.2307/1128237>
- Lenzing, A. (2013). *The development of the grammatical system in early second language acquisition. The Multiple Constraints Hypothesis*. Amsterdam: John Benjamins.
- Lenzing, A. (2015). Exploring regularities and dynamic systems in L2 development. *Language Learning* 65(1), 89–122. <https://doi.org/10.1111/lang.12092>
- Lenzing, A. (forthc.). *The production-comprehension interface in second language acquisition. An integrated encoding-decoding model*. London: Bloomsbury.
- Levelt, W. J. M. (1989). *Speaking. From intention to articulation*. Cambridge, MA: The MIT Press.
- Maratsos, M. P. (1974). Children who get worse at understanding the passive: A replication of Bever. *Journal of Psycholinguistic Research* 3(1), 65–74.
- Maratsos, M., Fox, D., Becker, J., & Chalkley, M. (1985). Semantic restrictions on children's passives. *Cognition* 19(2), 167–191. [https://doi.org/10.1016/0010-0277\(85\)90017-4](https://doi.org/10.1016/0010-0277(85)90017-4)
- Marinis, T. (2007). Proceedings of the 2nd conference on generative approaches to language acquisition North America (GALANA): On-line processing of passives in L1 and L2 children. In A. Belikova, L. Meroni, & U. Umeda (Eds.), *2nd Conference on Generative Approaches to Language Acquisition* (pp. 265–276). Somerville, MA: Cascadilla Press.
- Marinis, T., & Saddy, D. (2013). Parsing the passive: Comparing children with Specific Language Impairment to sequential bilingual children. *Language Acquisition* 20(2), 155–179.
<https://doi.org/10.1080/10489223.2013.766743>
- McIver, J. P., & Carmines, E. G. (1981). *Unidimensional scaling*. Beverly Hills CA: Sage.
- Meints, K. (1999). *Typizitätseffekte im Erwerb des englischen Passivs. Eine empirische Untersuchung*. Wiesbaden: DUV. <https://doi.org/10.1007/978-3-322-95434-3>

- Meisel, J., Clahsen, H., & Pienemann, M. (1981). On determining developmental sequences in natural second language acquisition. *Studies in Second Language Acquisition* 3(2), 109–135.
- Menenti, L., Gierhan, S. M., Segaert, K., & Hagoort, P. (2011). Shared language: Overlap and segregation of the neuronal infrastructure for speaking and listening revealed by functional MRI. *Psychological Science* 22(9), 1173–1182. <https://doi.org/10.1177/0956797611418347>
- Menzel, H. (1953). A new coefficient for scalogram analysis. *Public Opinion Quarterly* 17(2), 268–280.
- Nagy, N., Moisset, C., & Sankoff, G. (1996). On the acquisition of variable phonology in L2. *University of Pennsylvania Working Papers in Linguistics* 3(1), 111–126.
- Pica, T., Kanagy, R., & Falodun, J. (1993). Choosing and using communicative tasks for second language instruction. In G. Crookes & S. M. Gass (Eds.), *Tasks and language learning: Integrating theory and practice* (pp. 9–34). Clevedon: Multilingual Matters.
- Pickering, M., & Garrod, S. (2007). Do people use language production to make predictions during comprehension? *Trends in Cognitive Science* 11(3), 105–110. <https://doi.org/10.1016/j.tics.2006.12.002>
- Pickering, M., & Garrod, S. (2013). An integrated theory of language production and comprehension. *Behavioral and Brain Sciences* 36(4), 329–347. <https://doi.org/10.1017/S0140525X12001495>
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M., & Mackey, A. (1993). An empirical study of children’s ESL development and Rapid Profile. In P. McKay (Ed.), *ESL development. Language and literacy in schools* (Vol. 2, pp. 115–259). Commonwealth of Australia and National Languages and Literacy Institute of Australia.
- Pienemann, M., Di Biase, B., & Kawaguchi, S. (2005). Extending Processability Theory. In M. Pienemann (Ed.), *Cross-linguistic aspects of Processability Theory* (pp. 199–251). Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30.09pie>
- Pienemann, M., & Lenzen, A. (2015). Processability Theory. In B. VanPatten & J. Williams (Eds.), *Theories in second language acquisition: An introduction* (2nd ed., pp. 159–179). New York, NY: Routledge.
- Rickford, J. R. (1979). Variation in a creole continuum: Quantitative and implicational approaches. Unpublished doctoral dissertation. University of Pennsylvania.
- Rickford, J. R. (1991). Variation theory: Implicational scaling and critical age limits in models of linguistic variation, acquisition and change. In T. Huebner & C. A. Ferguson (Eds.), *Crosscurrents in second language acquisition and linguistic theories* (pp. 225–246). Amsterdam: John Benjamins.
- Rickford, J. (2002). Implicational scales. In J. K. Chambers, P. Trudgill, & N. Schilling-Estes (Eds.), *The handbook of language variation and change* (pp. 142–167). Oxford: Blackwell.
- Roos, J. (2007) *Spracherwerb und Sprachproduktion: Lernziele und Lernergebnisse im Englischunterricht der Grundschule*. Tübingen: Narr.
- Ruder, K. F., & Finch, A. (1987). *Toward a cognitive-based model of language production*. In H. W. Dechert & M. Raupach (Eds.), *Psycholinguistic models of production* (pp. 109–138). Westport CT: Ablex.
- Sanford, A., & Sturt, P. (2002). Depth of processing in language comprehension: Not noticing the difference. *Trends in Cognitive Science* 6(9), 382–386. [https://doi.org/10.1016/S1364-6613\(02\)01958-7](https://doi.org/10.1016/S1364-6613(02)01958-7)

- Sankoff, G. (1973). Above and beyond phonology in variable rules. In C.-J. Bailey, & R. W. Schuy (Eds.), *New ways of analysing variation in English* (pp. 44–61). Washington DC: Georgetown University Press.
- Sayehli, S. (2013). *Developmental perspectives on transfer in third language acquisition*. Lund: Travaux de l'Institute de Linguistique de Lund.
- Segaert, K., Menenti, L., Weber, K., Petersson, K. & Hagoort, P. (2012). Shared syntax in language production and language comprehension – an fMRI study. *Cerebral Cortex* 22(7), 1662–1670. <https://doi.org/10.1093/cercor/bhr249>
- Slobin, D. (1966). Grammatical transformations and sentence comprehension in child and adulthood. *Journal of Verbal Language and Verbal Behavior* 5(3), 19–227.
- Spada, N., & Tomita, Y. (2010). Interactions between type of instruction and type of language feature: A meta-analysis. *Language Learning* 60(2), 263–308. <https://doi.org/10.1111/j.1467-9922.2010.00562.x>
- Spinner, P. (2011). Second language assessment and morpho-syntactic development. *Studies in Second Language Acquisition* 33 (4), 529–561.
- Spinner, P. (2013). Language production and reception: A Processability Theory study. *Language Learning* 63(4), 704–739. <https://doi.org/10.1111/lang.12022>
- Spinner, P., & Jung, S. (2017). Production and comprehension in Processability Theory: A self-paced reading study. *Studies in Second Language Acquisition* 40(2), 1–24. <https://doi.org/10.1017/S0272263117000110>.
- Steinlen, A. K., Håkansson, G., Housen, A., & Schelletter, C. (2010). Receptive L2 grammar knowledge development in bilingual preschools. In K. Kersten, A. Rohde, C. Schelletter, & A. K. Steinlen (Eds.), *Bilingual preschools, Volume 1: Language and development* (pp. 69–100). Trier: Wissenschaftlicher Verlag Trier.
- Tomlin, R. S. (1997). Mapping conceptual representations into linguistic representations: The role of attention in grammar. In J. Nuyts, & E. Pederson (Eds.). *Language and conceptualization* (pp. 162–189). Cambridge: Cambridge University Press.
- Tomlin, R. S. (1995). Focal attention, voice, and word order: An experimental, cross-linguistic study. In P. Downing & M. Noonan (Eds.), *Word order in discourse* (pp. 517–554). Amsterdam: John Benjamins. <https://doi.org/10.1075/tsl.30.18tom>
- Trofimovich, P., Gatbonton, E., & Segalowitz, N. (2007). A dynamic look at L2 phonological learning: Seeking processing explanations for implicational phenomena. *Studies in Second Language Acquisition* 29(3), 407–448.
- Trudgill, P. (1986). *Dialects in contact*. Oxford: Blackwell.
- VanPatten, B. (1984). Morphemes and processing strategies. In F. Eckman, L. Bell, & D. Nelson (Eds.), *Universals of second language acquisition* (pp. 88–98). Cambridge, MA: Newbury House.
- VanPatten, B. (1996). *Input processing and grammar instruction: Theory and research*. Norwood, NJ: Ablex.
- VanPatten, B. (2015). Input processing in adult SLA. In B. VanPatten & J. Williams (Eds.), *Theories in second language acquisition. An introduction* (2nd ed., pp. 113–134). New York, NY: Routledge.
- Wang, K. (2011). *The fish was eaten: The acquisition of the English passive construction by Chinese learners of ESL*. Saarbrücken, Germany: LAP Lambert Academic Publishing.
- Watermeyer, M. (2010). Ausagieren von Sätzen versus Satz-Bild-Zuordnung. Vergleich zweier Methoden zur Untersuchung des Sprachverständnisses anhand von semantisch reversiblen Sätzen mit Objektivoranstellung bei drei- und fünfjährigen Kindern. Unpublished diploma thesis. Potsdam University.

Productive and receptive processes in PT

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In this study, we investigate whether Processability Theory (Pienemann, 1998, 2005) accounts for reception data, and whether productive and receptive processing routines emerge simultaneously. Sixty-one learners of English as a second language (ESL learners) participate in an oral interview and self-paced reading (SPR) task targeting five stages of PT. Two analyses are performed: Implicational scaling and a comparison of individuals' performance on the oral interview versus the SPR. The implicational table demonstrates that the SPR data do not clearly reflect the PT order, and the comparison data demonstrate that individuals' performance on the oral production task does not match their performance on the SPR task. The results suggest that PT as currently formulated may not account for receptive data, and that productive and receptive processes may not always emerge simultaneously.

1. Introduction

Processability Theory (PT) is fairly unique in second language research. It makes clear, falsifiable predictions regarding the order of acquisition of a variety of morpho-syntactic forms and structures. It has received robust support from a large number of empirical studies that include language learners of a variety of language backgrounds and proficiencies (e.g., Pienemann, 1998; Sakai, 2008; Spinner, 2011). Importantly, PT also has a clear theoretical foundation, which some previous work on developmental orders did not (e.g., the morpheme order studies).

Over the years, PT has been developed in several ways. It has been applied to a variety of target languages other than English (e.g., Bonilla, 2015; Di Biase & Kawaguchi, 2002; Pienemann et al., 2011) and expanded to cover a wider range of linguistic phenomena (e.g., Pienemann et al., 2005). However, one potential dimension of PT has been left relatively unexplored (Hulstijn, 2015): That is, the type of linguistic data to which it can apply, and, by extension, the aspects of the linguistic system that it encompasses. This is a crucial step in determining the scope and limitations of the theory.

In particular, current interest centres on the issue of production versus reception, which is the subject of the three chapters in this section. Because PT is grounded in Level's Model of Speech Production and Kempen and Hoenkamp's Incremental Procedural Grammar, which are both models of language production, PT has often been considered a theory of language production only (as noted by Buyl & Housen, 2015; Ellis, 2008). For these reasons, PT studies have generally employed oral interviews that naturally elicit relevant grammatical phenomena, with the goal of determining whether learners use the grammar in a productive way.

However, Pienemann indicates that PT is meant to account for at least some kinds of receptive data. As he writes (2009: 9), "The logic underlying Processability Theory (PT) (Pienemann, 1998, 2005) is the following: At any stage of development the learner can produce *and comprehend* only those L2 linguistic forms which the current state of the language processor can handle" (emphasis ours). Unfortunately, the issue of comprehension is not further explored in much detail in that work. However, in a little-discussed section of his 1998 book, Pienemann suggests an approach to the issue: The Procedural Skills Hypothesis. The Procedural Skills Hypothesis states that learners who are able to produce a particular grammatical structure in a productive way should also process it in the same way as a native speaker. Pienemann tests this idea with a sentence matching task. He finds that learners of German who produce subject-verb agreement in their speech also are sensitive to ungrammaticalities in subject-verb agreement in the online receptive task; conversely, those who do not produce subject-verb agreement in speech are not sensitive. Thus, the Procedural Skills Hypothesis suggests that data from receptive tasks such as sentence matching should also reflect the PT order of acquisition.

In the current study, we ask two questions: (1) Do receptive processes emerge in an implicational order? and (2) Do productive and receptive processes emerge simultaneously? We examine these issues using oral interviews (a productive task) and self-paced reading (a receptive task). We employ two analyses. First, we examine whether learners demonstrate sensitivity to the grammatical structures in the self-paced reading task in the implicational order given in PT. If so, we can conclude that receptive processes emerge according to the PT order. Second, we compare individuals' performance on the productive and receptive tasks to determine whether learners reach a particular PT stage on the two tasks simultaneously. If each learner's performance on the oral task and the self-paced reading task are similar, we can conclude that the capacity for productive and receptive processes emerges at the same time.

2. The current study

Including those in this volume, there are six studies of which we are aware that attempt to apply PT to receptive data. Keatinge and Keßler (2009) were the first to do so, albeit in a limited way. They examined the use of passive voice by ten German-speaking learners of English. A variety of tasks were employed, including story-telling, film description, sentence completion, and sentence-picture matching. The researchers found that learners who used passives productively in their speech also scored well on the comprehension tasks (70% or higher); however, those who were unable to use them productively performed very poorly on the comprehension tasks. A more recent study on passives (Lenzing, this volume) provides a theoretical account of the production and comprehension of passive and predicts an order of acquisition for several different aspects of the passive construction based on PT. An empirical study finds not only a clear implicational order for the acquisition of the different aspects of the passive construction, but also a correlation between the production and comprehension of passives in individual learners. One great strength of this study is that it employed a comprehension task (arranging figurines based on the interpretation of passive structures) that allowed a fairly straightforward comparison to production – which is one of the more significant challenges when conducting a study on receptive data involving the grammatical elements in PT.

Another recent study in this area is Buyl and Housen (2015), who conducted a study to determine whether PT could predict the order of acquisition for a number of grammatical phenomena: Plural marking on nouns, SVO word order, negation with *not*, possessive, and subject-verb agreement. They used picture selection tasks to measure comprehension. Because it was not clear at what level of accuracy each structure should be considered acquired, they examined a variety of accuracy levels and concluded that, while there was more ‘noise’ in the data at certain levels, it was clear that PT could predict the order of acquisition of these structures. Notably, though, the grammatical phenomena only represented stages 2 and 5, which leaves open the question of whether an implicational table with more detail would support the predictions of PT.

Indeed, there are two studies that investigate a larger number of stages in PT. Spinner (2013) used an audio grammaticality judgment task to investigate a variety of English morpho-syntactic forms and structures from PT stages 2–6: Past tense -ed, plural -s, object pronouns, possessive pronouns, sentences with adverb first, Wh-copula questions, verbs with particles, third person singular -s, auxiliary 2nd questions, negative auxiliary 2nd questions, and cancel auxiliary 2nd structures. Two groups of ESL learners completed the task. Their responses were entered into an implicational table, but the PT order of acquisition was not supported. Buyl (this volume) also uses a grammaticality judgment task to examine the L2 acquisition of English, but limits the target items to morphological forms, because evidence has

demonstrated a variable relationship between syntax and morphology in PT (e.g., Bonilla, 2015). However, the results of this study also fail to support an implicational order of acquisition for comprehension of PT structures.

To summarise, so far the studies that have examined only one or two stages of PT have found support for the applicability of PT to comprehension, while those studies that have examined a larger number of stages have failed to find support. However, both studies that examined a large number of stages (Spinner, 2013; Buyl, this volume) used grammaticality judgments. In this study, we examine the same question through the use of self-paced reading.

3. The Procedural Skills Hypothesis

To determine an appropriate methodology for the study, we looked to Pienemann's (1998) Procedural Skills Hypothesis, which states that learners should respond similarly to native speakers on tasks requiring processing procedures that they have acquired. On the other hand, if they have not acquired a particular procedure, they will neither produce it in their speech nor respond similarly to native speakers on a receptive task. Pienemann used a sentence matching task to investigate this premise. He conducted interviews with 14 learners of German in order to determine whether they could use subject-verb agreement productively. Seven did, and seven did not. These two groups, plus a group of seven native speakers, then completed a sentence matching task. The sentence matching task included pairs of sentences; the participants pressed a button to indicate whether the sentences were the same or different. Some pairs included an ungrammatical sentence, as shown in (1) below. The stimuli are originally from Clahsen & Hong (1995).

- (1) a. *Du fliegst nach Korea am nächsten Sonntag* (Pienemann, 1998: 226)
 You fly-2SG to Korea next Sunday
- b. **Du fliegt nach Korea am nächsten Sonntag*
 You fly-3SG to Korea next Sunday

The rationale behind this design is that if participants are sensitive to the ungrammaticality, it takes longer to decide 'same' or 'different' on ungrammatical items than on grammatical ones. Results demonstrated that both the native speakers and the group of learners who produced subject-verb agreement in their speech were sensitive to ungrammaticalities in subject-verb agreement. On the other hand, the group of learners who did not produce subject-verb agreement in speech were not sensitive. Pienemann concluded that once a processing routine has been acquired, learners will demonstrate sensitivity to relevant structures on online tasks such as this one.

In our study, we used a self-paced reading task rather than sentence matching. Self-paced reading has received a good deal of empirical support as a measure of

grammatical sensitivity (e.g., Keating & Jegerski, 2015). Native speakers and learners who have acquired a particular processing routine should respond more quickly to grammatical than ungrammatical items because participants have no processing routine available for ungrammatical structures.

Two analyses of the data were conducted. First, we created an implicational table from individual responses to the self-paced reading task. The purpose of this table is to determine whether performance on the self-paced reading task develops in the order predicted by PT. We compared this table to a table created from oral production data from interviews. Second, we compared individuals' performance on the oral interview with their performance on the self-paced reading task. The goal of this analysis was to determine whether individuals reach a particular stage of production and comprehension at the same time, as predicted by the Procedural Skills Hypothesis.

4. The current study

4.1 Participants

A total of 61 learners of English from various L1 backgrounds (42 males and 19 females, 30 Arabic, 16 Chinese, ten Portuguese, two Japanese, two Korean, and one Mongolian) participated in the current study.¹ All participants were enrolled in an intensive English program at Michigan State University. Their length of residence (LOR) ranged from one to 18 months ($M = 10.33$, $SD = 10.57$), and their English proficiency levels ranged from low-intermediate to advanced, based on the levels of classes in which they had been placed in the program. Their ages ranged from 18 to 39 years old ($M = 22.7$, $SD = 4.8$). In addition to the ESL learners, there were 22 native English speakers (five males and 17 females) who participated as the control for the self-paced reading task. The controls were all undergraduate students except for one college graduate; their mean age was 21.4 years ($SD = 4.0$). Most participants were compensated with extra credit for the courses from which they were recruited.

4.2 Oral interview

Half-hour interviews were conducted one-on-one by either a native speaker of English or one of two advanced non-native speakers whose L1 is Korean. The interviews began with a short warm-up conversation, and then proceeded to various language games, picture descriptions, and role plays with the goal of eliciting forms

1. These data also appear in Spinner & Jung (2018) with a different analysis.

and structures whose acquisition has been analysed within PT, including plural -s, past -ed, possessive -s, Wh-copula questions, third person singular -s, auxiliary 2nd questions, and cancel auxiliary 2nd inversion structures. Recordings of the interviews were transcribed. After transcription, each learner's data were examined to determine whether the use of each form and structure was productive. Productivity was operationalised as at least three different uses of each grammatical element. That is, morphological forms such as plural -s or third person singular -s had to be used appropriately three times on different words to be considered productive. Additionally, we required the appearance of contrasting forms, such as singular nouns and uninflected verbs; for example, participants needed to use both *bus* and *buses*, or *kick* and *kicked*. Syntactic elements such as questions or cancel auxiliary 2nd structures were treated similarly. For example, for questions, there had to be three uses with unique verbs, auxiliaries and question words. An effort was made to ensure that each learner produced enough data to make a clear determination regarding productivity on each form or structure. Errors not directly related to the morphology or syntax in question were disregarded.

4.3 Self-paced reading task

The self-paced reading task adopted a noncumulative, segment-by-segment, moving-window paradigm (Just et al., 1982), created with Superlab software (ver. 4.0, Cedrus Corporation). Data collection took place in a quiet laboratory room setting equipped with a Mac laptop connected to a 23-inch LCD monitor and a button box. Individual participants had an oral interview for half an hour, then completed the self-paced reading task. In the SPR task, participants read only one segment of the sentence at a time, starting from the left; the text advanced as they pressed a button at their own pace. They were told that there would be comprehension questions and that they should “read each sentence as quickly and as naturally as possible, but be sure to understand each part when it is on the screen. Remember that you can't go back to the previous parts of the sentence once you pass them.” After reading each sentence, the participants answered a simple true/false comprehension question, which was included to ensure they processed sentences for meaning. Individual participants' comprehension accuracy scores and reading times (RTs) on each segment were recorded for further analysis.

The reading task consisted of 72 target sentences covering six grammatical structures representing five PT stages, from stage 2 through stage 6. Each structure included twelve items with six grammatical and six ungrammatical sentences for each structure type: Possessive -s (stage 2), object pronouns (stage 3), Wh-copula questions (stage 4), third person singular -s and auxiliary 2nd questions (stage 5), and cancel auxiliary 2nd structures (stage 6). Grammaticality was counterbalanced in that both the grammatical and ungrammatical versions were created for each

item, but each participant saw only one version. Examples of the target sentences are provided in (2) through (7). Italics and underlines are used here to indicate the primary interest areas (PIA) and spillover regions, respectively, while slashes indicate segmentation of the sentence presentations. Participants did not see these markers. As shown in the examples below, the PIAs are the regions where grammaticality is manipulated specifically in relation to the structure in question. The spillover regions are the areas where any processing difficulties can be carried over as a result of grammatical sensitivity after encountering the ungrammatical part of the sentence.

- (2) Stage 2: Possessive -s
 - a. Grammatical: *Tom's phone / is big / but / very light.*
 - b. Ungrammatical: **Tom phone / is big / but / very light.*
- (3) Stage 3: Object pronouns
 - a. The boy / kissed / *her / at the park / yesterday.*
 - b. **The boy / kissed / she / at the park / yesterday.*
- (4) Stage 4: Wh-copula questions
 - a. Why / *was her boyfriend / at the airport / last week?*
 - b. **Why / her boyfriend was / at the airport / last week?*
- (5) Stage 5: Third person singular -s
 - a. My friend / *drives / a car / to work / every day.*
 - b. **My friend / drive / a car / to work / every day.*
- (6) Stage 5: Auxiliary 2nd question
 - a. Why / *is the lady / fighting / with her boss / right now?*
 - b. **Why / the lady is / fighting / with her boss / right now?*
- (7) Stage 6: Cancel auxiliary 2nd structures
 - a. I / found / what / *my brother was / hiding / yesterday.*
 - b. **I / found / what / was my brother / hiding / yesterday.*

The vocabulary in the sentences was controlled for frequency to avoid effects of unfamiliar vocabulary. Based on the American English Subtitles (SUBTLEXus) corpus (Brysbaert & New, 2009), we only chose vocabulary items representing a minimum frequency of 17.86 per million. Those words were all ranked within the four percent highest frequency words among the 74,286 in the database, and were also selected to be likely to appear in a classroom setting (e.g., *mother, hospital, think*). Statistical analysis showed no significant frequency differences in the vocabulary used across the target structures, $F(5, 66) = 1.293, p = .278$, and across the different stages, $F(4, 67) = 1.635, p = .176$.

Importantly, we ensured that target sentences in each stage did not include any grammatical properties of higher stages, or of that stage except the one being tested. For example, items representing stage 5 could include structures from stages 1–4 but not features from stages 6 or 5 (other than the structure being tested).

4.4 Implicational scaling

While group scores on the SPR task are analysed elsewhere (Spinner & Jung, 2018), we chose to implement implicational scaling for this study, for several reasons. First, implicational scaling is the most common way to analyse data in PT studies (e.g., Pienemann, 1998). Second, implicational scaling can be used to determine whether a developmental pattern is present in a set of data (Meisel et al., 1981), making it ideal for PT studies. Finally, it is a good choice for this study because it takes not only group performance into consideration, but also individuals' performance, which is the relevant issue for most PT studies. This is the first time, to our knowledge, that SPR data have been used in implicational scales; however, it is not the first time that they have been used to look at individuals' performance on grammar. For example, VanPatten and Smith (2015) used SPR data to investigate grammatical sensitivity in English-speaking learners acquiring Japanese. In that study, individual learners' performance on an SPR task was compared to their performance on an aptitude measure. Here, we compare individual learners' performance on the SPR task with their performance on a production measure.

We had to decide what criterion to use to determine grammatical sensitivity for individuals with the self-paced reading task. VanPatten and Smith (2015) considered any individuals with higher average reading times on ungrammatical than grammatical items to be sensitive. In their data, which used whole-sentence reading times, this amounted to about a 100 ms difference (Smith, personal communication). In our data, with phrase-by-phrase reading times, we were hesitant to consider all scores with higher reading times on ungrammatical sentences to be indicative of grammatical sensitivity, since a very slight difference could simply be due to noise in the data. For instance, we speculated that a hypothetical participant with a 200 ms average reading time on ungrammatical structures and a 199 ms reading time on grammatical structures would not reasonably be considered to be demonstrating sensitivity to the difference in grammaticality. We therefore decided to set a threshold for grammatical sensitivity.

VanPatten and Smith (2015) considered whole sentence reading times, which were longer than the short words and phrases we used here. Since their threshold was about 100 ms, we examined our data for an appropriate equivalent. We decided to consider 25 ms greater reading time for ungrammatical than grammatical sentences to be a cutoff for sensitivity. It is possible that a different threshold (presumably longer) should be used for non-native speakers, but we had no principled way to determine this difference and so left it at 25 ms. Given the admittedly arbitrary threshold, we expected to find noise in the data; however, the point is to look for overall patterns.

A second difference between our study and VanPatten and Smith's is that we had measures for spillover regions, that is, the areas that follow the points of

ungrammaticality. Group results indicated that participants often demonstrated sensitivity in these spillover regions. We therefore considered a reading time difference of over 25 ms in either the region of interest or the following region to be indicative of sensitivity.

Implicational tables are created by entering each learner's data into a single row in a table. The elements of PT under consideration appear at the top of the table, with those predicted to emerge first at the left and those predicted to emerge last on the right. Learners receive one point for each grammatical element they are considered to have acquired. The learners with the fewest points appear at the top, and those with the most appear at the bottom (although this can also be reversed). A line is then drawn between the left side of the table, which has the acquired elements, and the right side of the table, which has the elements that are not yet acquired. The statistical procedure that is used to determine whether the data make a good implicational table (and thus, a real developmental pattern) is based on how many elements have emerged in a different order than the prediction. The Coefficient (or Index) of Reproducibility (C of R) is based on the number of items that either emerge when they should not, or do not emerge when they should. According to Hatch and Farhady (1982: 179), a C of R over .9 indicates a predictable pattern, although Rickford (2002: 157) recommends .93, which corresponds to a p value of .05. A second important measure is the Coefficient of Scalability (C of S). This statistic addresses the fact that a large number of positive responses for either individuals or categories can lead to a high C of R without there being a true acquisitional order. For instance, if all participants were sensitive to the grammatical items at every stage, the C of R would be 1 (that is, perfect), but there would be no evidence of an acquisitional order. Thus, the C of S takes into account the proportion of emerged versus non-emerged cells in the table. The C of S does not apply to the native speakers, since no acquisitional order is expected; however, we calculated it for the non-native speakers using Hatch and Farhady's (1982) formula. Hatch and Farhady suggest the C of S be over .6 in order to indicate a scalable table.

5. Results

5.1 Group scores on self-paced reading

The group results on the self-paced reading task are reported elsewhere (Spinner & Jung, 2018), but they are summarised here briefly. Based on paired sample t -tests, there were significantly ($p < .05$) longer reading times on ungrammatical versus grammatical items for the native speaker group on all structures.

The ESL learners showed less sensitivity to ungrammaticalities on the self-paced reading task. They demonstrated significantly longer reading times on

ungrammatical items representing stage 2 (possessive -s), stage 3 (object pronouns), and stage 6 items (cancel aux-2nd), but not on stage 4 (Wh-copula questions) or stage 5 (third person singular -s and Wh-aux 2nd questions). The crucial issue for the current study, however, lies not with group results but with individual results, which are explored in the following sections.

5.2 Implicational scaling results

Because no developmental pattern is expected for native speakers, their data cannot be entered into a standard implicational table. However, in order to ascertain that the data analysis was appropriate, we entered the native speaker (NS) data into a table with the expectation that all fields would be 'acquired'. That is, all of the native speakers, having acquired all of the grammatical elements, should show sensitivity to ungrammaticalities in these structures. Instances where this is not the case should be attributed to methodological error. We were thus able to calculate the Coefficient of Reproducibility (C of R) for the table, which is simply based on the number of errors (that is, cases where the native speakers are not measured as being sensitive to these grammatical elements). The numbers here reflect individual participants' grammatical sensitivities, that is, mean RT (ungrammatical) minus mean RT (grammatical). Positive numbers over 25 indicate a sensitivity to ungrammaticality; recall that we used scores in either the primary interest area or the spillover region to indicate sensitivity. The native speaker data shown in Table 1 yields a C of R of .87, which is slightly shy of the number considered to yield a good implicational table by Hatch and Farhady (1982). Note that the methodology of analysing individual SPR scores is relatively new, and may need to be further refined in future research. Presumably this accounts for some of the 'noise' in the current data. However, we are confident that the overall pattern of results is clear.

For the ESL learners, data from two learners were dropped from analysis because the participants failed to produce enough Wh-copula questions to make a determination of productivity. Data from the rest of the learners were entered into implicational tables. The raw scores for the SPR are provided in Table 2. The implicational table for these data is presented separately for visual clarity in Table 3.

Table 1. Native speakers' mean sensitivity scores on the PIA and Spillover region

Participant	Stage 2		Stage 3		Stage 4		Stage 5 (SAGR)		Stage 5 (Aux2)		Stage 6	
	PIA	Spillover	PIA	Spillover	PIA	Spillover	PIA	Spillover	PIA	Spillover	PIA	Spillover
NS 201	49	285	-195	-113	-15	492	-53	-235	29	142	235	149
NS 202	-49	-63	-171	113	207	30	19	-57	135	278	319	38
NS 203	-121	-413	-123	-5	193	283	42	8	74	85	149	164
NS 204	-131	181	171	95	-285	369	-43	52	-46	126	207	2
NS 205	-70	73	217	90	303	40	52	149	-166	57	158	74
NS 206	99	339	149	-18	341	-126	390	-51	397	145	87	52
NS 208	126	643	33	184	-93	-86	12	-44	93	152	126	97
NS 209	57	207	141	164	31	14	74	-86	62	-64	65	43
NS 210	36	-24	-53	-46	412	-89	-27	-45	-91	-7	66	5
NS 211	-68	276	34	201	-71	103	25	121	289	-103	295	-36
NS 212	349	103	52	-32	135	43	129	60	173	-1249	-40	76
NS 213	438	-96	88	44	10	-52	-16	28	228	34	43	-24
NS 214	101	217	266	-34	-45	-278	271	182	592	177	209	136
NS 215	47	68	-46	72	290	33	88	-61	226	73	65	-52
NS 216	-2	275	-41	10	10	-79	43	24	159	94	-58	128
NS 217	-54	189	36	78	-144	49	114	-59	187	-81	108	149
NS 218	782	445	634	187	1396	-284	1163	-33	1590	122	1640	-36
NS 219	281	306	-25	260	216	181	121	324	131	-50	467	-18
NS 220	-40	153	-40	-57	-34	286	45	-76	146	45	235	5
NS 221	120	17	188	82	85	92	38	20	114	89	72	16
NS 222	-101	45	12	153	-5	-13	140	84	-21	44	15	65
NS 223	84	142	37	297	262	242	176	297	7	361	228	115

** Sensitivity scores (i.e., RT [ungrammatical]- RT [grammatical]) that were greater than 25 milliseconds were considered to have grammatical sensitivity. Those scores are bolded.

Table 2. ESL learners' mean sensitivity scores on the PIA and Spillover region

Participant	Stage 2		Stage 3		Stage 4		Stage 5 (SAGR)		Stage 5 (Aux2)		Stage 6	
	PIA	Spillover	PIA	Spillover	PIA	Spillover	PIA	Spillover	PIA	Spillover	PIA	Spillover
ESL 201	330	85	-310	555	470	-314	-259	-306	-451	474	1668	-3
ESL 202	367	-170	-95	-343	225	220	-276	40	156	-161	366	261
ESL 203	897	497	23	1026	-146	694	-254	-266	319	390	-41	33
ESL 204	-38	482	265	130	-273	-429	89	522	-222	-529	269	-165
ESL 205	656	596	-52	625	-69	102	-117	112	64	14	-375	-48
ESL 206	-76	105	-238	-385	-20	200	296	37	-155	-155	112	-142
ESL 207	-305	112	265	980	-103	976	-315	-178	-30	26	392	-70
ESL 208	-804	-768	-271	147	274	-492	-183	72	-989	-563	-830	-201
ESL 209	-462	384	285	98	-604	482	-261	-358	-229	180	-231	87
ESL 210	-431	-1304	34	187	-194	388	-212	694	-190	-212	404	-350
ESL 211	550	-13	-217	1035	101	-296	-225	-29	85	574	-85	282
ESL 212	430	-379	-455	219	441	919	27	502	649	-837	428	-242
ESL 213	25	69	343	480	-240	301	-140	-113	-27	-16	137	98
ESL 214	-911	-219	-130	264	-907	624	84	7	409	-594	418	88
ESL 215	-77	-18	164	1677	980	297	-292	-373	376	267	769	60
ESL 216	-57	-107	-4	442	-79	72	86	-109	353	181	362	-157
ESL 217	-33	335	144	172	149	-767	176	-42	357	25	-17	-54
ESL 218	-191	22	-18	-527	-1747	740	-154	-216	-141	-710	434	-377
ESL 219	159	38	114	209	-46	49	-147	-250	-29	-47	187	-83
ESL 220	159	-50	3	49	83	241	-37	139	94	-117	389	-30
ESL 221	-405	700	-164	2573	21	292	-132	-178	-108	107	-80	21
ESL 222	-228	227	297	105	-37	201	25	140	-263	-100	598	6
ESL 223	-56	-612	607	679	1479	-1026	-183	660	-1982	816	-961	47
ESL 224	-598	-355	215	-411	-534	381	-28	324	238	-714	394	-171
ESL 225	32	246	458	1534	380	-218	-439	-457	205	162	467	-212
ESL 226	-1203	-61	-156	52	490	-885	34	219	634	-309	130	-193
ESL 227	-170	375	-82	590	1008	-125	-150	-178	270	-81	-438	-55
ESL 228	270	119	-104	21	191	72	41	-149	157	-364	266	-84
ESL 229	1338	1099	-34	-128	-656	-155	25	-306	-235	-205	-79	50
ESL 230	217	-683	-232	148	-410	-1593	253	-270	-526	-263	-96	-427

Table 2. (continued)

Participant	Stage 2		Stage 3		Stage 4		Stage 5 (SAGR)		Stage 5 (Aux2)		Stage 6	
	PIA	Spillover	PIA	Spillover	PIA	Spillover	PIA	Spillover	PIA	Spillover	PIA	Spillover
ESL 231	-314	112	101	-139	-679	-35	-276	70	-389	-893	208	-77
ESL 232	855	1086	-133	1468	315	972	-368	-524	-121	-78	14	56
ESL 233	210	-277	-135	729	-251	199	84	22	41	-162	165	-17
ESL 234	85	-351	-424	-675	-720	272	-325	371	472	-445	41	126
ESL 235	-578	575	207	23	400	473	64	65	308	-99	351	-362
ESL 236	-283	47	43	714	752	-324	-474	-120	417	-260	56	59
ESL 237	-715	267	156	84	-367	293	151	-347	-107	664	-459	-139
ESL 238	298	32	-62	-233	194	322	-23	-108	-378	409	409	152
ESL 239	-1199	204	-452	1077	-774	-685	654	-1343	-278	-806	459	223
ESL 240	-331	-69	96	1641	-936	789	-143	-200	135	248	227	-321
ESL 241	-707	-129	-68	-227	-283	224	17	-8	-154	47	589	14
ESL 242	-307	1177	141	892	-364	-385	-235	-630	-349	-513	1483	161
ESL 243	-269	211	71	-468	23	255	-51	266	-100	-156	257	79
ESL 244	141	457	347	1292	1089	-665	137	-90	196	133	464	-3
ESL 245	199	-37	138	291	-122	226	-196	180	307	-86	379	-32
ESL 246	-220	283	330	437	-737	-432	-436	-633	-134	717	-801	461
ESL 247	342	742	-256	-2208	-273	745	159	87	258	190	525	516
ESL 248	401	102	-31	424	143	-53	-129	-289	36	148	-6	-23
ESL 249	-442	-468	-265	-376	584	323	84	188	-206	271	68	-213
ESL 250	-120	-75	110	740	799	269	41	-169	-137	792	123	-66
ESL 251	-281	341	-27	545	-121	82	-18	-383	37	-69	27	-658
ESL 252	249	589	1093	1068	-1250	-385	-251	-398	157	-91	-266	553
ESL 253	544	1052	-1	264	-538	67	-98	-970	138	395	-49	319
ESL 255	-325	283	287	571	-162	476	-164	-131	-603	-14	129	-46
ESL 256	207	654	-139	-1333	-895	-394	274	294	1131	-154	933	-135
ESL 257	-900	-37	538	642	268	141	-244	101	267	200	-615	-79
ESL 258	-468	-69	31	-149	115	199	-222	113	-460	-100	283	13
ESL 260	-754	-122	127	174	271	154	-39	51	645	34	295	284
ESL 261	-531	215	15	949	659	-590	-210	-126	-45	72	-231	20

Table 3. Implicational table for ESL learners with SPR results

Participant	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Points
ESL 218	N	N	Y*	N	Y*	2
ESL 241	N	N	Y*	Y*	Y*	3
ESL 249	N	N	Y*	Y*	Y*	3
ESL 208	N	Y*	Y*	Y*	N	3
ESL 257	N	Y*	Y*	Y*	N	3
ESL 229	Y	N	N	Y*	Y*	3
ESL 256	Y	N	N	Y*	Y*	3
ESL 242	Y	Y	N	N	Y*	3
ESL 230	Y	Y	N	Y*	N	3
ESL 246	Y	Y	N	Y*	Y*	4
ESL 252	Y	Y	N	Y*	Y*	4
ESL 231	Y	Y	N	Y*	Y*	4
ESL 239	Y	Y	N	Y*	Y*	4
ESL 204	Y	Y	N	Y*	Y*	4
ESL 255	Y	Y	Y	N	Y*	4
ESL 219	Y	Y	Y	N	Y*	4
ESL 232	Y	Y	Y	N	Y*	4
ESL 213	Y	Y	Y	N	Y*	4
ESL 237	Y	Y	Y	Y	N	4
ESL 217	Y	Y	Y	Y	N	4
ESL 221	Y	Y	Y	Y	N	4
ESL 261	Y	Y	Y	Y	N	4
ESL 227	Y	Y	Y	Y	N	4
ESL 248	Y	Y	Y	Y	N	4
ESL 205	Y	Y	Y	Y	N	4
ESL 206	Y	N*	Y	Y	Y	4
ESL 240	N*	Y	Y	Y	Y	4
ESL 215	N*	Y	Y	Y	Y	4
ESL 238	Y	N*	Y	Y	Y	4
ESL 258	N*	Y	Y	Y	Y	4
ESL 210	N*	Y	Y	Y	Y	4
ESL 224	N*	Y	Y	Y	Y	4
ESL 226	N*	Y	Y	Y	Y	4
ESL 214	N*	Y	Y	Y	Y	4
ESL 223	N*	Y	Y	Y	Y	4
ESL 234	Y	N*	Y	Y	Y	4
ESL 202	Y	N*	Y	Y	Y	4
ESL 216	N*	Y	Y	Y	Y	4
ESL 228	Y	N*	Y	Y	Y	4
ESL 247	Y	N*	Y	Y	Y	4

Table 3. (continued)

Participant	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Points
ESL 250	N*	Y	Y	Y	Y	4
ESL 260	N*	Y	Y	Y	Y	4
ESL 207	Y	Y	Y	Y	Y	5
ESL 251	Y	Y	Y	Y	Y	5
ESL 243	Y	Y	Y	Y	Y	5
ESL 222	Y	Y	Y	Y	Y	5
ESL 209	Y	Y	Y	Y	Y	5
ESL 203	Y	Y	Y	Y	Y	5
ESL 211	Y	Y	Y	Y	Y	5
ESL 236	Y	Y	Y	Y	Y	5
ESL 253	Y	Y	Y	Y	Y	5
ESL 201	Y	Y	Y	Y	Y	5
ESL 225	Y	Y	Y	Y	Y	5
ESL 233	Y	Y	Y	Y	Y	5
ESL 212	Y	Y	Y	Y	Y	5
ESL 235	Y	Y	Y	Y	Y	5
ESL 220	Y	Y	Y	Y	Y	5
ESL 244	Y	Y	Y	Y	Y	5
ESL 245	Y	Y	Y	Y	Y	5

** Raw numbers are omitted here for visual clarity. They can be found in Table 2.

The C of R for Table 3 is .82, which is not as high as native speakers, but might seem suggestive of a trend. Importantly, however, we also applied a second measure, the Coefficient of Scalability (C of S) in order to determine whether the table reflects a true acquisitional pattern. For the non-native speaker (NNS) results, the C of S is .33. Hatch and Farhady state that it should be over .6 to indicate a scalable table; therefore, this table fails to demonstrate scalability and therefore does not demonstrate a clear acquisitional order.

Finally, an implicational table was created with the production data for the purposes of comparison, shown in Table 4. In this table, the productive use of a form or structure (as measured by the criteria listed in the methodology section) is indicated with bolded numbers. The C of R for the table with production data is .98, when the results for the different structures in stages 2 and 5 are collapsed (that is, productive use of any structure in a stage is counted as productive use for the whole stage). The C of S is .88, indicating a scalable table and a true acquisitional order.

Table 4. Implicational table for ESL learners' oral interview results

Participant	2PL	2PST	2POS	4WHQ	5SAGR	5AUX2	6CAUX2	Points
ESL 214	1/6	0/7	0/6	1	0/5	0	0	0
ESL 229	1/5	0/11	0/4	0	0/14	1	0	0
ESL 230	2/5	1/10	0/8	2	0/9	5	1	1
ESL 247	9/12	2/11	5/5	2	0/15	2	1	1
ESL 227	6/6	1/9	6/6	2	0/11	2	0	1
ESL 238	7/7	1/8	2/9	2	2/8	0	0	1
ESL 246	6/7	2/13	0/9	0	0/14	1	0	1
ESL 225	5/5	5/6	4/4	2	0/8	2	3	2
ESL 204	4/6	4/6	3/3	4	0/8	0	2	2
ESL 207	4/8	0/6	4/5	4	0/10	2	2	2
ESL 218	5/5	2/10	0/8	3	0/12	2	1	2
ESL 219	6/6	5/10	11/11	5	0/11	1	2	2
ESL 231	6/6	9/12	3/6	5	1/10	0	0	2
ESL 234	7/7	4/8	0/3	10	0/8	0	0	2
ESL 255	3/4	3/10	0/8	5	1/8	1	0	2
ESL 260	5/8	4/8	0/11	5	0/12	1	0	2
ESL 244	7/7	8/15	3/7	6	2/19	0	5	3
ESL 201	3/3	6/6	4/4	3	1/10	4	2	3
ESL 203	2/6	5/7	4/4	3	0/10	6	0	3
ESL 205	8/8	7/7	3/3	3	6/8	10	2	3
ESL 208	3/3	8/8	3/3	11	2/14	14	2	3
ESL 210	2/5	5/8	4/4	5	2/15	7	2	3
ESL 212	5/5	3/4	0/4	3	7/8	13	1	3
ESL 213	8/8	7/10	0/7	7	6/6	4	2	3
ESL 215	6/6	14/15	7/7	3	4/16	10	2	3
ESL 216	12/12	13/16	6/12	5	2/18	8	2	3
ESL 217	8/9	10/10	7/7	3	4/6	12	1	3
ESL 221	5/5	7/11	2/7	5	2/11	5	1	3
ESL 222	7/7	12/14	3/4	11	2/13	8	1	3
ESL 223	6/6	8/9	3/3	6	9/13	9	2	3
ESL 224	6/6	6/8	5/7	5	2/20	5	1	3
ESL 226	6/6	5/7	0/11	5	10/11	5	1	3
ESL 228	4/5	4/8	6/6	3	2/13	6	1	3
ESL 235	5/5	5/5	4/4	5	0/15	10	2	3
ESL 236	5/6	0/12	3/9	5	2/17	7	0	3
ESL 237	6/6	8/8	0/6	4	5/11	5	0	3
ESL 240	8/8	3/6	4/4	7	3/10	8	0	3
ESL 243	9/9	15/16	4/6	10	10/12	7	2	3
ESL 245	7/7	18/21	8/9	9	8/19	8	2	3
ESL 248	12/12	5/22	5/5	11	2/16	3	1	3

Table 4. (continued)

Participant	2PL	2PST	2POS	4WHQ	5SAGR	5AUX2	6CAUX2	Points
ESL 249	5/6	17/21	4/4	10	4/8	2	1	3
ESL 250	8/8	18/20	5/5	5	5/7	6	2	3
ESL 256	7/7	5/7	4/8	4	6/9	5	1	3
ESL 257	5/5	3/3	0/4	3	5/8	2	1	3
ESL 258	10/10	10/11	0/5	6	0/3	3	1	3
ESL 202	4/4	1/11	3/3	4	0/10	11	2	3
ESL 206	6/6	10/10	5/5	7	6/9	6	2	3
ESL 232	7/7	8/11	1/9	13	6/11	5	2	3
ESL 233	9/9	8/10	3/3	5	3/11	4	2	3
ESL 261	6/8	1/9	1/9	5	5/13	7	1	3
ESL 253	7/7	10/11	5/5	2	8/11	9	4	3
ESL 209	4/4	5/5	3/3	10	13/13	11	3	4
ESL 220	5/5	13/14	5/5	5	6/9	9	4	4
ESL 239	5/6	4/5	3/3	3	5/9	1	3	4
ESL 241	6/6	5/11	4/4	3	11/18	7	4	4
ESL 242	9/10	8/9	5/10	5	7/11	9	4	4
ESL 211	7/7	3/16	0/4	4	5/9	11	3	4
ESL 251	6/7	6/6	4/4	5	6/6	7	4	4
ESL 252	12/12	21/22	4/4	3	10/13	9	5	4

Note: Bolded entries meet the criteria for emergence. 2PL = plural -s, 2PST = Past -ed, 2POS = Possessive -s, 4WHQ = Wh-copula questions, 5SAGR = third person singular -s, 5AUX2 = auxiliary second questions, 6CAUX2 = cancel aux 2nd clauses

5.3 Production versus comprehension: Individual results

To compare individuals' performance on production and reception, we examined whether the results using the measure of sensitivity for the SPR task (that is, a difference in reading times between the ungrammatical and grammatical items) corresponded with the results obtained in the interview.

We made the assumption that native speakers were able to produce all structures orally. That is, every cell in the production table should indicate emergence. Therefore, the match between their oral production data and SPR data can be measured directly by Table 1, with an 87% match.

The results of the ESL learners were entered into a table directly comparing each learner's oral production versus their performance on the SPR, shown in Table 5. Overall, there was a 58% match between learners' productive and receptive scores. For stage 2, there was a 61% match between productive and receptive scores. For stage 4, the percentage of matching results was 81%. For stage 5 third person

singular -s, the percentage was 47%; for stage 5 auxiliary questions, the percentage was 63% and for stage 6, the percentage was 36%.² Note that stage 3 was not included because the oral interviews did not directly elicit object pronouns.

Table 5. Comparison between ESL learners' oral production and SPR results

Participant	Stage 2 (possessives)		Stage 4		Stage 5 (SAGR)		Stage 5 (Aux2)		Stage 6	
	SPR	Oral	SPR	Oral	SPR	Oral	SPR	Oral	SPR	Oral
ESL 201	330	4/4	470	3	-306	1/10	474	4	1668	2
ESL 202	367	3/3	225	4	40	0/10	156	11	366	2
ESL 203	897	4/4	694	3	-266	0/10	390	6	33	0
ESL 204	482	3/3	-429	4	522	0/8	-529	0	269	2
ESL 205	656	3/3	102	3	112	6/8	64	10	-375	2
ESL 206	105	5/5	200	7	296	6/9	-155	6	112	2
ESL 207	112	4/5	976	4	-315	0/10	26	2	392	2
ESL 208	-804	3/3	274	11	72	2/14	-989	14	-830	2
ESL 209	384	3/3	482	10	-358	13/13	180	11	87	3
ESL 210	-1304	4/4	388	5	694	2/15	-212	7	404	2
ESL 211	550	0/4	101	4	-225	5/9	574	11	282	3
ESL 212	430	0/4	919	3	502	7/8	649	13	428	1
ESL 213	69	0/7	301	7	-140	6/6	-27	4	137	2
ESL 214	-911	0/6	624	1	84	0/5	409	0	418	0
ESL 215	-77	7/7	980	3	-373	4/16	376	10	769	2
ESL 216	-107	6/12	72	5	86	2/18	353	8	362	2
ESL 217	335	7/7	149	3	176	4/6	357	12	-54	1
ESL 218	-191	0/8	740	3	-216	0/12	-710	2	434	1
ESL 219	159	11/11	49	5	-250	0/11	-47	1	187	2
ESL 220	159	5/5	241	5	139	6/9	94	9	389	4
ESL 221	700	2/7	292	5	-178	2/11	107	5	-80	1
ESL 222	227	3/4	201	11	140	2/13	-263	8	598	1
ESL 223	-612	3/3	1479	6	660	9/13	816	9	47	2
ESL 224	-598	5/7	381	5	324	2/20	238	5	394	1
ESL 225	246	4/4	380	2	-457	0/8	205	2	467	3
ESL 226	-1203	0/11	490	5	219	10/11	634	5	130	1
ESL 227	375	6/6	1008	2	-178	0/11	270	2	-438	0

2. As in Spinner (2013), we attempted a few different analyses (different cutoff points, using only the area of interest rather than both the area of interest and spillover region, etc.) to determine whether these results were due to the particular methodology we used. These attempts resulted in lower, not higher, rates of 'matches' between the SPR and oral results. Therefore, we are confident that these results are fairly robust.

Table 5. (continued)

Participant	Stage 2 (possessives)		Stage 4		Stage 5 (SAGR)		Stage 5 (Aux2)		Stage 6	
	SPR	Oral	SPR	Oral	SPR	Oral	SPR	Oral	SPR	Oral
ESL 228	270	6/6	191	3	41	2/13	157	6	266	1
ESL 229	1338	0/4	-656	0	25	0/14	-235	1	50	0
ESL 230	217	0/8	-1593	2	253	0/9	-526	5	-427	1
ESL 231	112	3/6	-679	5	70	1/10	-893	0	208	0
ESL 232	1086	1/9	972	13	-524	6/11	-121	5	56	2
ESL 233	210	3/3	199	5	84	3/11	41	4	165	2
ESL 234	85	0/3	272	10	371	0/8	472	0	126	0
ESL 235	575	4/4	473	5	65	0/15	308	10	351	2
ESL 236	47	3/9	752	5	-474	2/17	417	7	59	0
ESL 237	267	0/6	293	4	151	5/11	664	5	-459	0
ESL 238	298	2/9	322	2	-108	2/8	409	0	409	0
ESL 239	204	3/3	-774	3	654	5/9	-806	1	459	3
ESL 240	-331	4/4	789	7	-200	3/10	248	8	227	0
ESL 241	-707	4/4	224	3	-8	11/18	47	7	589	4
ESL 242	1177	5/10	-385	5	-630	7/11	-513	9	1483	4
ESL 243	211	4/6	255	10	266	10/12	-156	7	257	2
ESL 244	457	3/7	1089	6	137	2/19	196	0	464	5
ESL 245	199	8/9	226	9	180	8/19	307	8	379	2
ESL 246	283	0/9	-737	0	-633	0/14	717	1	461	0
ESL 247	742	5/5	745	2	159	0/15	258	2	525	1
ESL 248	401	5/5	143	11	-289	2/16	148	3	-23	1
ESL 249	-468	4/4	584	10	188	4/8	271	2	68	1
ESL 250	-120	5/5	799	5	41	5/7	172	6	123	2
ESL 251	341	4/4	82	3	-383	6/6	37	7	27	4
ESL 252	589	4/4	-1250	4	-398	10/13	157	9	553	5
ESL 253	1052	5/5	67	2	-970	8/11	395	9	319	4
ESL 255	283	0/8	476	5	-164	1/8	-603	1	129	0
ESL 256	654	4/8	-895	4	294	6/9	1131	5	933	1
ESL 257	-900	0/4	268	3	-244	5/8	267	2	-615	1
ESL 258	-468	0/5	199	6	113	0/3	-460	3	283	1
ESL 260	-754	0/11	271	5	51	0/12	645	1	295	0
ESL 261	215	1/9	659	5	-210	5/13	72	7	-231	1

Note: For purposes of comparison, positive SPR results are represented as the higher positive result (either the area of interest or spillover). If neither SPR score is positive, the lower negative result is presented. Full results can be examined in Table 2.

There are a few possible objections to this analysis. The first is that, while it is predicted that learners who have acquired a particular processing procedure should behave similarly to native speakers, it is not clear what should be expected from learners without that processing procedure. Second, we made an arbitrary cutoff point for the individuals' responses to the self-paced reading task (that is, 25 ms difference between grammatical and ungrammatical reading times). For these two reasons, we decided to conduct a post-hoc examination of the more extreme positive scores, specifically the 48 SPR results with a 500 ms or higher reading time difference between grammatical and ungrammatical structures. This analysis slightly raises the percentage of matches between productive and receptive results; 31 of the 48 strongly positive SPR scores (65%) were from participants who also used the form productively in speech. Together, these findings indicate that there may be some association between producing a form in speech and responding to that form on a self-paced reading task, but the association is nearly not as strong as it is for native speakers, as the Procedural Skills Hypothesis would predict.

6. Discussion

The first research question dealt with the PT order for receptive data. We measured individuals' responses on a self-paced reading task and entered them into an implicational table with the PT order. It was found that the data did not represent a developmental order. Therefore, we conclude that the PT order does not hold for reception data as measured by a self-paced reading task in this way.

The second research interest dealt with the Procedural Skills Hypothesis, which predicts that learners who use particular grammatical elements in their production should respond to those same elements in an online task in a manner similar to native speakers. Here again, we found that this was not the case. A comparison between individual learners' oral production results and self-paced reading results demonstrates very little correspondence between the two scores. In fact, the percentage of matching scores hovers slightly above chance at 58% average among the stages examined. Even examining only results from learners who were sensitive to ungrammaticalities and displayed the most extreme difference in reading times yielded only a 65% match between productive and receptive measures. We therefore feel it is safe to conclude that there is not a strong and direct relationship between learners' performance on the oral production task and their performance on the SPR task.

A similar difference between production and reception is noted with the implicational tables. Although the implicational table based on SPR results failed, the

implicational table based on the oral production task was quite successful, with an extremely high coefficient of reproducibility of .98 and a high coefficient of scalability of .88. One note of caution: This score was only achieved after combining the results of several different measures for stage 2 and stage 5: Plural -s, past -ed, and possessive -s for stage 2, and third person singular -s and Wh-auxiliary questions for stage 5. It is likely that the table would have been unsuccessful if we had only chosen to elicit one grammatical element from either of these stages. For instance, a number of learners, particularly those with Arabic as a first language, failed to produce possessive -s in a productive way, even though they productively produced the other stage 2 elements. If we had only elected to elicit possessive -s as representative of stage 2, the implicational table might have failed to show a developmental order. Remember that for the SPR we only selected one element to represent each PT stage except stage 5, so it is possible that the reason the implicational table with receptive data failed is that we chose the ‘wrong’ representative from each stage. This issue may partially explain why studies that have only examined elements representing one or two PT stages have generally provided evidence for the predicted order in comprehension data, while those that have examined more have not. (For work on intra-stage development in PT that addresses these issues, see, e.g., Di Biase et al., 2015.) This issue of which particular elements should be selected to investigate the PT order needs to be further examined.

Finally, we should note that recent studies have suggested that morphology and syntax may develop on separate paths (see, e.g., Bonilla, 2015; Di Biase et al. 2015). We did not explore that issue here, and do not believe that results would be significantly different if we had narrowed our focus to only syntax or only morphology. However, it may be worthwhile for future research to consider this possibility.

7. Conclusion

In this study, we examined the question of whether self-paced reading data would reflect the developmental order predicted by PT, and whether performance on this receptive task would correspond to performance on a productive task, as predicted by the Procedural Skills Hypothesis. We did not find either of these possibilities to be the case.

Of course, the study has limitations. By using a self-paced reading task, we avoided using accuracy as a measure of receptive skills; however, it is difficult to measure individuals’ grammatical sensitivity with self-paced reading. It is entirely possible that using a different cutoff point for grammatical sensitivity would lead to different results (see Buyl & Housen, 2015 for an example of a study that

experiments with this idea). A different group of learners, perhaps one with a greater range of proficiencies, might also improve the SPR implicational tables, particularly by improving the coefficient of scalability.

It is hoped that this study, combined with findings from other researchers using other methodologies, will help uncover a clearer picture of the relationship between production and reception, and the scope of PT.

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References

- Bonilla, C. (2015). From number agreement to the subjunctive: Evidence for Processability Theory in L2 Spanish. *Second Language Research* 31(1), 53–74.
<https://doi.org/10.1177/0267658314537291>
- Brysbaert, M., & New, B. (2009). Moving beyond Kucera and Francis: A critical evaluation of current word frequency norms and the introduction of a new and improved word frequency measure for American English. *Behavior Research Methods* 41(4), 977–990.
<https://doi.org/10.3758/BRM.41.4.977>
- Buyl, A., & Housen, A. (2015). Developmental stages in receptive grammar acquisition: A Processability Theory account. *Second Language Research* 31(4), 523–550.
<https://doi.org/10.1177/0267658315585905>
- Clahsen, H., & Hong, U. (1995). Agreement and null subjects in German L2 development: New evidence from reaction-time experiments. *Second Language Research* 11, 57–87.
<https://doi.org/10.1177/026765839501100103>
- Di Biase, B., & Kawaguchi, S. (2002). Exploring the typological plausibility of Processability Theory: Language development in Italian second language and Japanese second language. *Second Language Research* 18(3), 274–302. <https://doi.org/10.1191/0267658302sr2040a>
- Di Biase, B., Kawaguchi, S., & Yamaguchi, Y. (2015). The development of English as a second language. In C. Bettoni & B. Di Biase (Eds.), *Grammatical development in second languages: Exploring the boundaries of Processability Theory* (pp. 85–116). Paris: European Second Language Association.
- Ellis, R. (2008). *The study of second language acquisition* (2nd ed.). Oxford: Oxford University Press.
- Hatch, E., & Farhady, H. (1982). *Research design and statistics for applied linguistics*. Rowley, MA: Newbury House.
- Hulstijn, J. H. (2015). Discussion: How different can perspectives on L2 development be? *Language Learning* 65(1), 210–232. <https://doi.org/10.1111/lang.12096>
- Just, M. A., Carpenter, P. A., & Woolley, J. D. (1982). Paradigms and processes in reading comprehension. *Journal of experimental psychology: General* 111(2), 228.
<https://doi.org/10.1037/0096-3445.111.2.228>

- Keatinge, D., & Keßler, J.-U. (2009). The acquisition of the passive voice in English as a foreign language: Production and perception. In D. Keatinge & J.-U. Keßler (Eds.), *Research in second language acquisition: Empirical evidence across languages* (pp. 41–68). Newcastle upon Tyne: Cambridge Scholars.
- Keating, G., & Jegerski, J. (2015). Experimental designs in sentence processing research: A methodological review and user's guide. *Studies in Second Language Acquisition* 37(1), 1–32. <https://doi.org/10.1017/S0272263114000187>
- Meisel, J., Clahsen, H., & Pienemann, M. (1981). On determining developmental stages in natural second language acquisition. *Studies in Second Language Acquisition* 3(2), 109–135. <https://doi.org/10.1017/S0272263100004137>
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M. (2005). An introduction to Processability Theory. In M. Pienemann (Ed.), *Cross-linguistic aspects of Processability Theory* (pp. 1–60). Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30.03pie>
- Pienemann, M., Di Biase, B., & Kawaguchi, S. (2005). Extending Processability Theory. In M. Pienemann (Ed.), *Cross-linguistic aspects of Processability Theory* (pp. 199–251). Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30.09pie>
- Pienemann, M. (2009). A brief introduction to Processability Theory. In J.-U. Keßler (Ed.), *Processability approaches to second language development and second language learning* (pp. 9–29). Newcastle upon Tyne: Cambridge Scholars.
- Pienemann, M., Keßler, J.-U., & Itani-Adams, Y. (2011). Comparing levels of processability across languages. *International Journal of Bilingualism* 15(2), 128–146. <https://doi.org/10.1177/1367006910380037>
- Rickford, J. (2002). Implicational scales. In J. K. Chambers, P. Trudgill, & N. Schilling-Estes (Eds.), *The handbook of language variation and change* (pp. 142–167). Malden, MA: Blackwell.
- Sakai, H. (2008). An analysis of Japanese university students' oral performance in English using Processability Theory. *System* 36, 534–549. <https://doi.org/10.1016/j.system.2008.03.002>
- Spinner, P. (2011). Second language assessment and morphosyntactic development. *Studies in Second Language Acquisition* 33(4), 529–561. <https://doi.org/10.1017/S027226311000301>
- Spinner, P. (2013). Language production and reception: A Processability Theory study. *Language Learning* 63(4), 704–739. <https://doi.org/10.1111/lang.12022>
- Spinner, P., & Jung, S. (2018). Production and comprehension in Processability Theory: A self-paced reading study. *Studies in Second Language Acquisition* 40 (2), 295–318. <https://doi.org/10.1017/S0272263117000110>
- VanPatten, B., & Smith, M. (2015). Aptitude as grammatical sensitivity and the initial stages of learning Japanese as an L2. *Studies in Second Language Acquisition* 37(1), 135–165. <https://doi.org/10.1017/S0272263114000345>

Is morpho-syntactic decoding governed by Processability Theory?

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This study focuses on the comprehension of English morphological features by adult learners of English based in Belgium. I explore the relationship between their receptive grammatical processing and identified stages of the emergence of productive capacities using the Processability Theory framework. I problematise the notion of emergence in receptive grammatical processing, including recognising the additional challenges of chance performance. I explore the effects of using different acquisition criteria for the same data comparing the learners' performance across multiple morphological features in relation to PTs proposed developmental stages. I find no developmental systematicity on any of the measures. The implications of these findings are discussed.

1. Introduction

One of the most basic facts about language knowledge is that it involves knowing both how to speak and to comprehend utterances in the target language. This means that, aside from having lexical and semantic knowledge, speakers of a language must have the grammar knowledge¹ needed to perform structural analyses of the language – both to form coherent, well-formed utterances and to determine the relationship between words in the input they receive. This basic fact about language knowledge brings with it a number of questions about the nature of and interface between receptive and productive grammar knowledge. For example, do speakers of a language use one common, underlying mental grammar system for receptive and productive processing? Do receptive and productive grammar processing involve

1. The view of 'grammar knowledge' adopted in this chapter is that this 'knowledge' consists of two components, namely (1) a declarative grammar base (or 'mental grammar') and (2) a grammar processor that accesses the mental grammar during processing. The question underlying this paper, then, is which components of this 'grammar knowledge' are shared between language production and comprehension.

similar mechanisms and mental resources, which are used in different directions of processing; or are there distinct receptive and productive processes which rely on different sets of processing mechanisms and resources?

Applying these questions to the field of second language acquisition (SLA), it can be reasonably argued that any theory or model which aims to offer a comprehensive account of L2 (grammar) acquisition should explicate how it theorises receptive and productive grammar knowledge, and how this affects the model of L2 grammar acquisition. However, the field of SLA has not yet reached the state where such comprehensive theories are common. Nevertheless, researchers across research fields (psycholinguistics, L1 acquisition and SLA) do appear to agree that grammar knowledge consists of a *single* mental grammar base that is accessed during both comprehension and production. The question of the interface between receptive and productive grammar knowledge can thus be reformulated as concerning the relationship between the receptive and productive grammar *processor*.

Among psycholinguists, the traditional view has been that grammar decoding and encoding are handled by distinct, unrelated processors. Recently, psycholinguistic (Kempen, 2000; Kempen et al., 2012; Olsthoorn, 2007) and neurolinguistic (Hagoort, 2003; Segaeert, Menenti et al., 2012) evidence has been brought forward which challenges the traditional view, and instead supports the view that receptive and productive grammar processing involve the same processing mechanisms and resources, but different directions of processing (i.e., from message to meaning or vice versa).

In the present paper, then, I will look at the interface between *grammar decoding* and *encoding* within a Processability Theory (PT) perspective. Processability Theory (Pienemann, 1998, 2005) is a theory of L2 grammar acquisition which holds that L2 learners acquire the *processing procedures* that underlie *language production* in a predictable, universally valid order – resulting in so-called developmental stages in L2 learners' spoken language data. The question addressed in this chapter is whether the processing procedures which, according to PT, govern grammar encoding and, by extension, the development of processing abilities, also govern grammar decoding – resulting in similar developmental stages. This, I argue, would support the view that grammar decoding and encoding share the same processor.

The issue of the interface between grammar decoding and encoding is one that has only recently come to the attention of researchers working within the PT framework. Previous research on this issue was published by Spinner (2013); Buyl (2015) and Buyl and Housen (2013, 2015). Ongoing research on this issue was also presented in conference papers by Lenzing (2013, 2014).

At their core, then, these papers all dealt with the same question – *Can PT be applied to receptive grammar acquisition?* – but the theoretical vantage points from which this question was addressed differed slightly. Spinner (2013), for example,

centred her paper around the question of whether the processing mechanisms underlying receptive and productive grammar processing are the same. The papers by Buyl (2015) and Buyl and Housen (2013, 2015), on the other hand, focused more on the implications for our understanding of SLA research on developmental stages, and ‘grammar development’ more generally (although the use of PT implies, of course, that ‘grammar’ should here be understood as referring to the processing component, rather than the mental grammar). The research by Lenzing (2013, 2014) also focused on the implications for the architecture of the grammar processor. Indeed, Lenzing explicitly focused on the psycholinguistic issue of the ‘shared workspace’ discussed above.

This chapter complements the work of Lenzing (this volume) and Spinner and Jung (this volume). It is a continuation of the research presented in Buyl (2015) and Buyl and Housen (2013, 2015). It explores the same question but does so using a different methodological approach – one that is, in fact, closely related (though not entirely similar) to the methodology used in Spinner (2013). It also focuses more explicitly on the relationship between decoding and encoding, and the implications for the architecture of the language processor – and as such continues the discussion on the ‘shared workspace’ that was initiated by Lenzing (2013, 2014) and is also further developed in Lenzing’s contribution in the present volume.

2. Processability Theory: Basic mechanisms

Processability Theory (Pienemann, 1998, 2005) aims to offer a cross-linguistically applicable and psycholinguistically plausible explanation for the stages and sequences learners go through in learning to produce morpho-syntactic structures of the target L2. The fundamental tenet underlying PT is that language acquisition is constrained by the architecture of human language processing: “learners can acquire only those linguistic forms and functions which he or she can process” (Pienemann, 2011b: 27).

An important note is that PT defines acquisition not in terms of native-like performance, as is often the case in SLA, but in terms of *emergence*. Pienemann (1998: 138) defines emergence as the “first systematic use” of a structure and explains that “from a speech processing point of view, emergence can be understood as the point in time at which certain skills have, in principle, been attained or at which certain operations can, in principle, be carried out” (Pienemann, 1998: 138). This means that learners’ production is clearly distinct from formulaic sequences and memorized chunks, but not necessarily native-like. It is thus clearly distinct from acquisition criteria which define acquisition in terms of native-like accuracy – i.e., anywhere between 60% (e.g., Vainikka & Young-Scholten, 1994) and 90% (Dulay &

Burt, 1974) correct use in obligatory contexts. The operationalisation of emergence for the receptive side of grammar acquisition is one of the main methodological challenges in the study of developmental stages in receptive grammar acquisition.

In the present-study, the focus will be on the acquisition of *English morphology*. The phenomena that are commonly included in the Processability Hierarchy for L2 English (ESL) morphology are listed in Table 1.

Table 1. Processing procedures applied to ESL morphology (based on Pienemann, 1998, 2005a, 2011a)

Stage	Procedure	Morphological feature	Example
1	word/lemma	words	invariant forms
2	category procedure	plural -s poss -s past -ed -ing (PROG)	cats Pat's cat she play- <i>ed</i> Jane going.
3	phrasal procedure	NP agreement	plural agreement: <i>many</i> dogs; <i>two</i> cats
4	VP-procedure	tense agreement	He <i>has seen</i> him
5	S-procedure	SV agreement (= 3SG -s)	He eat-s
6	subord. CL procedure	/	/

It is worth noting that the developmental hierarchy for ESL morphology includes an extra processing procedure (and corresponding developmental stage) beyond that proposed for syntax. The additional VP-procedure (stage 4) is used for 'tense agreement', which is defined by Pienemann (2005a: 20) as "agreement of the modal and lexical verbs and the auxiliary in the marking of such diacritic features as tense, person and number". The example given is agreement between the auxiliary *have* and the *past participle*, as in "*he has seen him*" rather than '*he has sees him*' or '*he has seed him*'" (Pienemann, 2005a: 20).

3. PT and grammar decoding: The psycholinguistic plausibility of mirrored processors

The present study investigates whether the processing procedures which, according to PT, govern the encoding of morphological features and shape the developmental trajectory of L2 learners' ability to process the target language morphology, also apply to grammar decoding. Pienemann (1998: 52) writes that "it is clear that comprehension and production are not mirror images of each other" and limits the scope of PT to productive grammar acquisition. This assertion is certainly true if applied

to the comprehension and production process as a whole. Indeed, Kempen (2000) calls this assertion “trivially true”, because differences between comprehension and production are obvious and undeniable. Perhaps the most striking difference is that listeners are presented with input which they can interpret using not only grammatical information but also semantic information (e.g., probability information). In some cases, semantic information may be sufficient to interpret the sentence (i.e., a process also called ‘shallow parsing’). In production, however, grammatical processing is unavoidable.

However, the focus of the present study is restricted to pure morphological processing – i.e., grammar decoding and encoding – and differences related to semantic or lexical processes are thus not relevant. This study explores whether the decoding of morphology is executed by the same processing procedures which, according to PT, operate in grammar encoding – but in a mirrored direction. However, before embarking on a research venture that aims to investigate whether the same set of processing principles and procedures that underlies grammar encoding also applies to grammar decoding, it might be prudent to consider the said principles and procedures in light of the available research on grammar decoding – or ‘parsing’, as it is commonly called in the relevant research field.

The introduction of this section has mentioned that there is neurolinguistic and psycholinguistic support for the idea that a common processor underlies grammar decoding and encoding but that it operates in different directions of mapping. When looked at from a PT perspective, this ‘one processor, different directions of mapping’-view means that decoding and encoding are both (1) incremental and (2) lexically-driven processes which (3) involve the storing and unification of grammatical information. In encoding, conceptual information is used to activate lemmas which are associated with grammatical information. Syntactic trees are constructed which are then further processed to result in surface structures that are articulated by the speakers. In the course of this tree-construction process, learners have to store grammatical information about certain constituents and call up the information at later points to unify information between different constituents in the syntactic tree.

A mirrored decoding process could look like this: Input is received by the language user, who processes the lemmas contained in this input, and accesses the grammatical information contained therein. This grammatical information is used in an incremental fashion to construct syntactic trees in which the relationship between the different constituents in the input is made explicit. In the course of this tree construction process, learners also access, store and recall grammatical information about constituents. Through this parsing process, the language user arrives at the meaning of the input (see e.g., the parsing model by Vosse & Kempen, 2000).

4. PT, methodology and receptive grammar tasks

The present section identifies the main methodological challenges that are encountered when studying receptive grammar acquisition (or, more specifically, the development of grammar decoding abilities) within a PT framework (4.1). Some of these challenges are related to the nature of receptive grammar knowledge in general, while others are more specifically related to PT. I then move on to discuss some of the available receptive grammar instruments in terms of their capacity to deal with the identified challenges (4.2). I illustrate some of the points made by discussing the few currently available studies of receptive grammar acquisition within a PT framework (4.3). Finally, I will briefly introduce the methodology of the present study.

4.1 Methodological challenges

At a general level, uncovering L2 learners' receptive grammar knowledge – although not an unprecedented venture in SLA research – remains an arguably more challenging endeavour than uncovering its productive counterpart. While the state of an L2 learner's productive interlanguage is (relatively) easy to access by looking at the outcome of this knowledge, i.e., the (native-like and non-native like) structures produced by the learner, receptive grammar knowledge and processing abilities are more deeply hidden in the learner's mind. Their outcome is a mental processing of the grammatical information in the input, which, in turn, results in comprehension of this input. However, unlike in production, where the production of morpho-syntactic phenomena cannot take place without any processing of the relevant grammar (except in the case of formulae), correct comprehension of a structure does not always require a processing of the grammar. Rather, learners can rely to some extent on lexical, contextual and semantic information to parse input (Fernández & Cairns, 2011; Van Gompel & Pickering, 2007). Researchers interested in receptive grammar knowledge thus have to use instruments that circumvent the problem of non-syntactic processing.

At a more specific level, studying receptive grammar acquisition within the framework of a particular theory presents the challenge of having to use a methodology that allows us to adequately address the specific claims made by this theory. In the case of PT, the instrument used will, first, have to enable us to focus on the specific processing procedures as described by PT, or, in other words, give us an insight into feature unification within receptive language parsing. Secondly, since PT claims that the acquisition of a processing procedure will result in the emergence of those structures that rely on the processing procedure, it is important to consider whether, and how, a distinction between emergence and native-like performance can be made in receptive grammar processing, and how it can be operationalised.

4.2 Receptive grammar instruments and PT

The pool of instruments available for studying receptive grammar knowledge can be roughly subdivided into three main categories of tasks. The first category consists of *comprehension tasks*, that is, tasks that try to ascertain learners' receptive L2 knowledge by looking at the outcome of grammar processing – namely, comprehension of the input. Two common examples are picture selection tasks and truth-value judgment tasks (Schmitt & Miller, 2010). In the first task, participants are asked to select, from among several options, the picture that matches the proposition of a sentence (containing a target grammatical phenomenon). The second task asks participants whether the proposition of a sentence is 'true' – that is, whether it matches the action or situation expressed in a picture or in a scene formed by puppets, dolls etc.

For use within a PT context, comprehension tasks pose the following problem. First, in L2 English, processing grammatical agreement is rarely necessary for comprehension. For example, a sentence containing subject-verb agreement (e.g. *the boy runs*; or *the boys run*) could be comprehended even when learners have knowledge of plural -s marking on nouns but no knowledge of verbal morphology – i.e., based on the presence or absence of plural -s marking on the noun. Psycholinguistic processing assumes that agreement processing does take place in the decoding process (e.g., Severens et al., 2008) – but this assumes that the knowledge or skill to do so is available to the language user. In L2 learners who do not have this kind of knowledge, the comprehension process offers the possibility to decode the input without performing this agreement processing. Indeed, this is where comprehension and production prove *not* to be mirror processes: In comprehension, non-native language users may combine what little grammatical information is available to them with other, non-grammatical information (e.g., probability information, contextual information) (Garman, 1990) to arrive at a correct comprehension of the input. In production, lack of grammar encoding skills will result in non-grammatical utterances. In sum, in receptive grammar tasks which involve assessing learners' grammar knowledge based on their *comprehension* performance, reliable results can only be obtained if participants cannot arrive at a correct comprehension by combining grammar decoding and non-grammatical resources. Such a comprehension task may not be ideal for capturing feature unification, the central process underlying PT.

An additional problem is that it may be difficult to determine the emergence criterion for comprehension for two reasons. First, setting a certain score as the lower cut-off point for emergence will always involve making a relatively arbitrary choice – not dissimilar from the traditional but arbitrary acquisition criteria of 80% or 90% correct suppliance criticised by PT. Second, in any multiple-choice

task, certain scores (depending on the number of options to choose from and the number of items/trials) will be below chance performance – meaning that there is no statistical certainty that learners did not attain this score merely by guessing (Howell, 2010). Thus, if the emergence criterion is set too low, the results may be biased because learners might give the impression of having acquired a grammatical phenomenon when they were in fact lucky in their guessing behaviour.

A second type of task is grammaticality judgment tasks (GJTs). Depending on whether these types are untimed or timed, they access offline/explicit or online/implicit knowledge respectively (Rod Ellis, 1991, 2009). In case of PT, therefore, timed online tasks are most appropriate. An advantage of these tasks is that they can offer insights into whether or not learners can process agreement by checking whether learners identify sentences with erroneous omission of morphemes, e.g., *the cat eat*, as incorrect. The disadvantage is that, as in the case of comprehension tasks, an arbitrary emergence criterion must be set – which, when too low, may again include scores that are below chance performance.

A third category of task involves psycholinguistic techniques such as self-paced reading, eye-tracking reading tasks and Event-Related Potentials (ERPs) (Marinis, 2003). In these tasks, learners' behavioural responses (i.e., in the form of reaction times in self-paced reading and of eye-movements in the case of eye-tracking) or neural responses (in the case of ERPs) to ungrammatical constructions are measured to determine whether or not the learner can receptively process the targeted grammatical phenomena. These tasks are believed to measure implicit, online processing and have been used extensively to capture agreement processing among both native speakers and L2 learners – making them arguably the most suitable tasks for use within a receptive PT study. One disadvantage is that it is not clear how to set an emergence criterion. Traditionally, in these tasks an item is considered 'acquired' when learners' behavioral or neural response to ungrammatical constructions is significantly different from their reaction to grammatical constructions – but it is not clear at this point what this means in terms of emergence and native-like performance.

4.3 Previous research

Prior to the writing of this chapter, the growing interest in the decoding – encoding interface had resulted in the publication of only a small number of studies that specifically addressed the applicability of PT to receptive grammar acquisition. These include studies by Keatinge & Kefßler (2009); Spinner (2013); Buyl & Housen (2013, 2015), and Buyl (2015).

In their study, Keatinge and Keßler (2009) examined ten German-speaking adolescents' receptive and productive knowledge of the passive voice in L2 English within a PT framework. L2 learners' productive knowledge of the passive voice was tested using a number of elicitation tasks, namely Tomlin's (1995) Fish Film, two sentence completion tasks, and a story telling task. Learners' receptive knowledge of the passive was assessed by a semantic decision task based on the Fish Film, whereby learners had to match passive and active sentences to one of two pictures. The authors claim that their data support the applicability of PT to receptive grammar acquisition. However, their study exhibits a number of methodological limitations, such as the fact that they do not explicate which acquisition criterion they used. In addition, the study is limited in that the authors looked at one syntactic structure only.

A different methodological approach was taken by Spinner (2013). In this study, a timed, aural grammaticality judgment task (GJT) was used to test 51 adult ESL learners' receptive knowledge of a wide range of both morphological and syntactic grammatical phenomena. More precisely, 15 syntactic and morphological structures representing stages 2 through 6 in the PT Processability Hierarchy for L2 English were included. Spinner conducted two studies using a GJT task (the second task was highly similar to the first, but contained some small changes in the number of test items per grammatical phenomena and in the grammatical phenomena included in the task) and also collected oral data from a subset of the learners to whom the GJT was administered. In the GJT tasks, Spinner defined emergence as "80% or higher accuracy on the grammatical items in the GJT" (Spinner, 2013: 14) in the first study and 83% accuracy on the grammatical items in the second study. However, while the *production* data did confirm the PT hierarchy, the implicational scales for the receptive data did not show any developmental systematicity. Spinner brought forward a number of possible explanations. The first is that receptive and productive grammar knowledge develop separately. The second is that – although the production data in the test did support PT – "there is a flaw in the PT model". Other explanations are methodological in nature: Learners were influenced in their judgment by non-targeted elements in the test items; results were influenced by pragmatic difficulties; or learners did rely on metalinguistic knowledge (despite the GJT being timed).

Yet another approach was taken in two studies, one longitudinal and one cross-sectional, conducted by Buyl and Housen (Buyl & Housen, 2013, 2015 respectively). Both studies used data collected by the present author within the context of the *Early Language and Intercultural Acquisition Studies* (ELIAS) project (Kersten et al., 2010a, 2010b) by means of the ELIAS Grammar Test (Steinlen et al., 2010), complemented by further data that were collected with the same instrument, in the same

school, after completion of the ELIAS project. The studies reported in Buyl and Housen (2013, 2015) looked for developmental systematicity in early, francophone ELS learners' development of a number of grammatical structures from stages 2 and 5. For each grammatical phenomenon, the learners were presented with six sentences. Three of these presented the grammatical feature under investigation and three presented a grammatical contrast. For each stimulus, participants had to select from among three pictures the one that corresponded with the stimulus. As an ad hoc definition of the emergence criterion, 30%, 50% and 80% acquisition criteria were used. Of these, only the 80% criterion could rule out the influence of chance performance. Overall, the results were in line with PT – though, depending on the emergence criterion used, some individual learners showed a development that was not entirely in line with the predictions. This conclusion was of course a very tentative one, since only stage 2 and stage 5 structures were included in the test.

Because of the methodological issues associated with the use of a picture selection task (see above), Buyl (2015) adopted a different methodological approach to further explore the applicability of PT to receptive grammar acquisition. In this study, a self-paced reading task was used to test adult L2 learners' knowledge of L2 English morphology. The focus was restricted to morphological feature unification. Participants' reaction times to ungrammatical and grammatical sentences were compared for each grammatical feature. A statistically significant delay in reaction time was considered evidence that the learner was able to process the ungrammaticality and, hence, that s/he could perform the feature unification process necessary to process the ungrammaticality. The results showed that no developmental systematicity was found – and hence that the predictions of PT were not applicable to the data.

5. Design and methodology

The research presented in this chapter builds on the research conducted by Buyl (2015). While Buyl (2015) used a self-paced reading task to study L2 learners' ability to decode selected morphological features, the present study uses a timed, written GJT. Since the timed nature of the task makes it suitable for testing online processing abilities, it is thus closely related to the task used in Spinner (2013) – though the former involves (1) an aural task and (2) includes both syntactic and morphological features.

Lenzing (this volume) and Spinner and Jung (this volume) use an enactment task (a type of 'comprehension task', where decoding abilities are accessed through comprehension abilities) and a self-paced reading task, respectively. The former focusses on the passive voice while the latter focusses on various syntactic and

morphological structures. Although a direct comparison between the studies is not possible, together they contribute to a better understanding not just of the theoretical research questions but also the associated methodological issues.

5.1 Participants

The GJT was administered to nineteen adult native speakers (NSs) of English and to 61 adult L2 learners of English (NNSs) recruited for this study. The NNS participants were recruited from an adult education centre in Brussels. All NNS participants had had some years of formal instruction (typically in secondary school) and had subsequently had varying degrees of contact with the L2, through media, movies, books, music and/or at work. None of the participants had lived in an English-speaking country. The participants' levels of L2 English were between B1 and C1 on the CEFR, according to a diagnostic test taken at the school prior to the participants' enrolment in the course. Their L1 background was diverse. The NS control group were students at the University of York (United Kingdom).

5.2 Instrument

The instrument used for the study is a timed, written GJT. As indicated earlier, regardless of whether they are written or aural, timed GJTs have been found to measure learners' online, implicit grammar 'knowledge' (in this case, I assume, processing skills rather than mental grammar) (Rod Ellis, 2009; Loewen, 2009).

5.2.1 Grammatical features

The grammatical features included in the task are the same as those in Buyl (2015): genitive -'s (GEN), past tense -ed (Past -ED), plural -s (PLU), *be* + / - *ing* form (*be* + ING), *have* + past participle (*have* + -ED), subject-verb agreement in 3rd person singular (3SG-s). According to PT's predictions for productive grammar acquisition, these grammatical features become processable at the following stages:

Stage 2: GEN and Past -ED

Stage 3: PLU

Stage 4: *have* + -ED (and *be* + ING; see below)

Stage 5: 3 SG-s

Concerning tense agreement, Dyson (2010) hypothesises that both '*have* + past participle' and 'auxiliary *be* + *-ing* form' are forms of tense agreement. She names the latter form 'Aux + *ing*', while referring to '*have* + past participle' as 'Aux + ed'. This use of the *-ing* form, then, differs from the '*-ing* (PROG)' in the Processability

Hierarchy above which is hypothesised to emerge at stage 2. The examples given for ‘-ing (PROG)’ – or ‘V-ing’, as Dyson (2009, 2010) refers to it – all involve non-native like uses of the *-ing* form, as in **Jane going*. In these non native-like structures, then, no exchange of information is required. The native-like construction ‘auxiliary *be* + *-ing* form’ is, to our knowledge, not extensively discussed in PT reference works. Interestingly, another study from Dyson (2009) presents data from two L2 learners, both of whom acquire ‘V-ing’ and ‘V + ing’ at stage 3, before ‘V + ed’ (stage 4). This contrasts with the hypothesis from Dyson (2010) mentioned above. No further discussion of the ‘V-ing’, ‘V + ing’ and ‘V + ed’ structures is included in the (2009) paper, nor is any reference made to this in the (2010) paper. Clearly, then, ‘V + ing’ is one of the structures which will have to be further researched within the PT context. I will include it in this study and will follow Dyson in her tentative hypothesis that this structure involves VP-agreement.

5.2.2 Instrument design

The original stimulus list (as presented to the participants) contained 120 sentences. 60 of these were distractor items (all of which were grammatical). The remaining 60 sentences were target items which tested the knowledge of one of the six target grammatical features (ten sentences per grammatical feature). For every grammatical feature, five sentences were grammatical while the other five were ungrammatical (see example (1) and (2) respectively). In ungrammatical sentences, the target morpheme was missing. It is assumed that, in order to process the sentence containing the grammatical error, learners must be able to unify the grammatical information between the sentence constituent from which the morpheme is missing (e.g., the verb phrase) and a constituent in the preceding part of the sentence (e.g., the initial noun phrase) (except in case of stage 2 sentences, which do not involve feature unification). All stimuli in the GJT were automatically randomized within PsyScope, yielding a different order for every participant.

- (1) Jessica has two daughters and a son. (PLU G)
- (2) *Her daughter has bake a cake. (have + past participle, UG)

Although the test stimuli were carefully designed and reviewed by near-native speakers of English, it was nonetheless decided to filter out any test items that were judged incorrectly by a high proportion of the NSs and hence might confound the results of the GJT. Upon inspection of the item scores, it was decided to remove any items to which less than 80% of the NS participants responded correctly. Concretely, this resulted in the removal of six experimental items, belonging to the experimental conditions ‘*be* + *-ing* grammatical’ (two items), ‘past *-ed* grammatical’ (one item), ‘3sgs grammatical’ (one item), ‘plural *-s* ungrammatical’ (one item) and ‘have + *-ed* ungrammatical’ (one item).

The internal reliability of the GJT (experimental items only; and after removal of the problematic items) was calculated using Cronbach alpha. Since NSs and NNSs may be expected to behave very differently on the GJT, only the NNSs' scores were used. Cronbach alpha was .87, indicating that the internal reliability was sufficient (Field, 2009). None of the items reduced the reliability of the test.

5.3 Administration procedure

The task was administered to every participant individually on a MacBook Pro laptop. Responses were made by pressing a key on an external USB keyboard. All participants were tested by the author in a quiet room.

Before the start of the task, participants read the instructions on the computer screen. The instructions informed the participants in detail about when a sentence should be considered 'bad'. More specifically, it was explained that a sentence was 'bad' only when the participants thought it could never be used, under any circumstances, because there were errors in the sentence; *not* when they thought that they would or could formulate the sentence differently. Participants were also informed that they would have only a few seconds to respond (depending on the length of the sentence), and that they therefore had to respond quickly, using their 'intuition' about the grammaticality of the sentence. Participants were also given information about the number of sentences, the response keys which corresponded which each answer and the number and duration of breaks.

During the administration, every sentence appeared on the screen for a limited period of time. Participants had to read the sentence and respond by pressing either the 'z'-key (marked green on the keyboard) for 'correct', the 'o'-key (marked red) for 'incorrect' or the space bar (marked blue) for 'I don't know'. The time out was signalled by a '+' in the centre of the screen. After this, the next sentence appeared on the screen. After every ten items, the participants were given a 20-second break. The time limit for judging the sentences as correct or incorrect was set at .75 second per word. An additional, fixed time of two seconds was added to the time limit for each stimulus to allow for pressing the response key. As the experimental sentences were between six and 16 words in length, the time limit (including the fixed two seconds response time) varied between 6.5 and 14 seconds.

5.4 Scoring and analysis

5.4.1 'I do not know' and 'time out'

Consistent with timed GJTs that included 'unsure' or 'I don't know' responses, failures to respond within the time limit and 'I don't know' responses were treated as incorrect.

5.4.2 *Grammatical and ungrammatical test items*

Spinner (2013), in her study on the applicability of PT to receptive grammar acquisition, analysed only the results of the grammatical items in her aural timed GJT, because, she writes, “Ellis (2005) found that learners’ scores on grammatical items on his GJT correlated strongly with implicit measures, while the scores on ungrammatical items correlated with explicit measures” (Spinner, 2013: 14). A closer look at the literature, however, reveals that the picture is not as clear as Spinner’s (2013) brief explanation might suggest. Most importantly, she ignores the different findings that have been reported for timed versus untimed GJTs. The study by Ellis (2005) referred to by Spinner (2013) only studied the effect of item grammaticality for an *untimed* GJT, not for the *timed* GJT included in his study. Evidence on the effect of grammaticality in timed GJTs comes from studies conducted by Gutiérrez (2013) and Godfroid et al. (2015). The former reports that “learners in this study processed grammatical and ungrammatical sentences in the GJTs [i.e., both a timed and untimed GJT] differently” (Gutiérrez, 2013: 440) – a difference which could indicate that “the grammatical sections of the timed and untimed GJTs likely measure the construct of implicit knowledge, whereas the ungrammatical sections of both GJTs possibly measure the construct of explicit knowledge” (Gutiérrez, 2013: 440). Godfroid et al. (2015), however, found an effect of grammaticality in the untimed GJT but not in the timed GJTs.

In the present study, I will repeat the implicational analyses with the scores of the grammatical and ungrammatical items separately (the former allows comparison with Spinner’s (2013) results), as well as, for the sake of completeness, with the overall scores. I will also make some comparisons between grammatical and ungrammatical items in our group-based reaction times and accuracy-score analyses.

5.4.3 *Emergence criterion*

As explained earlier, PT makes predictions which concern the *emergence* of grammatical items. One of the main challenges in testing whether receptive grammar acquisition is governed by PT lies in defining and operationalising the concept of emergence for receptive grammar acquisition. For GJT tasks, assessing whether learners have any receptive knowledge of a grammatical item (whether *emerged* or *acquired* at native-like level) can only be done by interpreting their scores on what is essentially a multiple-choice task. This multiple-choice nature of GJTs calls for a consideration of the role of guessing in interpreting participants’ scores, and in setting an emergence criterion. Participants who randomly select either ‘correct’ or ‘incorrect’ (ignoring the ‘I don’t know’-response) have a 50 percent chance of attaining a correct score for every sentence they judge, which in turn means that, if learners consistently guess on the test, they will on average achieve a score higher than zero. In interpreting GJTs’ scores, then, we may want to consider whether participants’ performance is better than we would expect if they were just guessing.

Statistically, a participants' number of correct choices is at 'better than chance'-level when the probability of making *at least* that many correct choices is smaller than or equal to .05. For every number of correct choices, we can calculate the probability of making at least that number of correct choices based on the number of trials (in this case, sentences to be judged) and the chance of success for every single trial. Depending on our purpose, we can perform this calculation for scores on the entire set of experimental sentences, or on scores for every grammatical feature. This can be done for either the scores on both grammatical and ungrammatical items, or on either grammatical or ungrammatical items.

In the present study, the original test consisted of 60 experimental sentences. After removal of some problematic sentences, 54 sentences remained. In a 54-item test, scores of 34 correct items (63%) or better gives us this statistical certainty. If we were to analyse only grammatical *or* ungrammatical items, the number of trials is reduced to 30 in the original version of the test. Analysis of the native speakers' data resulted in the removal of four grammatical and two ungrammatical sentences. In the resulting trial sets, scores of 18 out of 26 (68%) and 19 out of 28 (69%), respectively, are at better than chance level. If we look at the scores for every grammatical feature separately, we are left, in the original version of the test, with a subset of ten sentences (five grammatical and five ungrammatical) for every grammatical feature. Analysis of the native speakers' performance resulted, in some cases, in the removal of one or two items per grammatical feature. Thus, when grammatical and ungrammatical items are analysed together, the number of trials per items was either ten, nine or eight. A calculation of the probability of achieving each score shows that only scores of nine out of ten (90%), eight out of nine (89%) or seven out of eight (88%), respectively, allow us to say with statistical certainty that participants' performance is at better than chance level. When only grammatical items were analysed, the number of trials per grammatical feature was either five, four or (in the case of one feature) three. When only ungrammatical items were analysed the number of items was either five or four. In the case of a 5-trial situation, only scores of five out of five are associated with a probability $<.05$. In the case of a 4- or 3-trial situation, the probability of getting all items correct, even when responding at random, is .06 and .12 respectively – meaning that random behaviour cannot be excluded.

In sum, while looking at the overall scores on the GJT allows us to exclude guessing behavior as soon as participants attain a score of around 65%, the smaller number of sentences per grammatical feature can only exclude such random behaviour when the participants' performance is near-perfect. This confronts us with an important dilemma when it comes to setting an *emergence criterion*: If we lower the acquisition criterion to anything less than near-perfect performance (say, five out of ten items correct), we cannot be certain that the participants' scores truly reflect their ability to identify the grammatical errors in the sentences; if

we set the emergence criterion at the cut-off score between chance- and better than chance-performance, it becomes difficult to differentiate *emergence* from acquisition as *native-like performance*. When only the scores on grammatical (or ungrammatical) items are analysed (see Section 5.5) the problem becomes even more pronounced.

Spinner (2013), whose GJT task also contained only five sentences per grammatical feature, set the emergence criterion at 80%, or at least 4/5 items correct. In a somewhat different (production-data) study, Glahn et al. (2001) presented different versions of the same analysis, using different ‘emergence’ criteria. In the present study, then, I opted for the latter solution. The same implicational scaling tables will be presented using three criteria: 80% (which allows us to compare our data to Spinner’s (2013) results), 50% and 30%. The former score is closer to native like performance (i.e., suggesting full, native-like processing abilities),² while the latter allow learners to make some mistakes – potentially reflecting processing abilities which do not yet operate perfectly in all circumstances. It should also be emphasised, however, that this interpretation of the GJT scores is tentative at best. The notions of emergence and acquisition have been defined and operationalised within the context of productive grammar knowledge and abilities only. Thus, our presentation of the results below should be viewed in this light: As an exploration of how using different criteria of acquisition or emergence may reflect different states of processing abilities – though with no clear understanding yet of how these criteria relate to the concepts of emergence and acquisition in production studies.

5.5 Results

Below I will present different implicational scales, using the 80%, 50% and 30% criteria of acquisition. In these scales, grammatical features predicted to be acquired at the same developmental stages appear in the same column; and the corresponding stage is considered ‘acquired’ when at least one of the grammatical features meets the relevant criterion.

5.5.1 Grammatical items

Table 2 is based on the 80% acquisition criterion. Version *a* includes the ‘ING-feature’ in stage 4, while version *b* excludes this ‘ING-feature’. Similarly, scales including and excluding ‘ING’ were designed using 50% and 30% accuracy scores as alternative acquisition criteria (Tables 3 and 4 respectively).

2. While learners’ interlanguage may technically speaking develop along a continuum from emergence to, eventually, native-like knowledge, not all L2 learners will succeed in reaching the latter end of the continuum. Indeed, it is a commonly accepted fact in SLA that many L2 learners never reach the ‘endstate’ of native-like knowledge (Rod Ellis, 2008).

Table 2. Implicational scale 1 PT scale: Grammatical items, 80% criterion

a. including be + -ING					
# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
32*	e	e	e	e	4
12*	e	e	e	-	3
3	e	(-)	e	(e)	3
1	(-)	e	e	(e)	3
1*	e	e	-	-	2
4	e	(-)	(e)	-	2
2	(-)	e	(e)	-	2
1	(-)	(-)	(e)	(e)	2
1*	e	-	-	-	1
2	(-)	-	(e)	-	1
2	-	-	-	-	0
# "e"	53	48	57	37	
C_{rep} : 0.89, MM_{rep} : .80, Cs: 0.43; * = in line with PT					

b. excluding be + -ING

# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
26*	e	e	e	e	4
6*	e	e	e	-	3
6	e	e	(-)	(e)	3
3	e	(-)	e	(e)	3
1	(-)	e	e	(e)	3
7*	e	e	-	-	2
3	e	(-)	(e)	-	2
1	(-)	e	(e)	-	2
1	(-)	(-)	(e)	(e)	2
2*	e	-	-	-	1
1	(-)	(e)	-	-	1
1	(-)	-	(e)	-	1
3	-	-	-	-	0
# "e"	53	48	42	37	
C_{rep} : 0.85, MM_{rep} : .74; Cs: 0.44; * = in line with PT					

Table 3. Implicational scale 2 PT scale: Grammatical items, 50% criterion

a. including be + -ING					
# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
50*	e	e	e	e	4
8*	e	e	e	-	3
3	e	(-)	e	(e)	3
# "e"	61	58	61	53	
C_{rep} : .98, MM_{rep} : .96, Cs: .45; * = in line with PT					

Table 3. (continued)

b. excluding <i>be + -ING</i>					
# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# “e”
45*	e	e	e	e	4
6*	e	e	e	–	3
5	e	e	(–)	(e)	3
2	e	(–)	e	(e)	3
2*	e	e	–	–	2
1	e	(–)	–	(e)	2
# “e”	61	58	53	53	

$C_{rep}.93$, $MM_{rep}.92$, $CS.16$; * = in line with PT

Table 4. Implicational scale 2 PT scale: Grammatical items, 30% criterion

a. including <i>be + -ING</i>					
# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# “e”
59*	e	e	e	e	4
1*	e	e	e	–	3
1	e	(–)	e	(e)	3
# “e”	3	2	3	2	

$C_{rep}.99$, $MM_{rep}.99$, $CS.0$; * = in line with PT

b. excluding <i>be + -ING</i>					
# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# “e”
58*	e	e	e	e	4
1*	e	e	e	–	3
1	e	e	(–)	(e)	3
1	e	(–)	e	(e)	3
# “e”	4	3	3	3	

$C_{rep}.098$, $MM_{rep}.99$, $CS.-.33$; * = in line with PT

In the 80% scale, a large proportion of the participants (32 of the 61 participants if we include ‘*be + -ING*’; 26 of the 61 participants if we exclude ‘*be + -ING*’) have reached our acquisition threshold for stage 5 of the PT stages. Another twelve participants are at stage 4 (showing a pattern that conforms with PT) if we include ‘*be + -ING*’; while six are at stage 4 in a PT-consistent manner if we do not count ‘*be + -ING*’. In the ‘*be + -ING*’-inclusive scale, two further participants (see *s in the 5th and 9th rows from the top) show a PT-consistent pattern in having reached stage 2 or stages 2 and 3. In the scale that excludes ‘*be + -ING*’, seven participants have reached stage 2 and 3, while two participants have reached stage 2 (see *s in the 6th and 7th scale rows). The remaining participants show patterns of ‘acquisition’

which are not in line with PT. As a more objective measure of scalability, the coefficient of reproducibility of the 80% scale is high – both with and without the ‘*be + -ING*’ data’ – but because the minimal marginal reproducibility is also high in both versions of the scales, the coefficients of scalability are low (below .60).

Lowering the criterion for acquisition to a 50% accuracy score, then, affects the scales in a number of ways. First, the number of participants who have reached stage 5 (in a PT-consistent manner) would increase to 50 participants in the scale that includes ‘*be + -ING*’ and to 45 in the scale that does not include ‘*be + -ING*’. In the former, eight further participants would have reached stage 4 in a PT-consistent manner, while the remaining three participants would have reached stage 5 while skipping stage 4. In the scale that does not include ‘*be + -ING*’, six participants would have reached stage 4 in a PT-consistent manner, while two would have reached stage 2 in a PT-consistent manner. The remaining eight participants would have skipped at least one stage. In short, the number of participants whose behavior is not in line with PT would be low, resulting in high coefficients of reproducibility (.98 and .93 with and without ‘*be + -ING*’ respectively). However, because there is also a high number of participants who would have acquired all four stages, the minimal marginal reproducibility of the scale would be also high, resulting in low coefficients of scalability (.45 and .16 with and without ‘*be + -ING*’ respectively).

Finally, applying a 30% criterion would continue the trend that was set when lowering the criterion from 80 to 50%. As can be seen in Table 4 (a and b), an even larger number of participants would have reached stages 2 through to 5 (59 and 58 of the 61 participants in the scale with and without ‘*be + -ING*’ respectively). In both scales, one further participant would have reached stages 2 through to 4. In the scale which includes ‘*be + -ING*’, one remaining participant would have skipped stage 2, while two participants would have skipped a stage (stage 3 in one case, stage 4 in the other) in the scale which does not include ‘*ING*’. These changes would also result in a high coefficient of reproducibility (.98 and .99) but also in a high minimal marginal reproducibility (.99 in both scales) and hence in insignificant coefficients of scalability.

5.5.2 *Ungrammatical items*

Applying an acquisition criterion of 80%, about one third of the participants fail to reach this criterion on any of the ungrammatical items (18 participants in Table 5a, which includes ‘*be + -ING*’, and 22 participants in the scale without ‘*ING*’). Conversely, only one participant (in both scales) has reached stage 5 (without skipping any of the preceding stages). A further six participants in Table 5a have reached either stage 2 (three participants), 3 (two participants) or 4 (one participant) in a PT-consistent manner; in Table 5b, 13 participants reached stage 2 and three participants reached scale 3 in a PT-consistent manner, but there were no participants who acquired stage 2 through to 4 without skipping stages. The remaining

participants (36 in Table 5a, 22 in Table 5b) show a pattern that does not correspond to the prediction of PT. As for scalability coefficients, neither scale reaches the minimum required coefficient of scalability of .60. Table 5b does have a coefficient of reproducibility $> .80$ but the minimal marginal reproducibility is also quite high.

Table 5. Implicational scale 3 PT scale: Ungrammatical items, 80% criterion

a. including *be + -ING*

# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
1*	e	e	e	e	4
1*	e	e	e	-	3
11	e	(-)	e	(e)	3
2*	e	e	-	-	2
15	e	(-)	(e)	-	2
1	e	(-)	(e)	-	2
2	e	(-)	-	(e)	2
3*	e	-	-	-	1
5	(-)	-	(e)	-	1
2	(-)	-	-	(e)	1
18*	-	-	-	-	0
# "e"	36	4	34	16	
$C_{rep}.70$, $MM_{rep}.70$, $Cs.0$; * = in line with PT					

b. excluding *be + -ING*

# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
1*	e	e	e	e	4
4	e	(-)	e	(e)	3
3*	e	e	-	-	2
6	e	(-)	(e)	-	2
9	e	(-)	-	(e)	2
13*	e	-	-	-	1
1	(-)	-	(e)	-	1
2	(-)	-	-	(e)	1
22*	-	-	-	-	0
# "e"	36	4	12	16	
$C_{rep}.82$, $MM_{rep}.77$, $Cs.:.23$; * = in line with PT					

Lowering the acquisition criterion to 50%, the balance of the scale shifts. An 80% criterion resulted in about one third of participants not reaching the criterion for any of the features. But with a 50% criterion, about one third of participants would have reached the criterion for acquisition for *all* stages (2 through to 5) (i.e., 21 participants if '*be + -ING*' is included; 19 participants if '*be + -ING*' is excluded). In

both scales, eight participants would not have acquired any of the stages. Of the remaining participants, only one in Table 6a shows a pattern consistent with PT (stage 2 up to 4 acquired). In Table 6b, three participants did in fact show evidence of having acquired features reflecting one or another stage (one of whom would have achieved stage 4; and two of whom would have achieved stage 2). Neither scale reaches a coefficient of reproducibility of .80.

Table 6. Implicational scale 5 PT scale: Ungrammatical items, 50% criterion

a. including be + -ING

# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
21*	e	e	e	e	4
1*	e	e	e	-	3
4	e	e	(-)	(e)	3
11	e	(-)	e	(e)	3
7	e	(-)	(e)	-	2
2	e	(-)	-	(e)	2
1	(-)	e	(e)	-	2
2	(-)	e	-	(e)	2
2	(-)	(-)	(e)	(e)	2
1	(-)	(e)	-	-	1
1	(-)	-	-	(e)	1
8*	-	-	-	-	0
61	46	30	43	43	

$C_{rep}.73$; $MM_{rep}.67$; Cs.19; * = in line with PT

b. excluding be + -ING

# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
19*	e	e	e	e	4
1*	e	e	e	-	3
6	e	e	(-)	(e)	3
11	e	(-)	e	(e)	3
5	e	(-)	(e)	-	2
2	e	(-)	-	(e)	2
2	(-)	e	-	(e)	2
2	(-)	(-)	(e)	(e)	2
2*	e	-	-	-	1
2	(-)	(e)	-	-	1
1	(-)	-	-	(e)	1
8*	-	-	-	-	0
61	46	30	38	43	

$C_{rep}.73$; $MM_{rep}.65$; Cs.23; * = in line with PT

Lowering the criterion for acquisition to 30% has very little effect on the number of participants who would have reached stage 5 (from 21 to 22 participants in Table 7a; Table 7b is unchanged). The number of participants who would have not reached even stage 2 decreases slightly (from eight to two in Table 7a and from eight to five in Table 7b). Of the remaining participants, the number of participants whose pattern of acquired and non-acquired stages would conform with PT predictions remains low (a total of four in Table 7a; a total of six in Table 7b). The coefficient of reproducibility remains below .80.

Table 7. Implicational scale 6 PT scale: Ungrammatical items, 30% criterion

a. including be + -ING					
# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
22*	e	e	e	e	4
2*	e	e	e	-	3
4	e	e	(-)	(e)	3
14	e	(-)	e	(e)	3
8	e	(-)	(e)	-	2
1	(-)	e	-	(e)	2
1	(-)	(-)	(e)	(e)	2
2*	e	-	-	-	1
1	(-)	(e)	-	-	1
3	(-)	-	(e)	-	1
1	(-)	-	-	(e)	1
2*	-	-	-	-	0
61	52	30	50	43	
$C_{rep}.72, MM_{rep}.72, CS.0; * = \text{in line with PT}$					
b. excluding be + -ING					
# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
19*	e	e	e	e	4
1*	e	e	e	-	3
7	e	e	(-)	(e)	3
12	e	(-)	e	(e)	3
1*	e	e	-	-	2
5	e	(-)	(e)	-	2
2	e	(-)	-	(e)	2
1	(-)	e	-	(e)	2
1	(-)	(-)	(e)	(e)	2
5*	e	-	-	-	1
1	(-)	(e)	-	-	1
1	(-)	-	-	(e)	1
5*	-	-	-	-	0
61	52	30	38	43	
$C_{rep}.75, MM_{rep}.67, Cs.23, * = \text{in line with PT}$					

5.5.3 Grammatical and ungrammatical items

For the sake of completeness, I present the implicational scales based on the participants' scores with combined grammatical and ungrammatical items (Tables 8, 9 and 10 for the 80% criterion, 50% criterion and 30% criterion respectively). The general tendencies are similar to those in the preceding tables. Most importantly, none of the scales have a coefficient of scalability that is higher than .60. (Some scales do have a coefficient of reproducibility higher than .80, but the minimal marginal reproducibility is also high in these cases.)

Table 8. Implicational scale 7 PT scale: Grammatical & ungrammatical items, 80% criterion

a. including be + -ING					
# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
5*	e	e	e	e	4
3*	e	e	e	-	3
8	e	(-)	e	(e)	3
1*	e	e	-	-	2
13	e	(-)	(e)	-	2
3	e	-	-	-	1
4	(-)	-	(e)	-	1
2	(-)	-	-	(e)	1
22*	-	-	-	-	0
# "e"	33	9	33	15	

$C_{rep}.78$, $MM_{rep}.67$, $Cs.33$; * = in line with PT

b. excluding be + -ING

# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
4*	e	e	e	e	4
2*	e	e	e	-	3
1	e	e	(-)	(e)	3
5	e	(-)	e	(e)	3
2*	e	e	-	-	2
7	e	(-)	(e)	-	2
3	e	(-)	-	(e)	2
9*	e	-	-	-	1
1	(-)	-	(e)	-	1
2	(-)	-	-	(e)	1
25*	-	-	-	-	0
# "e"	33	9	19	15	

$C_{rep}.84$, $MM_{rep}.71$, $Cs.46$; * = in line with PT

Table 9. Implicational scale 8 PT scale: Grammatical & ungrammatical items, 50% criterion

a. excluding be + -ING					
# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
42*	e	e	e	e	4
6*	e	e	e	-	3
1	e	e	(-)	(e)	3
4	e	(-)	e	(e)	3
1	(-)	e	e	(e)	3
2	e	(-)	(e)	-	2
1	e	(-)	-	(e)	2
1	(-)	e	(e)	-	2
1*	e	-	-	-	1
2	(-)	-	(e)	-	1
# "e"	57	51	58	49	

C_{rep} .89, MM_{rep} .88, Cs.03; * = in line with PT

b. excluding be + -ING

# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
37*	e	e	e	e	4
3*	e	e	e	-	3
6	e	e	(-)	(e)	3
4	e	(-)	e	(e)	3
1	(-)	e	e	(e)	3
3*	e	e	-	-	2
2	e	(-)	(e)	-	2
1	e	(-)	-	(e)	2
1*	e	-	-	-	1
1	(-)	(e)	-	-	1
2*	-	-	-	-	0
# "e"	57	51	47	49	

C_{rep} .89, MM_{rep} .84, Cs.30; * = in line with PT

Table 10. Implicational scale 9 PT scale: Grammatical & ungrammatical items, 30% criterion

a. excluding be + -ING					
# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# "e"
58*	e	e	e	e	4
1*	e	e	e	-	3
2	e	(-)	e	(e)	3
# "e"	61	59	61	60	

C_{rep} .98, MM_{rep} .99, CS -.33; * = in line with PT

Table 10. (continued)

b. excluding be + -ING					
# Ss	Stage 2	Stage 3	Stage 4	Stage 5	# “e”
58*	e	e	e	e	4
1*	e	e	e	–	3
2	e	(–)	e	(e)	3
# “e”	61	59	61	60	

C_{rep} .98, MM_{rep} .99, CS –.33; * = in line with PT

6. Discussion

In sum, none of the implicational scales constructed using different acquisition criteria regardless of which items are considered show developmental systematicity. This would suggest that (1) the mechanisms which are hypothesised by PT to underlie productive grammar acquisition (a hypothesis which has received support from empirical research) do not underlie receptive acquisition and (2) that grammar decoding and encoding are at least partially different processes. This finding corroborates the finding of two of the three currently available studies previously conducted on this topic (discussed earlier in this chapter): Buyl & Housen’s (2015)’s self-paced reading study and Spinner’s (2013) aural GJT study. The third study (Buyl & Housen, 2013) did provide some tentative support for the applicability of PT to receptive grammar acquisition. However, this study was severely limited in that it only included grammatical structures situated at stages 2 and 5. Methodological limitations characterised the other two studies – and though it is promising that the present study seems to confirm the findings of these studies despite these limitations, it is nonetheless necessary to review this study in terms of its methodological position.

One of the methodological limitations that can be identified in Spinner’s (2013) study is that it mixes morphological and syntactic features into one implicational scale (and indeed, as in the present study, collapses features that belong to the same stage). This is problematic since the interface between morphology and syntax in PT is not yet entirely clear. Although PT distinguishes 5 stages for both morphology and syntax, it is not clear whether these stages are perfectly aligned. Stage 3 features in syntax may not necessarily emerge at the same time as stage 3 features in morphology. The present study avoids this problem by focusing on morphology only.

Another methodological challenge discussed earlier is the operationalisation of *emergence*. PT has a clear operational definition of what emergence means in terms of language production, but the same is not the case for grammar reception.

Spinner (2013) used an 80% acquisition criterion and, in the margins, reported that other acquisition criteria resulted in similar results. The present study tried to be more thorough in its reporting of results by comparing implicational scaling using different acquisition criteria. Following Glahn et al. (2001), three criteria representing, arguably, both ends *and* the middle of the emergence–mastery continuum were used (30%, 50%, 80% correct). While this gives a more complete picture of the data, it does not solve the problem of emergence. Not only does it still involve arbitrary acquisition criteria (which is exactly what the emergence criterion for production seeks to avoid), the emergence criteria in GJTs are also confounded with *chance performance* – as was explained in the methodology section of this paper. In Buyl (2015), this problem of chance performance was absent from the self-paced reading data – yet here too the question remained of how the results from the analyses should be interpreted.

Another problem is that GJTs do not offer an entirely *genuine* reflection of the grammar decoding process that takes place in the learners' mind. Making a decision about a task involves an additional extra cognitive process – even when it involves 'online', 'unconscious' processing, as in the case of timed GJTs – which may well interfere with grammar processing and hence distort the outcomes of the task. The earlier study by Buyl (2015) tried to overcome this problem by using a self-paced reading task – but although self-paced reading tasks are considered reliable tasks for assessing learners' processing abilities, there remains a possibility that the laboratory setting confounds the results of the task. Perhaps the most 'genuine' receptive task is a task that involves actual language *comprehension*, as was used by Buyl and Housen (Buyl & Housen, 2013, 2015) – but then this poses yet another problem, namely that there are not many grammatical structures which can be investigated in this way.

7. Conclusion

To sum up, the present study investigated whether the processing procedures, which, according to PT, underlie and govern productive grammar processing (or encoding) are also applicable to grammar decoding. This might suggest that decoding and encoding share the same processor – a psycholinguistic hypothesis which has gained in popularity in recent years. For SLA, it would mean that receptive and productive grammar processing abilities are governed by similar mechanisms and develop along similar developmental trajectories.

The present study used a timed GJT to study the processing abilities of adult learners of L2 English and focused on morphology only. Using implicational scaling analysis and different criteria of acquisition, no developmental systematicities were found.

The main challenge that was encountered in the present study concerns the emergence criterion – and this is one which may well continue to pose a problem for research into the applicability of PT to receptive grammar acquisition. The problem with receptive grammar tasks, after all, is that the type of data that is analysed is invariably related to the type of task used. Self-paced reading tasks result in reaction time data; GJTs result in correct/incorrect multiple choice responses; and so forth. This means that an operational definition of *emergence* would always be *ad hoc* – i.e., defined for the type of task at hand. All this is unlike production data, where a wide array of tasks exists which all result in a dataset consisting of spontaneous speech – which can then be analysed using one and the same emergence criterion. For receptive grammar acquisition research, it can only be hoped that the accumulated evidence from a wide range of studies will show some consistency in the outcome. At present, research seems to suggest that receptive grammar acquisition is not governed by PT's processing procedures, but a total of four studies is of course hardly enough to call this a well-supported finding.

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References

- Buyl, A. (2015). Studying receptive grammar acquisition within a PT framework. In K. Baten, A. Buyl, K. Lochman, & M. Van Herreweghe (Eds.), *Theoretical and methodological developments in Processability Theory* (pp. 139–168). Amsterdam: John Benjamins.
<https://doi.org/10.1075/palart.4.07buy>
- Buyl, A., & Housen, A. (2013). Testing the applicability of PT to receptive grammar knowledge in early immersion education. Theoretical considerations, methodological challenges and some empirical results. In A. Flyman Mattson & C. Norrby (Eds.), *Language acquisition and use in multilingual contexts* (pp. 13–27). Lund: Lund University Press.
- Buyl, A., & Housen, A. (2015). Developmental stages in receptive grammar acquisition: A Processability Theory account. *Second Language Research* 31(4), 523–550.
<https://doi.org/10.1177/0267658315585905>
- Dulay, H. C., & Burt, M. K. (1974). Natural sequences in child second language acquisition. *Language Learning* 24, 37–53. <https://doi.org/10.1111/j.1467-1770.1974.tb00234.x>
- Dyson, B. (2009). Processability Theory and the role of morphology in English as a second language development: A longitudinal study. *Second Language Research* 25(3), 355–79.
- Dyson, B. (2010). Learner language: Analytic methods and pedagogical implications. *Australian Review of Applied Linguistics* 33(3), 30.1–30.21.
- Ellis, R. (1991). Grammatical judgments and second language acquisition. *Studies in Second Language Acquisition* 13(2), 161–186. <https://doi.org/10.1017/S0272263100009931>

- Ellis, R. (2005). Measuring implicit and explicit knowledge of a second language: A psychometric study. *Studies in Second Language Acquisition* 27(2), 141–172.
<https://doi.org/10.1017/S0272263105050096>
- Ellis, R. (2008). *The study of second language acquisition* (2nd ed.). Oxford: Oxford University Press.
- Ellis, R. (2009). *Implicit and explicit knowledge in second language learning. Testing and teaching*. Bristol: Multilingual Matters.
- Fernández, E. M., & Cairns, H. S. (2011). *Fundamentals of psycholinguistics*. New York: John Wiley.
- Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). London: SAGE publications.
- Garman, M. (1990). *Psycholinguistics*. Cambridge: Cambridge University Press.
<https://doi.org/10.1017/CBO9781139165914>
- Glahn, E., Håkansson, G., Hammarberg, B., Holmen, A., & Lund, K. (2001). Processability in Scandinavian second language acquisition. *Studies in Second Language Acquisition* 23, 389–416.
<https://doi.org/10.1017/S0272263101003047>
- Godfroid, A., Loewen, S., Jung, S., Park, J.-H., Gass, S., & Ellis, R. (2015). Timed and untimed grammaticality judgment measure distinct types of knowledge. *Studies in Second Language Acquisition* 37(Special Issue 02), 269–297. <https://doi.org/10.1017/S0272263114000850>
- Gutiérrez, X. (2013). The construct validity of grammaticality judgment tests as measures of implicit and explicit knowledge. *Studies in Second Language Acquisition* 35(3), 423–449.
<https://doi.org/10.1017/S0272263113000041>
- Hagoort, P. (2003). Interplay between syntax and semantics during sentence comprehension: ERP effects of combining syntactic and semantic violations. *Journal of Cognitive Neuroscience* 15(6), 883–899. <https://doi.org/10.1162/089892903322370807>
- Howell, D. C. (2010). *Statistical methods for psychology* (8th ed.). Belmont, CA: Wadsworth Publishing.
- Keatinge, D., & Keßler, J.-U. (2009). The acquisition of the passive voice in English as a foreign language: Production and perception. In J.-U. Keßler & D. Keatinge (Eds.), *Research in second language acquisition: Empirical evidence across languages* (pp. 41–68). Newcastle upon Tyne: Cambridge Scholars.
- Kempen, G. (2000). Could grammatical encoding and grammatical decoding be subserved by the same processing module. *Behavioral and Brain Sciences* 23(1), 38.
<https://doi.org/10.1017/S0140525X00402396>
- Kempen, G., Olsthoorn, N., & Sprenger, S. (2012). Grammatical workspace sharing during language production and language comprehension: Evidence from grammatical multitasking. *Language and Cognitive Processes* 27(3), 345–380.
<https://doi.org/10.1080/01690965.2010.544583>
- Kersten, K., Rohde, A., Schelletter, C., & Steinlen, A. K. (Eds.). (2010a). *Bilingual preschools, Volume 1: Learning and development*. Trier: Wissenschaftlicher Verlag Trier.
- Kersten, K., Rohde, A., Schelletter, C., & Steinlen, A. K. (Eds.). (2010b). *Bilingual preschools, Volume 2: Best practices*. Trier: Wissenschaftlicher Verlag Trier.
- Lenzing, A. (2013). *The interface between comprehension and production in SLA*. Paper presented at the 13th International Symposium of Processability Approaches to Language Acquisition (PALA), Lund, Sweden.
- Lenzing, A. (2014). *Shared syntax in L2 Acquisition. Exploring the interface between grammatical encoding and decoding in SLA*. Paper Presented at the 14th International Symposium on Processability Approaches to Language Acquisition, Paderborn, Germany.

- Loewen, S. (2009). Grammaticality judgment tests and the measurement of implicit and explicit L2 knowledge. In R. Ellis, S. Loewen, C. Elder, R. Erlam, J. Philp, & H. Reinders (Eds.), *Implicit and explicit knowledge in second language learning, testing and teaching* (pp. 94–112). Bristol: Multilingual Matters. <https://doi.org/10.21832/9781847691767-006>
- Marinis, T. (2003). Psycholinguistic techniques in second language acquisition research. *Second Language Research* 19(2), 144–161. <https://doi.org/10.1191/0267658303slr217ra>
- Olsthoorn, N. (2007). *Relationships between grammatical encoding and decoding. An Experimental psycholinguistic study* (Unpublished doctoral dissertation). Universiteit Leiden.
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M. (2005). (Ed.). *Cross-linguistic aspects of Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30>
- Pienemann, M. (2005a). An introduction to Processability Theory. In M. Pienemann M (Ed.), *Cross-linguistic aspects of Processability Theory* (pp. 1–60). Amsterdam: John Benjamins.
- Pienemann, M. (2011a). Explaining developmental schedules. In M. Pienemann & J.-U. Kefler (Eds.), *Studying Processability Theory: An introductory textbook*. (pp. 49–62). Amsterdam: John Benjamins.
- Pienemann, M. (2011b). Learner variation. In M. Pienemann & J.-U. Kefler (Eds.), *Studying Processability Theory: An introductory textbook*. (pp. 12–24). Amsterdam: John Benjamins.
- Schmitt, C., & Miller, K. (2010). Using comprehension methods in language acquisition research. In E. Blom & S. Unsworth (Eds.), *Experimental methods in language acquisition research* (pp. 35–56). Amsterdam: John Benjamins. <https://doi.org/10.1075/llt.27.04sch>
- Segaert, K., Menenti, L., Weber, K., Petersson, K. M., & Hagoort, P. (2012). Shared syntax in language production and language comprehension – an fMRI study. *Cerebral Cortex* 22(7), 1662–1670. <https://doi.org/10.1093/cercor/bhr249>
- Severens, E., Jansma, B. M., & Hartsuiker, R. J. (2008). Morphophonological influences on the comprehension of subject–verb agreement: An ERP study. *Brain Research* 1228, 135–144. <https://doi.org/10.1016/j.brainres.2008.05.092>
- Spinner, P. (2013). Language production and reception: A Processability Theory study. *Language Learning* 63(4), 704–739. <https://doi.org/10.1111/lang.12022>
- Steinlen, A. K., Håkansson, G., Housen, A., & Schelletter, C. (2010). Receptive L2 grammar knowledge development in bilingual preschools. In K. Kersten, A. Rohde, C. Schelletter, & A. K. Steinlen (Eds.), *Bilingual preschools, Volume 1: Language and development* (pp. 69–100). Trier: Wissenschaftlicher Verlag Trier.
- Tomlin, R. S. (1995). Focal attention, voice and word order: An experimental, cross-linguistic study. In D. R. Dowty (Ed.), *Natural language parsing: Psychological, computational, and theoretical perspectives*. Cambridge: Cambridge University Press.
- Vainikka, A., & Young-Scholten, M. (1994). Direct access to X0-Theory. Evidence from Korean and Turkish adult learners of German. In T. Hoekstra & B. Schwartz (Eds.), *Language acquisition studies in generative grammar*. Amsterdam: John Benjamins. <https://doi.org/10.1075/lald.8.13vai>
- Van Gompel, R., & Pickering, M. J. (2007). Syntactic parsing. In G. Gatskil (Ed.) *The Oxford handbook of psycholinguistics* (pp. 289–307). Oxford: Oxford University Press.
- Vosse, T., & Kempen, G. (2000). Syntactic structure assembly in human parsing: A computational model based on competitive inhibition and a lexicalist grammar. *Cognition* 75(2), 105–143. [https://doi.org/10.1016/S0010-0277\(00\)00063-9](https://doi.org/10.1016/S0010-0277(00)00063-9)

Language acquisition features across typological boundaries

Over a number of years, work in PT has engaged with a range of typologically different languages that now includes German, English, Swedish, Italian, Turkish, Russian, Japanese, Arabic, Chinese and Hindi, among others. Issues that have been addressed have been dominated by morpho-syntactic features, but some work has been completed in relation to the acquisition of discourse-pragmatic features, such as topic, prominence and focus. The two chapters in this section contain investigations of the acquisition of Russian and Italian.

The first chapter by Daniele Artoni has Russian case as the focus of acquisition. It raises the question of whether 'case' is a unitary construct when it comes to acquisition. If it is a unitary construct, the issue that PT needs to address is the stage of L2 development at which learners acquire case. If it is not a unitary construct, there is a need to specify which aspects of case are acquired at which point of development and why. Artoni addresses this issue and thus extends the work of Artoni and Magnani (2013). They aligned aspects of the acquisition of case with PT stages as defined in Pienemann (1998) and showed language-specific sequences of development within a particular stage (Artoni & Magnani 2013: 86). Artoni's findings in this volume suggest that case is not a unitary feature as it has both grammatical and lexical aspects. The former appear to be acquired in alignment with PT's proposed universal constraints and to follow similar sequences and stage assignments across languages. However, the latter seem to be language-specific and susceptible to both language variation and variation between individual learners.

In the second chapter, Marco Magnani looks at the realisation of prominence across Russian and Italian, languages that differ in relation to the morpho-syntactic resources that are used to support their non-configurational organisation. To do this, Magnani makes use of a more recent modification of PT (Bettoni & Di Biase, 2015) that has engaged with discourse organisation through the notion of the Prominence Hypothesis. The issue explored is how the development of prominence marking interacts with the different typological resources of the two languages. Magnani argues that both languages proceed through the same sequence of stages in ways consistent with the Prominence Hypothesis even though different resources are deployed to realise the different prominence options. He goes further to

suggest that these changes within stages appear to be specific to the language being acquired. The issue opened up is what this implies for the relationship between development and variation in overall additional language development, whether in fact this relationship is an artefact of the data or a principled way of distinguishing routes through stages for certain aspects of language.

References

- Artoni, D. & Magnani, M. (2013). LFG Contribution in Second Language Acquisition Research: The Development of Case in Russian L2. In M. Butt, & T.H. King (Eds.). *Proceedings of the LFG13 Conference* (pp. 69–89). Stanford, CA: CSLI.
- Bettoni, C., & Di Biase, B. (2015). Processability Theory: Theoretical bases and universal schedules. In C. Bettoni & B. Di Biase (Eds.). *Grammatical Development in Second Languages: Exploring the Boundaries of Processability Theory* (pp. 19–79). EUROSLA Monograph Series (3).
- Pienemann, M. (1998). *Language Processing and Second Language Development: Processability Theory*. Amsterdam: Benjamins.

Case within the phrasal procedure stage

Sequences of acquisition in Russian L2

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This chapter investigates the acquisition of case in Russian L2 within the VP and the PP, two structures belonging to the same Processability Theory (PT)-based stage of acquisition, namely the Phrasal procedure stage. I claim that a crucial aspect of the intra-stage development is determined by the different nature of case assignments involved in the given structures. The study is conducted with a group of 15 learners of Russian L2 with varied L1 backgrounds. The analysis of their semi-spontaneous speech shows that (1) case within the VP develops from lack of case assignment to configurational, lexical, and eventually grammatical assignment, and (2) case within the PP develops from lack of case assignment to configurational and lexical case assignments. To conclude, the study confirms the cross-linguistic prediction that case develops from no marking to case assignment by position, and eventually to grammatical case assignment.

1. Introduction

Within the Processability Theory (PT) framework, there has been increased interest in the development of case-marked languages, as shown by studies on German L2 (Baten, 2011, 2013), Russian L2 (Artoni & Magnani, 2013, 2015), Serbian as a heritage language (Bettoni et al., 2015), Hindi L2 (Baten & Verbeke, 2015) and Turkish as a heritage language (Buttkewitz, 2014).

This chapter investigates the L2 acquisition of Russian case. Whereas previous studies on the acquisition of case in Russian L2 dealt with the emergence of case assignment along the PT stages (Artoni & Magnani, 2013) and the development of case in core functions (Artoni & Magnani, 2015), my study aims to explore whether, and to what extent, case is learned in a sequence within the VP and the PP, that is within the level of the Phrasal procedure stage. The ultimate purpose is thus to investigate whether the PT universal stages of development display language-specific sequences of development within the boundaries of one stage.

Acquisition of Russian case within the Phrasal procedure stage is a good candidate for such investigation, in that the structures belonging to this stage are numerous and varied in terms of case assignment and government.

Because this study deals with intra-stage sequences within the Phrasal procedure stage, my analysis refers only to the PT hierarchy for morphological development (Pienemann, 1998) and does not consider its interface with syntax (cf. the Prominence Hypothesis and the Lexical Mapping Hypothesis in Bettoni & Di Biase, 2015).

The paper is organised as follows: I will first provide a brief discussion of how case is marked in Russian and introduce the studies which have dealt with the acquisition of case both within the PT framework and in other theories. I will then present a study conducted with 15 learners of Russian L2 and finally show how cases within the VP and the PP are distributed in the learners' speech production data.

2. Case in Russian

Russian is a non-configurational language that marks Grammatical Functions (henceforth GFs) with both head-marking strategies – SUBJ and verb agree in number, person and gender – and dependent-marking strategies – NOM to SUBJ, ACC to OBJ and DAT to OBLGOAL. The Russian case system consists of six cases: Nominative, genitive, dative, accusative, instrumental and prepositional (also called locative).¹ Case is marked on nouns, pronouns and adjectives, and is enmeshed with other nominal features, such as number, gender, animacy and class.

The following tables show the case-marking paradigms in nouns (Table 1), pronouns (Table 2), and adjectives (Table 3). The description of pronouns here is limited to the most common personal and interrogative pronouns. However, there are also declension patterns for reflexive, demonstrative, determiner, possessive and numeral pronouns (see Timberlake, 2004: 116–123). The symbol \emptyset denotes the null morpheme and a slash (/) separates the allomorphs, where the first is the more prototypical and the second is influenced by phonological requirements (e.g., $-y$ cannot follow $-g/-k/-ch/-č/-š/-šč$ and palatalised consonants).

1. Scholars who split GEN and LOC into two subsets (see Jakobson, 1936) argue for eight cases.

Table 1. Russian case-marking paradigm: Nouns (Kempe & MacWhinney, 1998)

	SINGULAR				
	MASCULINE		NEUTER	FEMININE	
	ANIMATE	INANIMATE		1ST CLASS	2ND CLASS
	NOM	-∅	-∅	-o/-e	-a/-ja
GEN	-a/-ja	-a/-ja	-a/-ja	-y/-i	-i
DAT	-u/-ju	-u/-ju	-u/-ju	-e	-i
ACC	-a/-ja	-∅	-o/-e	-u/-ju	-’∅
INST	-om/-em	-om/-em	-om/-em	-oj/-ej	-’ju
PREP	-e	-e	-e	-e	-i
	PLURAL				
	MASCULINE		NEUTER	FEMININE	
	ANIMATE	INANIMATE		ANIMATE	INANIMATE
	NOM	-y/-i	-y/-i	-a/-ja	-y/-i
GEN	-ov/-ev/-ej	-ov/-ev/-ej	-∅ /-ej	-∅/-ej	-∅/-ej
DAT	-am/-jam	-am/-jam	-am/-jam	-am/-jam	-am/-jam
ACC	-ov/-ev/-ej	-y/-i	-a/-ja	-∅/-ej	-y/-i
INST	-ami/-jami	-ami/-jami	-ami/-jami	-ami/-jami	-ami/-jami
PREP	-ach/-jach	-ach/-jach	-ach/-jach	-ach/-jach	-ach/-jach

When the stress does not fall on the last syllable, *-o* and *-a* are both pronounced /ə/

Table 2. Russian case-marking paradigm – Personal pronouns and interrogative pronouns (Timberlake, 2004: 117)

PERS	SINGULAR					PLURAL			INTERR	
	1ST	2ND	3RD			1ST	2ND	3RD	ANIM	INANIM
			MASC	NEU	FEM					
NOM	ja	ty	on	ono	ona	my	vy	oni	kto	čto
GEN	menja	tebja	ego	ego	eë	nas	vas	ich	kogo	čego
DAT	mne	tebe	emu	emu	ej	nam	vam	im	komu	čemu
ACC	menja	tebja	ego	ego	eë	nas	vas	ich	kogo	čto
INST	mnoj	toboj	im	im	ej	nami	vami	imi	kem	čem
PREP	mne	tebe	nëm	nëm	nej	nas	vas	nich	kom	čem

Non-NOM pronouns beginning with a vowel may be preceded by an epenthetic *-n*

Table 3. Russian case-marking paradigm – Adjectives (Kempe & MacWhinney, 1998)

	SINGULAR			PLURAL		
	MASCULINE		NEUTER	FEMININE	ANIMATE	INANIMATE
	ANIMATE	INANIMATE				
NOM	-yj/-ij	-yj/-ij	-oe/-ee	-aja/-jaja	-ye/-ie	-ye/-ie
GEN	-ogo/-ego	-ogo/-ego	-ogo/-ego	-oj/-ej	-ych/-ich	-ych/-ich
DAT	-omu/-emu	-omu/-emu	-omu/-emu	-oj/-ej	-ym/-im	-ym/-im
ACC	-ogo/-ego	-yj/-ij	-oe/-ee	-uju/-juju	-ych/-ich	-ye/-ie
INST	-ym/-im	-ym/-im	-ym/-im	-oj/-ej	-ymi/-imi	-ymi/-imi
PREP	-om/-em	-om/-em	-om/-em	-oj/-ej	-ych/-ich	-ych/-ich

When -a/-o are not stressed, they are pronounced /ə/; -ogo/-ego are pronounced /əvə/ / /evə/

As these tables show, not only does the Russian case system have numerous endings, but each case can also be expressed by different markers, and conversely, some endings can mark more than one case. Such a variety of forms and such ambiguities between forms and functions contribute to making the acquisition of case a challenging task for the learner, and a problematic interlanguage feature for the researcher to analyse.

To discuss the use of case in Russian, I follow King (1995) within the framework of Lexical-Functional Grammar (LFG). King's (1995) work aims to distinguish four different strategies of case assignment: (1) configurational, (2) grammatical, (3) lexical, and (4) semantic.

Configurational case is assigned to any noun appearing in a certain phrase structure position; that is, case is determined by a slot in the c(onstituent)-structure. In King's view, Russian introduces two instances of cases assigned by position: GEN in the NP daughter of NP → N (NP), and NOM in external topic position. The rule of having GEN configurationally assigned is expressed in (1a), and an example of its use is given in (1b). Since GEN is not related to a specific semantic function, it can mark possession, quality, agency, etc.

- (1) a. NP → N (NP)
 ((↓CASE) = GEN)
- b. otvet učeník-a
 answer.NOM pupil-GEN

The second instance of configurational case assignment is the assignment of NOM to an external topic, that is, an XP that is topic (TOP) and does not occur in the complementiser phrase (CP), as in the example (2a) (taken from Franks & House, 1982: 161). The rule in (2b) shows the NOM case assignment in the c-structure position.

- (2) a. *milicioner-y na stol-e leža-l-o dve furažk-i*
 policemen-NOM.PL on table-PREP lie-PST-N two.F cap-NOM.PL
 [policemen, on the table there lie two service caps]
- b. $E \rightarrow XP \qquad CP$
 $(\uparrow E-TOP) = \downarrow \quad \uparrow = \downarrow$
 $(\downarrow CASE) = NOM$

Grammatical case assignment is determined by the GF of the constituent. In Russian, three types of GFs, namely SUBJ, OBJ and OBL_{GOAL} are required to be marked in their default case irrespective of their position in c-structure. This correspondence, formalised in (4b), assigns *NOM* to SUBJ, *ACC* to OBJ, and *DAT* to OBL_{GOAL} . The sentence in (3a) illustrates the three GFs and their default cases. This is formalised in (3b). The rules in (3b) are applied in f(unctional)-structure. Since word order at c-structure level is not specified, (3b) entails that the word order does not interfere with case assignment of SUBJ, OBJ and OBL_{GOAL} .

- (3) a. *malčik da-l Inn-e knig-u*
 boy.NOM give-PST.M Inna-DAT book-ACC
 [the boy gave Inna a book]
- b. $(\uparrow SUBJ \text{ CASE}) = NOM$
 $(\uparrow OBJ \text{ CASE}) = ACC$
 $(\uparrow OBL_{GOAL} \text{ CASE}) = DAT$

Lexical case assignment occurs when case is lexically governed by a particular preposition, verb or adjective. This means that the OBJ of a PP, VP or AP is marked by the case required by the head. This type of case assignment is formalised in f-structure as shown in (4a) for prepositions and in (4b) for verbs. King (1995) ignores those instances where case is lexically required by the adjective.

- (4) a. *u* 'at-near' P < OBJ >
 $(\uparrow OBJ \text{ CASE}) = GEN$
- b. *upravljat* 'govern' V < SUBJ, OBJ >
 $(\uparrow OBJ \text{ CASE}) = INST$

We note that (4b) may appear to contradict the OBJ assignment rule in (3b), but the rule in (4b) overrides the one in (3b), because lexical case assignment is more marked than grammatical case assignment.

Semantic case assignment occurs when a particular case is associated with a particular semantic role in a(rgument)-structure. Semantic cases are common across languages, but according to King (1995), the only candidate for semantic case in Russian is *INST* for <instrument>, as exemplified in (5).

- (5) Marija risova-l-a kartin-u karandaš-om
 Marija.NOM draw-PST-F painting-ACC pencil-INST
 [Marija drew a/the painting with a pencil]

From an acquisitional point of view, King's (1995) system of case assignments provides a clear classification of the different strategies available to learners when acquiring case. However, before looking at how King's classification fits into my developmental hypothesis, a remark on her approach needs to be added. Unlike Smith's (1987) work on the case system in German, King (1995) makes no distinction between prepositions governing one case and those selecting more than one case. In fact, in Russian, as in German, some prepositions govern only one case (one-way prepositions) – like *u* 'at/near', which is always followed by GEN, as in (4) – whereas other prepositions can govern two (or more) cases (two- and three-way prepositions) – like the preposition *v* 'in/into', which can select either PREP or ACC, as in (6a) and (6b), depending on the semantics of the sentence. In (6a) PREP indicates state, and in (6b) ACC indicates motion.

- (6) a. tarelka nachod-it-sja v korobk-e
 plate.NOM stay-3SG-REFL in box-PREP
 [the plate is in the box]
 b. klad-i tarelk-u v korobk-u
 put-IMP plate-ACC into box-ACC
 [put the plate into the box!]

There are two ways to account for this alternation. On the one hand, Baten (2013), following Smith (1987), assumes that the different cases selected by the same preposition are determined by semantic motivations broader than lexical case assignment. Therefore, semantic information should already be present, and represented in the a-structure of the verb. This hypothesis makes a distinction between one-way and two-way prepositions in German, according to the number of cases a preposition can govern, but retains a single lexical entry. On the other hand, since it is possible to argue for homonymy, the number of lexical entries would increase and correspond to the different number of cases selections that is possible, as shown in (7) for the preposition *v*.

- (7) *v* 'in' P < OBJ >
 (↑OBJ CASE) = PREP
v 'into' P < OBJ >
 (↑OBJ CASE) = ACC

This latter option entails that the selection of the preposition is lexically required by the verb in the VP. In this study I do not take a position on this issue, and will instead explore whether learning to mark cases in one-way prepositions differs from what occurs in two- or three-way prepositions.

3. Studies of acquisition of case

A variety of studies on the acquisition of case have been published both within and outside the PT framework. In this section I will introduce the two studies I will ultimately compare to mine: The study by Baten (2013), which details the sequence of the acquisition of case in German L2 from the PT perspective, and Gvozdev (1961), which provides an extensive collection of longitudinal data and useful insights on the acquisition of case in Russian L1.

Within the PT framework, Baten (2013) investigates the developmental sequences of case in German L2. His analysis also includes case on verb arguments – a scope broader than mine, which is limited to the acquisition of case within the VP and in Prepositional Phrases.

As far as case development in verb arguments is concerned, the sequence of acquisition found by Baten can be summarised as in (8).

- (8) 1. all-nominative
2. direct case mapping
3. position marking (canonical word order)
4. functional marking (non-canonical word order)

As we can see, the development of case in verb arguments is highly intertwined with the development of syntax. At the very first stage, learners rely on word order and no case markers are used; this is Baten's all-nominative stage. Subsequently, learners mark case in the canonical word order as a result of a direct case mapping strategy. At this stage, *NOM* is assigned to preverbal *SUBJ* and *ACC* to postverbal *OBJ*; as a consequence of direct case mapping, *ACC* is assigned to both postverbal *OBJS* in ditransitive sentences. Only at the next stage will learners be able to differentiate between the two *OBJS* in ditransitive structures by assigning *ACC* to the first and *DAT* to the second; this stage is referred to as position marking. Finally, functional case marking is used in non-canonical word order, where *NOM* is marked on *SUBJ*, *ACC* on *OBJ* and *DAT* on the restricted object *OBJ* θ irrespective of the position these elements have in the sentence.

Unlike case marking on verb arguments, case within the PP does not involve functional assignment, and is thus a lexical matter, even when it involves the

distinction between one-way and two-way prepositions referred to earlier. Following Smith (1987), one-way prepositions in German include a set of prepositions that can govern only one case, that is, either ACC or DAT. Two-way prepositions are those prepositions that can govern both ACC and DAT, depending on the respective meaning. Baten (2013) summarises the development of case within the PP as in (9).

- (9)
1. all-nominative
 2. direct case mapping
 3. lexical case assignment (ACC/DAT)
 4. conceptual case assignment (ACC/DAT)

After a first stage – not attested in Baten’s (2013) study – in which learners produce only NOM, learners begin to apply a direct case mapping strategy by marking nouns in the PP with non-NOM forms. At a further stage of development, the differentiation between ACC and DAT markers leads to lexical case assignment, in which the two cases are determined by the one-way prepositions’ lexical entries. Finally, learners reach the conceptual case assignment stage and are able to assign either DAT or ACC governed by two-way prepositions. The reason why the acquisition of the two-way prepositions is considered conceptual is that “it involves more than just unification in accord to the lexical entry of the preposition” (Baten, 2013: 287), i.e., it entails unification that goes beyond the lexical case assignment triggered by the preposition, thus requiring inter-phrasal grammatical information exchange.

Baten’s (2013) longitudinal study with eleven Dutch learners of German L2 provides evidence for the acquisition of case in a twofold way. On the one hand, development is explained in terms of the acquisition of processes, such as *mapping*, *marking* and *assignment*. Whereas *marking* deals with morphological variation, i.e., case markers, *assignment* refers to the syntactic relations among constituents, which result in case marking. Given the limited set of cases in German, Baten’s (2013) proposal for a developmental sequence for case (see (9) above), can be reduced to (1) NOM precedes non-NOM marking and (2) ACC and DAT assignment emerge together only when they are used in complementary distribution in different contexts.

With respect to the studies on the acquisition of case in Russian, interesting insights are provided by Gvozdev (1961), who investigated the acquisition of L1 Russian morphology in a detailed longitudinal study. Gvozdev notes that, for case marking, after an initial stage, when only unmarked forms (corresponding to the default NOM) are used, his learner begins to mark case by differentiating NOM from ACC and GEN.² Cases emerge simultaneously in different contexts, both in

2. Although Gvozdev explicitly refers to ACC and GEN, he noticed the emergence of *-u* and *-i* morphemes, which I have recently referred to as non-NOM, because evidence of case assignment is missing.

the PP and the VP. However, accuracy in the use of case endings is acquired later. Over-extension of different case forms in the child's speech is common. For example, the unambiguous MASC/NEUT INST marker *-om* is over-extended to all the three genders, and preferred to the FEM INST *-oj* ending, which is more frequent in the input (but more ambiguous). Only after the emergence of the ACC marker *-u* does the child use freer word orders, such as OV.

Whereas King (1995) identifies case assignments in different syntactic environments, Gvozdev (1961) only analyses morphology. It would be interesting to analyse his findings in light of King's taxonomy. To address this challenge, I use morpheme analysis, as does Gvozdev, and take King's account as a frame of interpretation for case assignment.

My study builds on Baten (2013) as well as other studies of the acquisition of case that have been conducted within the PT framework. Artoni and Magnani (2013, 2015) have adapted the PT hypothesis for the development of morphology to case in Russian L2. In particular, Artoni and Magnani (2013) show how King's (1995) theory of case assignment can fit into PT's developmental hypothesis, whereas Artoni and Magnani (2015) show how learners mark OBJ with ACC first in canonical and subsequently in non-canonical word order. This is in line with both the Topic Hypothesis (Pienemann et al., 2005a) and its reformulation as the Prominence Hypothesis (Bettoni & Di Biase, 2015). Both hypotheses predict that learners progress from fixed correspondences between GFs and position (canonical order) to more flexible correspondences (non-canonical order), which reflect the learners' discourse-pragmatic needs.

Bettoni et al.'s (2015) study of the acquisition of Serbian as a heritage language supports the Prominence Hypothesis, showing how learners move from marking ACC on OBJ in canonical word order sequences to marking it in non-canonical word order sequences via an intermediate stage characterised by a topicalised ADJ followed by canonical word order, where ACC is also marked.

Moving from studies mainly focused on OBJ case marking to SUBJ case marking, Hindi provides an interesting testing ground. Baten and Verbeke's (2015) study on Differential Subject Marking in Hindi L2 shows how learners' use of ERG as SUBJ marker, as opposed to canonical NOM, develops from zero marking to overgeneralisation, and finally to functional marking.

Finally, Buttkewitz (2014), based on Bayram's (2013) data on Turkish as a heritage language, suggests that further investigation of King's (1995) notion of case assignment should be incorporated into PT analyses, as typologically distant languages (Russian and Turkish) display similar developmental paths.

4. Developmental hypothesis

I assume that L2 learners of Russian will follow the universal stages of morphological development, as formulated in Pienemann (1998), and already verified for Russian L2 case in Artoni and Magnani (2013, 2015). Based on this assumption, my study will investigate the development of case within the VP and the PP. I do not hypothesise universal sequences for all features of case. Rather, I assume that different case assignments may contribute to a further sequential development within the Phrasal procedure stage. Therefore, before hypothesising a developmental schedule for case within the VP and the PP, in this section I will propose a revised version of King's (1995) case assignment to underpin my data analysis. Table 4 is based on a revised version of King's (1995) case assignment and shows the multiple motivations for case assignment and how these assignments are distributed in the VP in Russian, the target language of this study.

Table 4. Distribution of cases and case assignment in the VP

Case within the VP	Type of case assignment	Example
NOMINATIVE	<i>Always ungrammatical</i>	
ACCUSATIVE	Configurational and/or grammatical to OBJ	čitaju knig-u (I) read book-ACC
DATIVE	Semantic to <goal> and/or grammatical to OBLGOAL	skazala mam-e (she) said mum-DAT
INSTRUMENTAL	Lexical	zanimajus' sport-om (I) do sport-INST
GENITIVE	Lexical	bojus' cholod-a (I) fear cold-GEN
	Semantic to <partitive>	choču sachar-u (I) want sugar-GEN
PREPOSITIONAL	<i>Always ungrammatical</i>	

As shown in Table 4, the use of NOM in the VP is always ungrammatical, and can thus provide evidence for the lack of case assignment. When it comes to ACC and DAT, the question is more complicated. Both ACC and DAT are grammatically assigned to OBJ and OBLGOAL, but from an acquisitional perspective, learners can assign those cases using different strategies. According to King (1995) ACC is assigned grammatically to OBJ, but evidence of functional assignment is provided only when OBJ is marked in preverbal TOP position (see Artoni & Magnani, 2013). Since ACC in postverbal position is the default solution, case may be assigned by position, and it is thus not possible to postulate that grammatical case assigns ACC in the VP unless the learner's production includes ACC-marked OBJ in preverbal position. For

this reason, as hypothesised in Artoni and Magnani (2013), a proto-configurational strategy assigning ACC to postverbal noun – thus resulting in direct case mapping – is assumed to be active in the learners' early production. Similarly, DAT is assigned to OBLGOAL by grammatical case assignment. However, evidence for this assignment can only be found when OBLGOAL is DAT-marked outside the VP, since early learners' production of DAT within the VP might be assigned via a semantic strategy to the semantic role <goal>. As far as the grammatical cases of INST and GEN are concerned, they are lexically required by the head of the VP. However, GEN in the VP can also be semantically assigned to nouns with a partitive scope. Finally, as suggested by the name itself, PREP is never used in VP structures.

As a result of these considerations, I hypothesise the following stages for the acquisition of case within the VP, as in (10).

- (10) i. Lack of case assignment: NOM;
- ii. Configurational case assignment: non-NOM/ACC;
- iii. Lexical case assignment: INST, GEN; semantic case assignment: DAT;
- iv. Grammatical case assignment: ACC to OBJ, DAT to OBLGOAL.

In line with Baten (2013), I hypothesise that after a first stage of lack of case assignment, which in Russian results in the use of default NOM markers, learners will mark case positionally by default ACC. Only later will they be able to assign case lexically (i.e., INST, GEN) or semantically (i.e., DAT), and then grammatically (i.e., ACC to OBJ and DAT to OBLGOAL irrespective of position), which is also consistent with Baten (2013).

Unlike the multiple ways of motivating case assignment in the VP, case assignment in the PP can be almost exclusively explained through a lexical strategy, as can be seen in Table 5.

Table 5. Distribution of cases and case assignment in the PP

Case within the PP	Type of case assignment	Example
NOMINATIVE	<i>Always ungrammatical</i>	
PREPOSITIONAL	Configurational and/or lexical	o volk-e about wolf-PREP
INSTRUMENTAL	Lexical	s volk-om with wolf-INST
GENITIVE	Lexical	dlja volk-a for wolf-GEN
DATIVE	Lexical	k volk-u towards wolf-DAT
ACCUSATIVE	Lexical	pro volk-a about wolf-ACC

Apart from NOM, which is never assigned in the PP, all the other cases can be lexically assigned by different prepositions. From an acquisitional perspective, given that in Russian PREP can only be marked in the PP, learners may assign it configurationally to any noun preceded by a preposition.

These considerations suggest that case within the PP will develop as follows in (11).

- (11) i. Lack of case assignment: NOM;
 ii. Configurational case assignment: non-NOM/PREP;
 iii. Lexical case assignment: INST, DAT, GEN, ACC.

I hypothesise that after initial lack of case assignment (i.e., default use of NOM), learners will mark case positionally by default PREP. Only later will they be able to assign case lexically (i.e., DAT, INST, GEN, ACC).

Since case within the PP is lexically assigned by different prepositions, I will investigate whether the distribution of case is affected by the choice of the preposition and whether Baten's (2013) findings on one-way and two-way prepositions in German L2 are mirrored in Russian L2. In order to do so, I will analyse the distribution of prepositions and their cases in the learner data.

I hypothesise that learners will (1) follow the universal stages of morphological development as predicted by Pienemann (1998) and tested in Artoni and Magnani (2013, 2015), and (2) move from positional to lexical and functional case marking. In connection with (2), I will investigate the use of different cases within the Phrasal procedure stage and identify similarities and differences in the use of case within the VP and the PP.

5. The study

5.1 Methodology

In order to test my developmental hypothesis, I interviewed 15 learners of Russian L2 with different levels of proficiency and different L1 backgrounds, namely, Azeri, Georgian, Italian, Slovak and Serbian, as shown in Table 6.

The informants are twelve females and three males, from ten to 50 years old. Their level of proficiency in Russian ranges from A1 to C2 on the Common European Framework of Reference scale, and they display differences in their learning experiences in terms of both quantity (from one to 18 years of exposure) and quality (instructed learning and/or immersion).

Table 6. The learners

Learner	Gender	L1	L2 s	Age	Instruction (years)	Immersion (years)	Proficiency
AA	F	Italian	English, German, Spanish	48	1		A1
AE	F	Italian	English, French	23	3		B1
AN	F	Italian	English, French, Spanish, German	23	5	0.1	C1
BD	M	Georgian	English	27		3	C1
BE	F	Slovak	English, Hungarian, Croatian	20	1		B1
CA	F	Italian	English, German	26	3		B1
CH	F	Azeri	Turkish, English	10		2	C1
CI	F	Italian	English, Spanish, German, French	26	3	0.1	B1
DA	F	Slovak	English, German, Croatian	19	0.5		B1
EL	F	Italian	English, German, Spanish	20	2		A2
IR	M	Georgian	-	50	18	5	C2
JO	F	Serbian	Italian, English, Spanish	22	2		B2
LK	F	Georgian	English, French	25	5	3	B2
MA	F	Italian	English, German	20	1		A1
MT	M	Italian	English, Polish	22	3		B2

Data were collected in a dyadic conversation between each informant and me. In order to elicit case in the PP and in the VP specifically, four different tasks were used: A story retelling, in which the learner was asked to tell the story of Red Riding Hood shown in some pictures, a spot-the-differences task, a picture description, and a detective simulation task.

I transcribed the interviews and isolated the case endings. As already mentioned, the relationship between cases and endings is far from being transparent, and creativity in the learners' interlanguage must also be taken into consideration. For this reason, it is important to clarify the key concepts of emergence and accuracy. Since its inception, PT has provided a definition of the emergence criterion as "the first systematic use of a structure, so that the point in time can be located when a learner has – in principle – grasped the learning task" (Pienemann, 1984: 191). This definition was derived from the work of Meisel et al. (1981) and later elaborated by Pienemann (1998). Building on this work, Pallotti (2007) states that a productive use of a structure requires at least two morphological minimal pairs, a creative construction, or three pairs of correct lexemes (Pallotti, 2007: 375). The emergence criterion is thus the criterion used to locate learners at different PT stages. However, in order to look at the development of case within the VP and the PP, that is, at the level of intra-stage development, emergence itself is not sufficient. To investigate the trajectory of potentially increasing control, I will investigate not only whether case has emerged or not, but also which case markings are used and consider whether they are target-like. In order to do so, I will need to also use the notion of accuracy. Accuracy is the ratio of the number of target-like occurrences of a particular structure to the number of total contexts for that structure. It goes without saying that the emergence of a structure and its full accuracy are processes that follow different paths, as between the first systematic use of a structure and its full mastery – if ever reached – a significant amount of time can pass.

5.2 Data analysis

In this section I will first locate my learners along the developmental stages hypothesised by PT. Their level is established according to the emergence of the feature case, and not on the whole set of possible nominal and verbal features required by the Russian grammar. On the one hand, PT claims that its hierarchy holds also for the development of single features, which can be 'factorised' (cf. Pienemann, 1998: 159); on the other hand, I claim that case is the only 'reliable' feature for testing acquisition in Russian L2, in that other features such as gender and number can be independently marked on single items by their semantics, and SUBJ-V agreement can be 'independently retrieved', as suggested by Vigliocco et al.'s (1996)

findings on pro-drop languages. Secondly, once in the learner's production there is evidence of case-marked structures requiring the Phrasal procedure to be activated, I will analyse how the learners use case within the VP and within the PP.

Table 7 shows the emergence of case among the 15 learners. At the Category level, (+) indicates the presence of non-NOM opposed to NOM, crucially in postverbal position, and (–) indicates lack of minimal opposition between cases. In fact, the presence of any case marker other than the default NOM (therefore identified as non-NOM) indicates a first attempt to mark case in postverbal position, opposed to default (unmarked) NOM in preverbal position. At the Phrasal procedure stage, within the VP, (+) is assigned to those learners who mark postverbal OBJ by case other than default ACC; within the PP, (+) indicates presence of cases other than default PREP, irrespective of the case required by the governing preposition. At the Sentence procedure stage, (+) indicates functional use of case in non-canonical position, that is, ACC-marked topicalised OBJ. In Table 7, the learners who have reached higher stages of PT are on the right, whereas those on lower stages of acquisition are on the left. The order within the same stage is determined by the learners' relative accuracy (see the Appendix for the distribution of occurrences among the learners).

Table 7. Emergence of case marking in PT stages among learners³

Stage		AA	CI	MA	AE	CA	JO	EL	LK	CH	DA	MT	BE	IR	BD	AN
Sentence		–	–	–	–	–	–	–	–	+	+	+	+	+	+	+
Phrasal	VP	–	–	–	+	+	+	+	+	+	+	+	+	+	+	+
	PP	–	–	–	+	+	+	+	+	+	+	+	+	+	+	+
Category		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

As shown in Table 7, all the learners produce some case markings in canonical structures. In line with Gvozdev (1961), learners at an initial stage of development produce an opposition between NOM and non-NOM markers, such as *-i/-u/-e*, as exemplified in (12).⁴

- (12) CI: volk chotet est šapočk-i
 wolf.NOM want.3SG eat.3SG (Red Riding) Hood-non.NOM

3. For a detailed analysis of the full corpus of this study, see Artoni (2015).

4. *i-e-u* are highly ambiguous endings. *-i* marks NOM only in plural contexts, and so its use in (12) can be assumed to have the non-NOM meaning.

At the Phrasal procedure stage, twelve of the 15 learners (i.e., not AA, CI or MA) are able to assign case within the PP and the VP. This is indicated by their use of non-NOM markers. As mentioned above, emergence of case in the learners' production is recognised through use of cases other than the default PREP in the PP and the default ACC in the VP. The distribution of cases will be discussed in the next section.

Finally, at the Sentence procedure stage only seven out of 15 learners are able to mark TOP OBJ by ACC, as shown in (13). Those who do not use ACC use default NOM, as in (14).

- (13) BD: gitar-u prines-l-a balerin-a
 guitar-ACC bring-PST-F dancer-NOM
 [a guitar, the dancer brought]
- (14) LK: *gruš-a prines-l-a prepodavatel'nic-a
 *pear-NOM bring-PST-F teacher-NOM
 [a pear, the teacher brought]

Because I am investigating the acquisitional sequence of case at the Phrasal level, those learners who have not reached this stage (AA, CI and MA) will be ignored in the following analysis.

After having shown how the learners are distributed along the PT-based developmental path, I will investigate how learners who have reached the Phrasal procedure stage mark case within the VP and the PP. Table 8 shows the distribution of case markers within the VP among the twelve learners who have reached the Phrasal procedure stage. Numbers indicate the occurrences of unambiguous case markers in the learners' production, an asterisk (*) indicates default case marker (i.e., NOM) – which is always ungrammatical for non-NOM cases, and a slash (/) indicates lack of contexts for case markers. The sequencing of the learners in Table 8 is based on the PT developmental path, as presented in Table 7, given that the implicational relationships can be claimed only among different stages, and not among structures within the same stage.

Table 8. Distribution of cases within the VP among learners

	AE	CA	JO	EL	LK	CH	DA	MT	BE	IR	BD	AN
V NGEN	/	/	/	/	/	/	/	/	/	/	1	/
V NINST	/	/	/	1	2	1	2	2	2	1	1	4
V NDAT	2	1	2	/	/	1	1	3	/	1	3	/
V NACC	6	3	16	6	14	10	17	12	9	9	11	8
V NNOM	*5	*3	/	*7	*2	*2	*1	*3	/	*1	*1	/

The use of NOM in the VP indicates lack of case assignment, as exemplified in (15).

- (15) EL: muzykant prenès *trub-a
 musician-NOM brought.PST.M *trumpet-NOM

Non-occurrence of NOM in the VP indicates full accuracy in the learners' production, and occurs in only three learners, BE, AN and surprisingly JO, who has not reached the Sentence procedure stage. This might be explained in terms of the Developmentally Moderated Transfer Hypothesis (Pienemann, 1998; Pienemann et al., 2005b: 85), given that JO's L1 is Serbian; a language that displays not only case marking, but also morphological case markers similar to Russian. This hypothesis claims that L1 transfer is constrained by the processability of the given structure. In line with the hypothesis, JO can transfer case marking in the VP from her L1, whereas transfer is not an option in structures requiring the Sentence procedure, since JO cannot yet process structures from this stage. However, further investigation is needed to provide more robust evidence for this suggestion.

As already mentioned, ACC in the VP is the default case and may be assigned as a result of position rather than necessarily through recognition of its case meaning, as exemplified in (16).

- (16) MT: ona najd-ët volk-a
 3SG.F.NOM find-3SG wolf-ACC

Its use ranges from three occurrences in CC to 17 in DA, with no significant variation related to different stages.

The use of DAT appears in the language of eight out of 12 learners (AE, CA, JO, CH, DA, MT, IR, BD) with one to three occurrences per learner in contexts where DAT is required by the verb governing it. An example of its use is provided in (17).

- (17) DA: govorit' šapočk-e
 say.INF (Red Riding) Hood-DAT

INST in the VP appears between one and four times in the language of each of nine learners (EL, LK, CH, DA, MT, BE, IR, BD, AN), as exemplified in (18).

- (18) BE: šapočka zanima-et-sja muzyk-oj
 (Red Riding) Hood.NOM practise-3SG-REFL music-INST

The use of INST in the VP is a lexical requirement of the governing verb.

Because GEN is used in the VP only once (by BD) there is insufficient data to satisfy the emergence criterion. This single use is presented in (19).

- (19) BD: mne nauči-l-i russk-ogo jazyk-a
 1SG.DAT teach-PST-PL Russian-GEN language-GEN
 [they taught me Russian language]

The data show that the occurrences of NOM use decrease as the learners reach higher stages of development; the use of default ACC remains widespread, as does that of DAT and INST. GEN appears in the language of only one learner (BD), who is amongst the most advanced learners and has reached the Sentence procedure stage. This location means that GEN is amongst the cases that are unlikely to be used by the learners in the VP. No occurrences of PREP are found in the learners' production data; this is not surprising, in that PREP within the VP is never used in target Russian. The data driven analysis suggests the stages of development for case in the L2 acquisition of Russian that are presented in (20).

- (20) i. Lack of case assignment: NOM;
 ii. Configurational case assignment: non-NOM/ACC;
 iii. Lexical case assignment: INST; semantic case assignment: DAT;
 iv. Grammatical case assignment: ACC to OBJ.

Stages (ii) and (iii) are directly relevant to my analysis of the VP. Stage (i) lack of case assignment was not found in my analysis, since all the learners use some case markers. Though I found evidence of stage (iv) (see Table 7), the use of case within this stage was outside the scope of my analysis of case within the VP. Although data on lexically assigned GEN and DAT for the function OBLGOAL are missing due to the lack of contexts, the results confirm my hypothesis, as spelled out in (10), in that after the all-NOM stage, semantic and lexical case assignments tend to follow configurational assignment, before the learner acquires full grammatical case assignment.

Moving from case within the VP to case within the PP, Table 9 shows the distribution of case markers in the PP among learners. The criteria used in reading Table 8 apply here as well. In Table 9, I have also included the production of AA, CI, MA, who have not reached the Phrasal procedure stage, but whose data are relevant for my analysis of case within the PP.

Table 9. Distribution of cases within the PP among learners

	AA	CI	MA	AE	CA	JO	EL	LK	CH	DA	MT	BE	IR	BD	AN
P NACC	/	2	2	/	1	/	3	1	/	2	2	/	2	1	3
P N DAT	/	/	/	/	2	1	/	6	4	1	2	3	3	5	3
P N GEN	/	/	/	/	8	4	/	2	2	3	2	2	/	4	7
P N INST	/	/	/	3	4	3	5	5	1	4	2	5	4	8	4
P N PREP	/	2	3	2	6	2	9	3	17	14	15	2	10	7	7
P N NOM	*6	*10	*3	*4	*6	/	*2	*2	*4	/	*1	*1	/	*1	/

The use of *NOM* in the PP is never target-like and is present in eleven out of 15 learners. Occurrences of *NOM* are numerous in the beginners, as in (21), and almost absent in the more advanced learners. Only *JO*, *DA*, *IR* and *AN* never use *NOM* in the PP. As already stated, the emergence of a structure does not entail its full mastery, and thus lack of accuracy can be found even in the production of learners who have reached higher stages of development.

- (21) AE: dlja *blondinka
for *blond girl.*NOM*

PREP is used by 14 out of the 15 learners, as exemplified in (22), and is the most extensively used case in the PP.

- (22) JO: v avgust-e
in august-*PREP*

Interestingly, *AA* only uses *NOM* in the PP. No other case markers – not even the simple *PREP* marker – are used by *AA* in this context. As already mentioned, because it can only be used within the PP and its singular form does not vary according to *GEN*D and *ANIMACY*, *PREP* is a good candidate to be considered the default case in the PP and might thus be assigned by position. It is used by all learners except *AA*.

In addition to *PREP*, *INST* is the only other case marker used within the PP by all the twelve learners who have reached the Phrasal procedure stage. Its use is exemplified in (23).

- (23) IR: s inostranc-ami
with foreigners-*INST*

Its use ranges from one occurrence in the utterances produced by *CH* to eight occurrences in *BD*'s data, with no significant variation among learners, i.e., the frequency of use of *INST* in the PP does not vary as the learners' overall accuracy increases.

GEN and *DAT* are also used within the PP, by respectively nine and ten out of the twelve learners who have reached the Phrasal procedure stage. Its use is exemplified in (24)–(25).

- (24) MT: ot universitet-a
from university-*GEN*

- (25) LK: k nej
towards 3SG.F.*DAT*

ACC is used by eight out of twelve learners who have reached the Phrasal procedure stage. Its use is exemplified in (26).

- (26) DA: *za babušk-u*
 after grandmother-ACC

There are fewer occurrences of ACC than of GEN and DAT – from only one to a maximum of three per learner.

The data analysis shows that the unmarked NOM is mainly used by beginners, and all the learners produce numerous occurrences of default PREP within the PP. The other cases, INST, DAT and GEN, are used similarly frequently to PREP.

The data driven analysis suggests the stages of development presented in (27).

- (27) i. Lack of case assignment: NOM;
 ii. Configurational case assignment: non-NOM/PREP;
 iii. Lexical case assignment: INST, DAT, GEN, ACC.

The results confirm my hypothesis, as spelled out in (11). After the all-NOM stage, configurational case assignment tends to precede lexical assignment, the latter showing no significant differences among the possible cases (i.e., INST, DAT, GEN, ACC).

Because the use of INST, DAT, GEN and ACC in the PP is a matter of lexical annotation, I will now investigate to what extent the marking of these cases relates to the lexical variation of the prepositions themselves. Table 10 shows the prepositions and the cases used by the learners. The two- or three-way prepositions in Table 10 are underlined. In particular, they are: *v* ‘in/into’ and *na* ‘on/onto’, which govern PREP and ACC; *s* ‘with/about/from’, which governs INST, ACC, and GEN; *za* ‘for/beyond’, which governs ACC and INST. Unlike in Table 9, here I have included only the learners who have reached the Phrasal procedure stage.

Table 10 clearly shows that learners who have reached the Sentence procedure stage (from CH to AN in the table) display in general a larger set of prepositions, ranging from five (IR) to eleven (DA) compared to the range of four (AE, JO) to six (CA, LK). Of course, some prepositions are used by many learners, whereas others occur in the Russian of only one or two learners. Among the extensively used ones, we find the preposition *s* [with] followed by INST, used by all twelve learners, and *k* [towards] followed by DAT and *v* [in] followed by PREP used by ten of them. Also, *u* [at] with GEN and *na* [on] with PREP are common, each used by nine out of twelve learners. Among the less common ones are *o* [about] and *pri* [under] followed by PREP, *među* [among], *rjedom* [near], *pered* [in front of] and *za* [behind] followed by INST, *po* [along/through/according to] followed by DAT, *posle* [after], *ot* [from], *iz* [from], *dlja* [for] followed by GEN and *v* [into], *na* [onto] and *za* [behind/for] followed by ACC.

There does not seem to be a clear acquisitional consequence of being a two- or three-way preposition. There is a slight tendency for them to appear more among more accurate learners, but there is no obvious pattern of one-way prepositions

Table 10. Distribution of prepositions among learners

Case	Preposition	AE	CA	JO	EL	LK	CH	DA	MT	BE	IR	BD	AN
ACC	<i>za</i>							X					X
	<i>na</i>							X			X		
	<i>v</i>		X		X								
GEN	<i>posle</i>								X				
	<i>ot</i>								X			X	
	<i>iz</i>		X						X	X		X	
	<i>dlja</i>	X											
	<i>u</i>			X		X	X	X		X		X	X
DAT	<i>po</i>		X			X				X	X		X
	<i>k</i>		X	X	X	X	X	X	X	X		X	X
INST	<i>meždu</i>												X
	<i>rjedom</i>							X					
	<i>za</i>							X		X			
	<i>pered</i>	X							X				
	<i>s</i>	X	X	X	X	X	X	X	X	X	X	X	X
PREP	<i>pri</i>							X					
	<i>o</i>	X				X		X	X				
	<i>na</i>				X	X	X	X	X	X	X	X	X
	<i>v</i>		X	X	X		X	X	X	X	X	X	X
TOT		4	6	4	5	6	5	11	9	7	5	7	8
Prep types													

before others. Equally, there is not a strong indication of one case before another among two- or three-way prepositions; *v* and *na* seem to be used first with PREP and then with ACC, the preposition *s* is used only with INST and never with ACC or GEN, whereas no significant difference is noticed in the use of *za* with ACC and with INST.

6. Conclusion

The study conducted with a group of 15 learners of Russian L2 from varied L1 backgrounds corroborates the validity of PT in typologically diverse languages. My data confirm that learners follow the implicational stages of acquisition hypothesised within a PT framework. All learners who produce case marking at a given stage of their development also provide evidence of case-marked structures requiring the activation of lower procedures in the hierarchy. As Table 7 and the Appendix show, three learners (AA, CI and MA) do not go beyond the Category procedure stage, twelve learners have reached the Phrasal procedure stage, and seven learners (CH, DA, MT, BE, IR, BD, AN) have reached the Sentence procedure stage.

In this study, I have also investigated whether, and to what extent, there are sequences in the acquisition of cases within the VP and the PP. Amongst the twelve learners who have reached the Phrasal procedure stage, my data suggest the developmental sequence of case within the VP in (28):

- (28) i. Lack of case assignment: NOM;
 ii. Configurational case assignment: non-NOM/ACC;
 iii. Lexical case assignment: INST; semantic case assignment: DAT;
 iv. Grammatical case assignment: ACC to OBJ.

NOM occurrences in the VP do occur in my data, but they become less frequent in learners who have reached higher developmental stages. The second stage consists of marking a postverbal noun by non-NOM (called ACC once the opposition with other cases, such as DAT, has emerged). At the third stage of development, the data show the use of lexically assigned INST and semantically assigned DAT. Only at higher stages are the learners able to assign ACC to OBJ irrespectively of position (i.e., at the Sentence level, outside the VP). The data driven analysis thus confirms my hypothesis, as spelled out in (10). These findings generally mirror the sequence outlined in Baten (2013), who shows that case marking on verb arguments in German L2 develops from an all-NOM stage to position marking and finally to functional marking. In addition, unlike in German L2, these Russian data show a sequential hierarchy in the acquisition of lexically assigned cases in the VP; however, this is a matter of annotation at the lexical level and must be considered as a language-specific feature.

For the development of case within the PP, the data suggest the sequence in (29):

- (29) i. Lack of case assignment: NOM;
 ii. Configurational case assignment: non-NOM/PREP;
 iii. Lexical case assignment: INST, DAT, GEN, ACC.

After a first stage of unmarked NOM (unattested in my data), learners mark configurational non-NOM (or PREP if opposed to other cases) within the PP. My data do not suggest any fixed sequence for the emergence of lexically assigned cases. The data driven analysis also confirms hypotheses about the acquisitional sequences for both the VP and the PP. My findings reflect Baten's sequence, in so far as case is first mapped configurationally (positionally) and then assigned lexically. However, whereas at advanced stages of development the distinction between one-way and two-way prepositions seems to be crucial in German L2 to determine whether case is lexically assigned or conceptually determined, in Russian L2 this distinction is less important. For instance, the two-way preposition *v* is followed by both ACC and

PREP even in beginners' production, whereas the three-way preposition *s* is used by all the learners and followed only by INST and never by ACC and GEN. On the other hand, the richness of cases that are lexically assigned in the PP parallels the number of prepositions introduced by the learners, and thus suggests that, not surprisingly, the use of lexically assigned cases increases as the learners' lexicon grows.

My findings on the acquisition of Russian L2 mirror Gvozdev's (1961) observations on Russian L1 acquisition in that (1) no difference in terms of emergence is noted in case within the VP and the PP, and (2) no significant difference is noted in the order cases emerge after the NOM vs non-NOM stage.

Although I am not in a position to explicitly commit to either position on the developmental issue of whether case is acquired as a unitary feature or whether its different features emerge at different stages, my analysis supports this latter option. In particular, it is clear that the same case in different contexts is acquired at different stages; for example, ACC can emerge at the Category procedure stage in the VP, at the Phrasal procedure stage in the PP, at the Sentence procedure stage in TOP OBJ.

In sum, the results of my analysis of Russian L2 along with previous findings on the acquisition of case within the PT framework suggest that there is a neat distinction between the development of case motivated by grammatical functions and the development of case markers motivated by lexical assignment. The former seems to hold cross-linguistically, and thus fits into the PT hierarchy of morphological development in the sequence presented in (30):

- (30) i. No case assignment;
 ii. Position (configurational) case assignment;
 iii. Functional (grammatical) case assignment.

Such a cross-linguistic prediction is consistent with Buttkewitz's (2014) analysis of the acquisition of Turkish case, in which configurational case assignment precedes grammatical case assignment, the former emerging at the Phrasal procedure stage, the latter being acquired only at the Sentence procedure stage.

As to lexical case assignment, it seems to be a matter of pure annotation in the lexicon, and is thus highly language-specific, depending not only on the idiosyncratic aspects of the target language, but also on individual characteristics of the input and the learner. For this reason, cross-linguistic investigation on the acquisition of lexical case (and thus primarily within the PP) will possibly yield different sequences in different target languages.

References

- Artoni, D. (2015). *The development of case morphology in Russian as a second language* (Unpublished doctoral dissertation). University of Verona.
- Artoni, D., & Magnani, M. (2013). LFG contribution in second language acquisition research: The development of case in Russian L2. In M. Butt & T. H. King (Eds.), *Proceedings of the LFG13 conference* (pp. 69–89). Stanford, CA: CSLI.
- Artoni, D., & Magnani, M. (2015). Acquiring case marking in Russian as a second language. An exploratory study on subject and object. In C. Bettoni & B. Di Biase (Eds.), *Grammatical development in second languages: Exploring the boundaries of Processability Theory* (pp. 177–193). Paris: Eurosla.
- Baten, K. (2011). Processability Theory and German case acquisition. *Language Learning* 61(2), 455–505. <https://doi.org/10.1111/j.1467-9922.2010.00615.x>
- Baten, K. (2013). *The acquisition of the German case system by foreign language learners*. Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.2>
- Baten, K., & Verbeke, S. (2015). The acquisition of the ergative case in Hindi as a foreign language. In K. Baten, A. Buyl, K. Lochtman, & M. Van Herreweghe (Eds.), *Theoretical development in Processability Theory* (pp. 71–104). Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.4.04bat>
- Bayram, F. (2013). *Acquisition of Turkish by heritage speakers: A processability approach* (Unpublished doctoral dissertation). University of Newcastle.
- Bettoni, C., & Di Biase, B. (2015). Processability Theory: Theoretical bases and universal schedules. In C. Bettoni & B. Di Biase (Eds.), *Grammatical development in second languages: Exploring the boundaries of Processability Theory* (pp. 19–79). Paris: Eurosla.
- Bettoni, C., Di Biase, B., & Medojević, L. (2015). The development of case: A study of Serbian in contact with Australian English. In C. Bettoni & B. Di Biase (Eds.), *Grammatical development in second languages: Exploring the boundaries of Processability Theory* (pp. 195–212). Paris: Eurosla.
- Buttkewitz, P. (2014). Case acquisition in Turkish: Determining stages of processability. Manuscript delivered at the 14th Annual International Symposium of Processability Approaches to Language Acquisition (PALA), (pp. 22–23). University of Paderborn.
- Franks, S., & House, R. (1982). Genitive themes in Russian. In K. Tuite, R. Schneider, & R. Chametzky (Eds.), *Papers from the 18th Regional Meeting of the Chicago Linguistic Society* (pp. 155–168). Chicago, IL: Chicago Linguistic Society.
- Gvozdev, A. N. (1961). *Voprosy izučeniya detskoj reči*. Moscow: Izdatel'stvo akademii pedagogičeskich nauk.
- Jakobson, R. (1936). Beiträge zur Allgemeinen Kasuslehre: Gesamtbedeutungen der russischen Kasus. In *Travaux du Cercle Linguistique de Prague* 6, 240–288. Reprinted in (1966) in E. P. Hamp, F. W. Housolder, & R. Austerlitz (Eds.), *Readings in linguistics II* (pp. 51–89). Chicago, IL: The University of Chicago Press.
- Kempe, V., & MacWhinney, B. (1998). The acquisition of case marking by adult learners of Russian and German. *Studies in Second Language Acquisition* 20(4), 543–587. <https://doi.org/10.1017/S0272263198004045>
- King, T. H. (1995). *Configuring topic and focus in Russian*. Stanford, CA: CSLI.
- Meisel, J. M., Clahsen, H., & Pienemann, M. (1981). On determining developmental stages in natural second language acquisition. *Studies in Second Language Acquisition* 3(2), 109–135. <https://doi.org/10.1017/S0272263100004137>

- Pallotti, G. (2007). An operational definition of the emergence criterion. *Applied Linguistics* 28(3), 361–382. <https://doi.org/10.1093/applin/amm018>
- Pienemann, M. (1984). Psychological constraints on the teachability of languages. *Studies in Second Language Acquisition* 6(2), 186–214. <https://doi.org/10.1017/S0272263100005015>
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M., Di Biase, B., & Kawaguchi, S. (2005a). Extending Processability Theory. In M. Pienemann (Ed.), *Cross-linguistic aspects of Processability Theory* (pp. 199–251). Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30.09pie>
- Pienemann, M., Di Biase, B., Kawaguchi, S., & Håkansson, G. (2005b). Processing constraints on L1 transfer. In J. F. Kroll & A. M. B. de Groot (Eds.), *Handbook of bilingualism: Psycholinguistic approaches* (pp. 128–153). New York, NY: Oxford University Press.
- Smith, M. B. (1987). *The semantics of dative and accusative in German: An investigation in cognitive grammar*. San Diego, CA: University of San Diego.
- Timberlake, A. (2004). *A reference grammar of Russian*. Cambridge: Cambridge University Press.
- Vigliocco, G., Butterworth, B., & Garrett, M. F. (1996). Subject-verb agreement in Spanish and English: Differences in the role of conceptual constraints. *Cognition* 61(3), 261–298. [https://doi.org/10.1016/S0010-0277\(96\)00713-5](https://doi.org/10.1016/S0010-0277(96)00713-5)

A. Appendix

Distribution of case marker occurrences among learners

Stage	AA	CI	MA	AE	CA	JO	EL	LK	CH	DA	MT	BE	IR	BD	AN	
Sentence	-3	-4	-4	-4	-5	-4	-4	-5	+13	+8	+3	+9	+7	+6	+6	
									-2		-1					
Phrasal	VP	-11	-14	-2	+2	+1	+2	+1	+2	+4	+3	+5	+2	+2	+5	+4
					-5	-3		-7	-2	-2	-1	-3		-1	-1	
	PP	+1	+2	+2	+3	+16	+8	+8	+13	+7	+10	+8	+10	+9	+18	+17
		-7	-10	-3	-4	-5		-2	-2	-4		-1	-2		-1	
Category		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Developing morpho-syntax in non-configurational languages

A comparison between Russian L2 and Italian L2

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Within the Processability Theory (PT) framework, the Topic Hypothesis (Pienemann et al., 2005) and its recent reformulation as the Prominence Hypothesis (Bettoni & Di Biase, 2015) have contributed substantially to explaining syntactic development in non-configurational languages, adding an important discourse-pragmatic component. However, the role of morphological development cannot be ignored, because in this type of languages it is morphology that constructs syntactic relations (Nordlinger, 1998). This chapter will look at syntactic development by attempting to incorporate both morphological and discourse-pragmatic factors in a way that is consistent with the predictions of PT's Prominence Hypothesis. Specifically, I will look at the development of morpho-syntax in Russian L2 and Italian L2 – two languages located towards the less configurational end of the typological spectrum, the former more dependent-marking, the latter more head-marking.

1. Introduction

This chapter will explore how learners of Russian L2 and Italian L2 – two languages towards the less configurational end of the typological spectrum (see King, 1995; Dyakonova, 2009 for Russian; and Van Valin, 2007; Schwarze 2009 for Italian) – acquire the skills to move beyond the fixed frame of canonical order so as to optimise their communicative needs. In non-configurational languages, as Nordlinger (1998: 51) puts it, “grammatical functions (GFs) are constructed by the morphology rather than being identified in the syntax”. This means that GFs are not positionally predictable. Thus, in order to progress syntactically in these languages, L2 learners must develop the morphological resources needed to mark GFs, otherwise the propositional content of a sentence is at risk. This is especially so in the case of marked orders. Take, for example, the Russian and Italian sentences in (1): If in the Russian

Example (1a) the OBJ *mama* were not marked by accusative case, it would be unclear which is the SUBJ of the sentence (there being two NPs without case marking); and if in (1b) the OBJ *mamma* were not resumed by the co-referential clitic *la*, the listener would no doubt take it as the SUBJ (since Italian has no case marking).

- (1) a. Mamu obnimaet rebënok
 mum.ACC.SG.F hug.3.SG child.NOM.SG.F
- b. La mamma la abbraccia il bambino
 mum.SG.F her.3.SG.F kiss.3.SG the child.SG.M
 ‘The mum, the child hugs (her)’

Russian and Italian thus offer an intriguing test site for how learners develop the skills to free up word order to reflect their discourse and pragmatic needs. Although the two languages share a low degree of configurationality, they differ in the tools they use to identify GFs. Russian is dependent-marking, expressing GFs mainly by case. In contrast, Italian is head-marking, expressing GFs mainly by verbal inflection.¹

For L2 learners, the complexity of inflectional morphology taking on the functional load of syntax in these languages (Nordlinger, 1997: 1) is complemented by another set of complexities at the syntax-discourse interface. It has been widely shown that structures that involve an interface between syntax and other cognitive domains, such as discourse-pragmatics, tend to be most problematic for learners to acquire, even for those learners close to levels of ultimate attainment in the L2 (see the Interface Hypothesis in Sorace, 2006; Sorace & Filiaci, 2006; and Sorace & Serratrice, 2009). The marked word orders in Russian and Italian are among such structures since they instantiate not only a complex interface between syntax and morphology, but also respond to specific discourse and pragmatic needs.

These complexities suggest that learners will need to go through a process of acquisition to gain control of the features involved. The developmental hypotheses presented in this study are derived from PT’s Prominence Hypothesis, which in Bettoni and Di Biase’s (2015: 63) approach replaces the Topic Hypothesis (Pienemann et al., 2005). In essence, both the Topic Hypothesis and the Prominence Hypothesis trace the same developmental trajectory from unmarked to marked word orders. Furthermore, unlike Pienemann’s (1998) original morpho-syntactic schedules, both Pienemann et al. (2005) and Bettoni and Di Biase (2015) account for the development of marked orders not by recourse to Kempen and Hoenkamp’s (1987) processing procedures and Lexical-Functional Grammar’s (LFG) notion of feature unification, but by applying to PT the different kinds of correspondences

1. As will be pointed out in Section 2, despite being a separate word bearing case information, the clitic pronoun is interpreted as part of the verb inflectional system (see Cardinaletti & Starke, 1999 about the inseparability between clitic and verb in Italian).

between LFG's f-structure and c-structure. So, the choice of either the Topic Hypothesis or the Prominence Hypothesis would not, in principle, alter the predictions for syntactic development in Russian L2 and Italian L2. However, the Prominence Hypothesis appears preferable as it is broader in scope, in so far as it covers a wider range of structures at the syntax-discourse interface. First, as its very name suggests, the Prominence Hypothesis accounts for the grammatical encoding of all discourse functions characterised by prominence, that is, not only Topic, but also Focus. This then includes, in a principled way, not only topicalisations (already dealt with by the Topic Hypothesis), but also constituent questions, contrastive focalisations, and any structure involving the location of prominent material on the left periphery of the clause. Secondly, in changing the label from 'Topic' to 'Prominence', the emphasis is placed more on the processing principles underlying the production of marked orders (Bettoni & Di Biase, 2015: 59), and less on the linguistic description of the marked orders. Such change best captures the spirit in which syntactic development is considered in this chapter, that is, as chiefly driven not by linguistic factors internal to grammatical representation – which to a large extent are language-specific – but by learners' wishes to enhance their communication, which occur regardless of the language being used.

The chapter is organised as follows. I will first provide an overview of the syntactic strategies (i.e., dislocations in the complementiser phrase (CP) domain) and morphological markers (i.e., case and clitic pronouns) whereby Russian and Italian realise marked word orders (Section 2). I will then outline the Prominence Hypothesis and apply it to syntactic development in Russian L2 and Italian L2 (Section 3), with empirical support from two sets of cross-sectional data (Section 4). Finally, I will point out some possible directions for further research on syntactic development in these languages (Section 5).

2. Marked word orders in Russian and Italian

Prominence is an important principle in communication, to such an extent that Levelt (1989, 1999) maintains that attribution of prominence already takes place in the very early (pre-verbal message) level of the Conceptualiser. However, prominence is also a concept notoriously hard to define in linguistics – so varied are its uses, and so many the levels of analysis to which it may refer (see Lowe & Mycock, 2014). Not surprisingly, Butt and King (1996) consider 'prominence' (PROM), along with 'newness' (NEW), as a primitive feature of information structure. Following Butt and King's four-way taxonomy of discourse functions (DFs) illustrated in Table 1, I will operationalise prominence as a feature that is common to Topic and Focus – the two DFs marked as [+PROM].

Table 1. Information features and discourse functions according to Butt & King (1996)

	[+PROM]	[-PROM]
[+NEW]	Focus	Completive information
[-NEW]	Topic	Background information

According to Levelt's Model of speech production, after prominence has been assigned in the Conceptualiser, it must be further processed in the Formulator (i.e., at the level of grammatical encoding), where speakers select the appropriate linguistic form to express it. In fact, prominence is not necessarily encoded grammatically. For example, in Russian and Italian, focal SUBJ can be either encoded postverbally, as in (2), or marked prosodically (signalled by the use of all capital letters) in its default preverbal position, as in (3), which receives a contrastive interpretation.

(2) (Who screamed?)

- a. Kričal Ivan
screamed.SG.M.V John.3.SG.M.SUBJ
- b. Ha urlato Gianni
has.3.SG.AUX screamed.SG.M.V John.3.SG.M.SUBJ
'John screamed'

(3) (She said that Mark screamed)

- a. Net, IVAN kričal
No, John.SG.M.SUBJ screamed.SG.M
- b. No, GIANNI ha urlato
No, John.3.SG.M.SUBJ has.3.SG.AUX screamed.3.SG.M.V
'No, JOHN screamed'

By contrast, marked word orders themselves may not necessarily encode prominence. With unaccusative verbs in Italian, for example, marked orders are the pragmatically neutral option, as in (4), whereas canonical word order would yield a Topic (and hence prominent) reading of SUBJ, as in (5).

(4) (What happened?)

- È arrivato Gianni
has.3.SG.AUX arrived.SG.M.V John.3.SG.M.SUBJ
'John has arrived'

(5) (And what about John?)

- Gianni è arrivato
John.3.SG.M.SUBJ has.3.SG.AUX arrived.SG.M.V
'John has arrived'

Nevertheless, when there is some change in the information structure of the sentence – and crucially, when OBJ receives Topic reading, and/or SUBJ receives Focus reading – marked word orders are by far the prevailing outcome in non-configurational languages such as Russian and Italian. In order to exclude purely prosodic marking, I will consider prominence attribution achieved only through syntax in constructions with lexical verbs canonically mapping the agent/experiencer role onto the Subject. I will, thus, exclude copular, exceptional and unaccusative verbs. These verbs are dealt with by the Lexical Mapping Hypothesis (see Pienemann et al., 2005; Bettoni & Di Biase, 2015). Furthermore, I will consider prominence only in declarative sentences, and thus leave out both polar and constituent questions.²

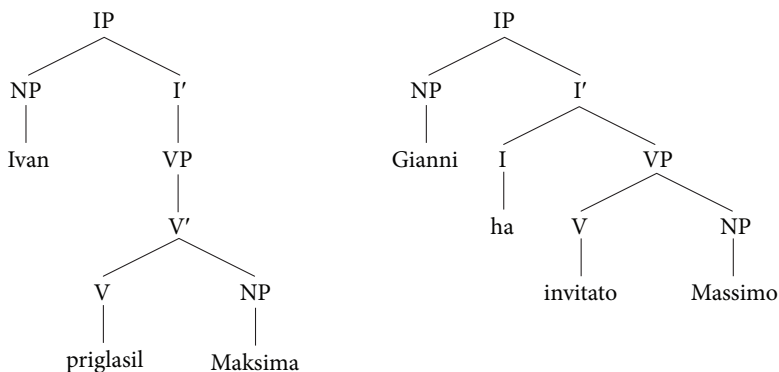
Within these constraints, from the point of view of syntax and information structure, Russian and Italian share many characteristics. In both languages, the canonical word order is SVO.³ And in principle, both languages allow for any permutation of the core elements in the clause (see Kallestinova, 2007; Dyakonova, 2009 for Russian; and Renzi et al., 2001; Salvi & Vanelli, 2004 for Italian), provided that the resulting word order corresponds to the speaker's discourse and pragmatic needs. Thus, word order is flexible in both Russian and Italian, but in both languages it is regulated by specific information structure constraints. This is why Nordlinger (1998) observes that, along the configurationality continuum, Russian and Italian share properties of both lexocentric languages such as Warlpiri (having a fully flexible syntax), and endocentric languages such as English (having a hierarchical constituent structure), despite being both located towards the non-configurational end of the typological spectrum.

In pragmatically unmarked contexts, GFs are determined positionally, and in both Russian and Italian TOP is encoded in the specifier position of the inflectional phrase (IP), that is, the default SUBJ position. This is formalised in (7)–(8) for the Russian and Italian sentences in (6). Note that in the f-structures in (8) TOP is not annotated because, following Bresnan (2001), in pragmatically unmarked contexts SUBJ is both a GF and a DF (the default discourse TOP) – see also Dalrymple (2001) and Dalrymple & Nikolaeva (2011).

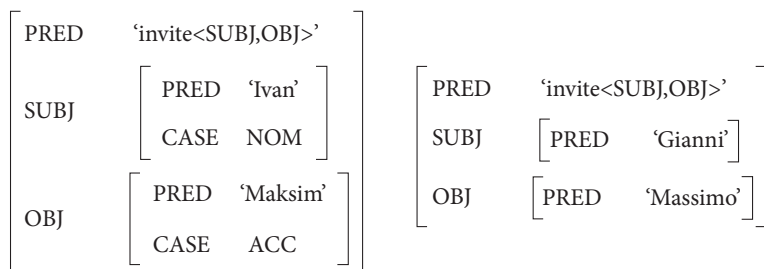
2. One could argue that the exclusion of constituent questions, which are characterised by focal prominence, makes the use of the Prominence Hypothesis instead of the Topic Hypothesis redundant. However, focality is not a prerogative of constituent questions (Mycock, 2007), and the Prominence Hypothesis can capture the relevant generalisations about the fronting of non-SUBJ constituents regardless of whether these are TOP or FOC.

3. King (1995) assumes VSO as the pragmatically unmarked order of Russian, and claims that SVO is pragmatically marked – with the SUBJ receiving only topic reading. Dyakonova (2009) argues that both SVO and VSO can encode sentence focus, and points out that the latter is restricted to narrative and epical contexts.

- (6) a. Ivan priglasil Maksima
 Ivan.NOM.SG.M invited.SG.M Maxim.ACC.SG.M
- b. Gianni ha invitato Massimo
 Massimo.SG.M has.3.SG invited.SG.M Maxim.SG.M
 ‘John invited Maxim’
- (7) C-structures for the Russian sentence *Ivan priglasil Maksima* and the Italian sentence *Gianni ha invitato Massimo* (‘John invited Maxim’)



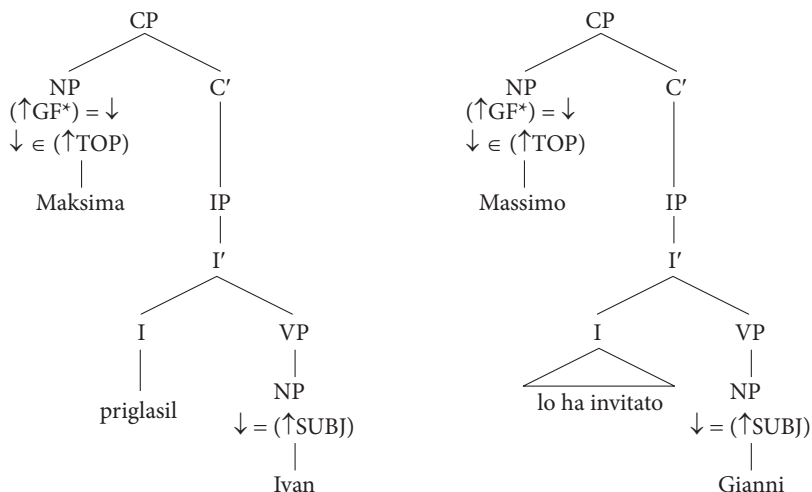
- (8) F-structures for the Russian sentence *Ivan priglasil Maksima* and the Italian sentence *Gianni ha invitato Massimo* (‘John invited Maxim’)



In pragmatically marked contexts, that is, when $\text{SUBJ} \neq \text{TOP}$, GFs are no longer positionally determined, and TOP is encoded in a higher domain of the syntactic hierarchy, namely the CP (for a detailed analysis of the CP domain, see Rizzi's (1997) 'cartographic approach'). Let us then consider the sentences in (9). In derivational frameworks, these structures are formalised by recourse to movement – that is, the prominent constituent is argued to move from its canonical position within the VP to its displaced position within the CP. However, in LFG, displaced constituents in the CP domain create functional uncertainty (Bresnan, 2001). This is formalised in the c-structures in (10) for the Russian sentences in (9). Note that the annotation on the CP node only denotes that this syntactic position is associated with the DF TOP and provides no information about GFs.

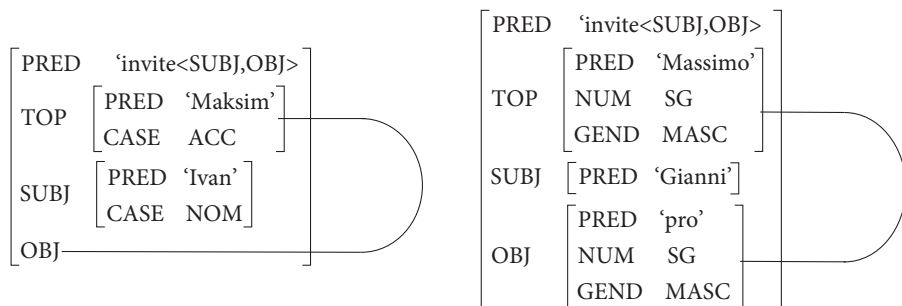
- (9) a. Maksima priglasil Ivan
 Maxim.ACC.SG.M invited.SG.M John.NOM.SG.M
 b. Massimo lo ha invitato Gianni
 Massimo.SG.M him.SG.M has.3.SG invited.SG.M John.SG.M
 ‘Maxim, John invited (him)’

- (10) C-structures for the Russian sentence *Maksima priglasil Ivan* and the Italian sentence *Massimo lo ha invitato Gianni* (‘Maxim, John invited him’)



Functional uncertainty is then resolved at f-structure, where “Topic and Focus must be linked to the semantic predicate argument structure of the sentence in which they occur, either by functionally or by anaphorically binding an argument” (Dalrymple, 2001: 390). So, the f-structures of the two sentences in (9) must ensure that the left-dislocated TOPs bind the grammatical function OBJ, as formalised in (11).

- (11) F-structures for the Russian sentence *Maksima priglasil Ivan* and the Italian sentence *Massimo lo ha invitato Gianni* (‘Maksim, John invited him’)



The ways in which the two languages resolve the functional uncertainty of TOP reflect their different location along the continuum between head-marking and dependent-marking that was mentioned at the beginning of this chapter. Russian, a dependent-marking language, binds the TOP_{OBJ} *Maksim* functionally to OBJ by means of case (marked by the accusative ending *-a* in our example). Italian, a head-marking language, binds the TOP_{OBJ} *Massimo* anaphorically to OBJ by means of a resumptive clitic marker on the verb, sharing the same number and gender values as those of TOP (singular and masculine in our example).

In sum, the difference between marked word orders in our two languages is that functional uncertainty is resolved by different morphological means. In Russian it is resolved by case when the left-dislocated NP is OBJ or OBL regardless of its DF (TOP or FOC). In Italian it is resolved by resumptive clitic pronouns when the left-dislocated NP bears the GF OBJ and the DF TOP is in the upper field within CP.

3. The developmental hypotheses

As mentioned, in order to test learner progression from the fixed frame of canonical word order to the flexibility of marked orders, we follow the Prominence Hypothesis (Bettoni & Di Biase, 2015: 63). This hypothesis replaces the former Topic Hypothesis, and predicts that learners' syntactic development unfolds from canonical word order, where constituents are identified by their position in the sentence, towards marked word orders, where GFs are assigned independent of position. In order to achieve these skills, learners must acquire the crucial morphological resources to mark GFs. Such development happens gradually, in an implicational four-stage sequence: (1) *lemma access*, when learners only produce formulas or juxtapose single words; (2) *canonical word order*, when learners mark GF positionally, that is, by default correspondences between c-structure and f-structure; (3) *XP canonical word order*, when learners front an element other than SUBJ (e.g. an ADJ) but leave the fixed canonical frame intact; (4) *non-canonical word order*, when learners can mark GFs functionally, independently of their position in the sentence.

In this section I will look at how the Prominence Hypothesis applies to the development of Russian and Italian syntax. But before doing so, a few clarifications are in order as to why the Prominence Hypothesis has been chosen for this purpose. In Section 1 I have anticipated that, compared to the Topic Hypothesis, the Prominence Hypothesis is broader in scope, in so far as it includes not only displaced TOP, but also displaced FOC, as is the case with constituent questions and contrastive focalisations. However, the latter constructions are not considered in this chapter, so – in theory at least – there is no principled reason for preferring the Prominence Hypothesis over the Topic Hypothesis. In using the Prominence

Hypothesis, the point I wish to stress here is that the motivations behind learners' deployment of constituents onto freer syntactic frames are not tightly linked to the notion of topicality (which identifies one element as *given* in the discourse), but they are more generally related to learners' wishes to give higher prominence to an element in the sentence – regardless of whether such prominence is topical or focal. In this regard, it may be worth noting that, within LFG, some scholars use the term UDF (unbounded dependency function) to label both TOP and FOC in order to capture the same mechanisms of syntactic displacement triggered by prominence (see Asudeh, 2004: 49). Indeed, our interest is precisely on the morpho-syntactic consequences of prominence in a developmental perspective, that is, how learners gradually learn to disrupt the default associations between GFs and DFs.

Let us then look at how the path spelled out in the Prominence Hypothesis from lemma access through canonical order to marked orders applies to Russian L2 and Italian L2. This is illustrated in Table 2. The leftmost column shows the universal stages of PT's Prominence Hypothesis, the second column provides the structures that are prototypical for each stage in both languages, and the last two columns exemplify such structures for each language.

Table 2. Developmental stages hypothesised for L2 Russian and Italian syntax based on PT's Prominence Hypothesis

Stage	Structure	Russian examples	Italian examples
NON-CANONICAL WORD ORDER	TOP _{OBJ} V SUBJ	<i>knigu čitala mama</i> [(the) book, mum read it]	<i>le patatine le ha mangiate Marco</i> [the fries, Marco has eaten them]
XP _{DF} CANONICAL WORD ORDER	TOP _{ADJ} SVO	<i>v lesu ona guljaet</i> [in (the) woods she walks]	<i>al supermercato Marco compra uova</i> [at the supermarket Mark buys eggs]
CANONICAL WORD ORDER	SVO	<i>mama est kašu</i> [mum eats porridge]	<i>Marco mangia panini</i> [Mark eats sandwiches]
LEMMA ACCESS	single words formulas	<i>eto pal'to</i> [this (is) a coat] <i>menja zovut Mark</i> [my name is Mark]	<i>no lavoro</i> [no work] <i>mi chiamo Marco</i> [my name is Mark]

At the Lemma Access stage, before grammaticalisation begins, learners will either map single concepts onto single words with no f-structure annotations, or express their communicative needs by producing unanalysed formulaic chunks, as shown in Table 2.

As soon as verbs acquire their pivotal role in the sentence (that is, once the category procedure is operative for morphology), learners will begin to organise their utterances according to the canonical word order of the target language. As

we have seen in Section 2, this is SVO for both Russian and Italian, which may also include the full range of possibilities that preserve the canonical sequence: (1) SV, in the case of intransitive verbs in both languages, as in Example (12); (2) SV(O) ADJ or OBL, as long as the TOP=SUBJ association remains intact, as in Example (13); and (3) V(O), in the case of pro-drop in Italian, as in Example (14), even though at this stage learners may not be able to work out the full range of discourse-pragmatic entailments of pro-drop (Belletti et al., 2007).

- (12) a. Babuška spat'
grandma.SUBJ sleep.V
'Grandma sleeps'
- b. Ragazzo lavora
boy.SUBJ work.V
'The boy works'
- (13) a. Devuška idti v les
girl.SUBJ go.V in forest
'The girl goes into the forest'
- b. Bambini gioca in giardino
children.SUBJ play.V in garden.ADJ
'The children play in the garden'
- (14) Mangia a casa
eat.V at home.ADJ
'(She) eats at home'

Note that here position alone is sufficient evidence that learners have reached the Canonical Word Order stage: The assignment of GFs is 'minimally specified' (Bettoni & Di Biase, 2015: 61), in the sense that GFs are determined positionally (i.e., SUBJ is preverbal and OBJ postverbal) rather than morphologically (e.g., SUBJ agrees with V in both Russian and Italian, and SUBJ is marked by NOM and OBJ by ACC in Russian).

In order to move beyond the Canonical Word Order stage, learners must begin to assign GFs by means other than position alone. According to PT's Prominence Hypothesis, the first step towards functional assignment independent of position occurs when learners are able to front an XP bearing the DF TOP or FOC to canonical word order, and thus uncouple the default association of TOP with SUBJ. One less costly choice for learners is that this fronted XP be ADJ, because its functional uncertainty may be resolved lexically without recourse to morphology – that is, either by choosing lexemes that are inherently specified as adverbials, as with *včera* ('yesterday') in the Russian sentence in (15a), or by using a PP, as with *a casa* ('at home') in the Italian sentence in (15b).

- (15) a. Včera babuška gotovila bliny
 yesterday.ADJ grandma.SUBJ prepared.V pancakes.OBJ
 ‘Yesterday grandma made pancakes’
 b. A casa la mamma lavora
 at home.ADJ the mum.SUBJ works.V
 ‘At home mum works’

Finally, when functional assignment is fully in place, learners can disrupt the core elements of canonical word order. So, as exemplified in (16), not only will they be able to satisfy their discourse-pragmatic needs by placing, if they so wish, the topical NPs *butylka* (‘bottle’) and *le fragole* (‘the strawberries’) preverbally, and the focal NPs *oficant* (‘waiter’) and *l’infermiera* (‘the nurse’) postverbally, but they can now also mark them as OBJ and SUBJ without producing semantically implausible utterances or causing misunderstandings for the listener.

- (16) a. Butylku prinës
 bottle-ACC.SG.FEM.TOP_{OBJ} brought-SG.MASC.V
 oficant
 waiter-NOM.SG.MASC.SUBJ
 ‘The bottle, the waiter brought (it)’
 b. Le fragole le porta
 the strawberries.PL.FEM.TOP_{OBJ} them.PL.FEMCL bring-3.SG.V
 l’infermiera
 the nurse-SG.FEM.SUB
 ‘The strawberries, the nurse brings (them)’

Notice that, unlike at the previous stages, evidence of having reached this last stage is provided only when learners have acquired the morphological means to mark GFs. If the accusative *-u* marker on TOP_{OBJ} in (16a) and the clitic marker *le* on V in (16b) were omitted, in both languages TOP would remain underspecified (i.e. not bound to a GF), in which case it would be impossible to label the resulting string as OVS, and listeners would interpret them as SVO.

4. Empirical evidence

In order to test my developmental hypotheses outlined in Section 3, I report on the results of two cross-sectional studies: One with ten learners of Russian L2 using data collected by Artoni and Magnani (2013), and the other with ten learners of Italian L2 using data collected by Ferrari and Nuzzo (2009). In both studies, learners are from different language backgrounds and have different proficiency levels in

the L2 as measured by the Common European Framework of Reference (CEFR) scale (see Table 3), from A1 as the lowest to C2 as the highest (neither of which is represented here).

Table 3. The learners

Russian L2			Italian L2		
Learner	L1	L2 Proficiency level	Learner	L1	L2 Proficiency level
BAR	Italian	A2	GHI	Tigrinya	A2
RAN	Italian	A2	MID	Arabic	A2
LEN	Romanian	B1	MRC	Czech	B1
JOV	Serbian	B1	CHA	Mongolian	B1
LIK	Georgian	B1	LEI	German	B1
ELI	Italian	B2	NAT	Japanese	B2
DAN	Romanian	B2	RIC	English	B2
SIL	Italian	B2	MOH	Arabic	B2
CLA	Italian	C1	SHI	Mongolian	C1
GAB	Italian	C1	HEL	Portuguese	C1

Similar communicative tasks were used in both studies to elicit learners' online oral production, such as story retelling, picture description, and spot the difference. Furthermore, in both studies, marked orders with fronted OBJ were elicited by the same task, that is, the Party Task originally devised by Di Biase (2007) to elicit OBJ topicalisation in Italian L2. In this task, learners are shown two pictures – one denoting a person, and the other a present which the person will contribute to a forthcoming party – and they are asked to report who brings what to the party by starting with the leftmost picture. When this picture denotes the present itself, learners are expected to produce a sentence with the OVS order, even though another option would be a passive, which is a more formal choice in Italian.

Altogether, 357 sentences have been extracted for the analysis of Russian L2, and 586 for Italian L2. These include main declarative clauses with lexical Vs, thus excluding copular and presentative sentences (in so far as they are 'verbless' predicates) (see Kroeger, 2005), questions and subordinate clauses. In order to determine progress to a stage, in both studies I used the emergence criterion as operationalised for syntax by Pienemann et al. (2005), whereby one occurrence of a structure is sufficient evidence, provided it is produced online in a non-formulaic way.

In all tables of results in this section, the Lemma Access stage is omitted because all learners have moved beyond it. For each target language, the ten learners are listed horizontally, from left to right, in a continuum that aims to reconstruct the interlanguage path: The learners to the left are at the lower PT stages, and those

to the right have progressed to higher stages in the hierarchy. The structures that learners produce are listed vertically, from the bottom up, and grouped according to the PT stage to which they belong. The number of the occurrences of each structure for each learner is entered in the appropriate row and under the learner who produces it.

Beginning with learners of Russian L2, Table 4 shows the distribution of the structures in the 357 sentences among the ten learners.

Table 4. Distribution of the syntactic structures among the Prominence Hypothesis stages in learners of Russian L2

Stage	Structure	BAR	RAN	LEN	JOV	LIK	ELI	DAN	SIL	CLA	GAB
NONCANONICAL WORD ORDER	O V S								7	7	7
XP CANONICAL WORD ORDER	ADJ S V (O/OBL)		3	3	1	2	5	4	3	7	7
CANONICAL WORD ORDER	TOP _{<theme>} V focus _{<agent>}	7	7	7	7	7	7	7			
	S V O OBL	5	3	2	3	2	2	2	4	3	3
	S V (O/OBL)	19	17	22	26	27	24	23	14	27	24

As mentioned, all ten learners can organise their syntax according to canonical order, and have thus reached the Canonical Word Order stage, which encompasses not only the full SVO structure, but also a variety of other structures, such as SV or SV OBL. There are, however, three important differences as to how the ten learners handle these constructions. The first difference concerns the case marking on the three argument GFs (SUBJ, OBJ, OBL) in their canonical position. As shown in Table 5, whereas all learners can mark SUBJ as *NOM* correctly, as in (17) – not surprisingly, as this is the default case – not all of them can mark postverbal OBJ and OBL as *ACC* and *DAT* respectively. For example, BAR and RAN oversupply *NOM* to mark any GF, as shown in (18); all other learners can mark postverbal OBJ as *ACC*, as in (19), but only the four more advanced ones (DAN, SIL, CLA, GAB) can also mark OBL as *DAT*, as in (20).

Table 5. Case marking in SUBJ, OBJ and OBL in their canonical position

	BAR	RAN	LEN	JOV	LIK	ELI	DAN	SIL	CLA	GAB
postverbal OBL marked by <i>DAT</i>	-5	-3	-2	3	+1-1	2	2	2-2	2-1	3
postverbal OBJ marked by <i>ACC</i>	-10	-11	+2-5	+12	+7-6	+5-3	+11-1	+4-4	+8-3	+7
preverbal SUBJ marked by <i>NOM</i>	+19	+17	+22	+26	+27	+24	+23	+14	+27	+24

- (17) RAN Oxotniki ubit' zloj volk
 hunters.SUBJ kill.V evil wolf.OBJ
 'The hunters kill the evil wolf'
- (18) RAN Krasnaja Šapočka dat' kniga mama
 Red Riding Hood.NOM give book.NOM mum.NOM
 'Red Riding Hood gives a book to her mum'
- (19) LIK Oficiant kupil ložku
 waiter.NOM bought spoon.ACC
 'The waiter bought the spoon'
- (20) GAB Mama daēt produkty Krasnoj Šapočke
 mum.NOM gives products.NOM/ACC Red Riding Hood.DAT
 'Mum gives some food to Red Riding Hood'

Furthermore, inaccuracy is not uncommon even among the learners at higher stages, with ELI once oversupplying a PP to mark an OBJ, as in (21), and CLA misusing an INST form to mark a beneficiary OBL, as in (22) – two interesting examples of general non-NOM and non-ACC marking. The most accurate learner in marking OBJ by using ACC is JOV – most likely due to her L1 (Serbian), which shares the same *-u* ending with Russian for marking feminine nouns as ACC.

- (21) ELI Volk sejčas est u babuške
 wolf.NOM now eats by grandmother.PREP
 'The wolf now eats grandma'
- (22) CLA Muž podarit rozu ženj
 husband.NOM gives rose.ACC wife.INST
 'The husband gives a rose to his wife (as a present)'

The second difference involves the referential *vs* pronominal expression of GFs. When SUBJ and OBJ have topical antecedents in the discourse, BAR and RAN consistently repeat the referential DP. The other learners replace topical antecedents by pronouns, but they do it more often in the context of SUBJ, and less so with OBJs, as shown in Table 6 for the SVO strings, and exemplified in (23) and (24).

Table 6. Distribution of referential and pronominal SUBJs and OBJs in SVO strings

	BAR	RAN	LEN	JOV	LIK	ELI	DAN	SIL	CLA	GAB
S _{pr} V O _{pr}			1			1	1	1		1
S _{ref} V O _{pr}				1						1
S _{pr} V O _{ref}			2	6	2	1	2		2	1
S _{ref} V O _{ref}	10	10	9	7	11	6	7	5	9	6

(23) JOV Ona slušaet mamu
 she.SUBJ listens.V mum.OBJ
 ‘She listens to mum’

(24) GAB Volk smotrit eë
 wolf.SUBJ looks.V her.OBJ
 ‘The wolf looks at her’

The third important difference to be observed at the Canonical Word Order stage relates to incorrect OBJ topicalisations (TOP V focus⁴), that is, structures in which learners attempt to topicalise OBJ and locate SUBJ post-verbally, but they fail to make use of morphological markers of functional assignment (i.e., marking GFs by case and V inflexion) – which explains why structures such as this are located at the early Canonical Word Order stage.⁵ In contrast, the learners at the highest stages (SIL, CLA, GAB) do not produce these ungrammatical structures. Among those who do produce them, the most frequent outcome by far is the overextension of default NOM on both NPs, as shown in (25). However, the data also yield two less frequent (and most interesting) outcomes. One is produced by JOV, who occasionally marks post-verbal SUBJ as ACC, as in (26), thus resetting the NOM-ACC pattern of canonical word order. Interestingly, she does so despite having the same structure in her L1 as well as the same *-u* ending as Russian for OBJ topicalisations. The other outcome is produced by ELI, who – as shown in (27) – consistently marks post-verbal SUBJ by INST, namely the case by which Russian marks agents in passive constructions.

(25) LEN Butylka kupil medsestra
 bottle.TOP_? bought.V nurse.*focus*_?
 ‘The bottle bought the nurse’

(26) JOV Vilka kupil balerinu
 fork.NOM.SG.F bought.SG.M dancer.ACC.SG.F
 ‘The fork bought the dancer’

4. The second NP is labelled as ‘focus’, which shows the information structure role associated with its postverbal position, and not as FOC, which would indicate syntactic displacement in the left periphery of the clause (cf. Dalrymple & Nikolaeva, 2011: 62).

5. In their analysis of syntactic development in Italian L2, Bettoni and Di Biase (2011) and Di Biase and Bettoni (2015) propose labelling these attempted OBJ topicalisations as SUBJ_{THEME} V OBJ_{AGENT} in order to point out learners’ exclusive positional assignment of GFs. Although I am sympathetic with their view, I do not use their label in my analysis for two reasons. First, it is incompatible with LFG’s assumption that the GFs SUBJ and OBJ are not thematically restricted. Secondly, it fails to show that in incorrect OBJ topicalisations there is only some DF assignment, and crucially no GF attribution. It is in fact the listener who may interpret the preverbal NP as SUBJ and the postverbal NP as OBJ, and not the learner, who leaves TOP unbound to any GF.

- (27) ELI Butylka kupili medsestrami
 bottle.NOM.SG.F bought.PL nurses.INST.PL.F
 ‘The bottle bought (by) the nurse’

All learners other than BAR are able to front TOP prior to canonical order sequences, and have thus reached the next XP_{DF} Canonical Word Order stage. In all these structures TOP is bound to the non-argument function ADJ. As exemplified in (28), ADJ is most often a lexical time or place adverbial, such as *sejčas* (‘now’). Only DAN uses a prepositional locative, as shown in (29).

- (28) ELI Sejčas ona priexala v dome
 now.ADJ she.SUBJ arrived.V at home.OBL_{LOC}
 ‘Now she arrives home’
- (29) DAN V lesu ona idët k svoej babuške
 in forest.ADJ she.SUBJ goes.V to her own grandma.OBL_{LOC}
 ‘In the forest she walks to her grandma’s place’

Finally, three learners (SIL, CLA, GAB) have also moved to the Non-Canonical Word Order stage. Unequivocal evidence of this is provided by their correct production of OBJ topicalisations, in which they mark TOP as ACC and use agreement to align the V and the postverbal SUBJ, as shown in (30).

- (30) SIL Butylku kupili medëstry
 bottle.SG.ACC.TOP_{OBJ} bought.PL.V nurses.PL.NOM.SUBJ
 ‘The bottle, the nurses bought it’

In sum, despite the variety of typologically different L1 backgrounds, the developmental hierarchy proposed in Table 2 seems confirmed for all ten learners, and no stage is skipped along the cross-sectional continuum. If it is generally true that the presence of a case system in the learner’s L1 can increase accuracy within a stage (e.g., JOV, who marks most Objects correctly as ACC at the Canonical Word Order stage), we can safely say that this does not affect the developmental sequence. Nor does it seem to boost progress towards full functional assignment: none of the four learners whose L1 presents a case system (LEN, JOV, LIK, and DAN) can mark displaced topical Objects correctly.

Switching now to Italian L2, let us see if the same developmental trajectory of the Prominence Hypothesis also holds in a more head-marking language. The results are presented in Table 7.

Table 7 shows that all learners have reached the Canonical Word Order stage. However, as was the case for Russian L2, here too there is significant variation among the ten learners in the way structures are distributed within this early

Table 7. Distribution of the syntactic structures among the Prominence Hypothesis stages in learners of Italian L2

Stage	Structure	GHI	MID	MRC	CHA	LEI	NAT	RIC	MOH	SHI	HEL	
NON-CANONICAL WORD ORDER	O V S						5	7	12	14	8	7
XP _{DF} CANONICAL WORD ORDER	ADJ V (O/OBL)		5	3	5	2	1	1	7	1		
	ADJ S V (O/OBL)		4	7	12	15	6	4	1	7	2	
CANONICAL WORD ORDER	* TOP _{<theme>} V focus _{<agent>}	14	8	16	14	12	9	3	1	7	1	
	V O OBL						1	1	2	4	6	5
	V (O/OBL)	1	4	1	2	1		4	9	12	14	
	S V O OBL	10	12	13	4	3	8	9	5	6	5	
	S V (O/OBL)	13	21	44	27	20	26	24	13	18	18	

syntactic stage. Such variation is manifested in three main areas: (1) the use of null rather than overt pronominal SUBJs, (2) OBJ and OBL cliticisation, and (3) ungrammatical left dislocations. With regard to null SUBJs, Table 7 shows that all learners use them at least once, but beginner learners make extensive (and pragmatically unmotivated) use of pronominal SUBJs, as in (31), whereas more advanced learners use null subjs more accurately, as in (32).

(31) MRC Lui ha aperto la porta
he has opened the door
'He has opened the door'

(32) MOH Hanno suonato il campanello
have rung-3.PL the bell
'(They) have rung the bell'

Table 7 does not include information about OBJ or OBL clitics. However, as shown in Table 8, in none of the contexts in which it would be expected do beginner learners supply the target option, that is, the clitic pronoun. With regard to OBJ clitics, when learners fail to produce them, they most often tend to repeat the referential DP, as in (33) (see Leonini & Belletti, 2004). Sometimes they resort to strong pronouns, which is the stressed alternative required for focal contexts (see Cardinaletti & Starke, 1999), even though such uses by the learners are pragmatically unmotivated, as in (34). The learners hardly ever omit the DP altogether, so the example of this in (35) is unusual. On the other hand, when learners fail to produce OBL clitics, they hardly ever use the lexical DP, and most often resort to strong pronouns.

Table 8. Learners' productions in contexts for OBJ and OBL clitic pronouns

OBJ clitic pronouns										
	GHI	MID	MRC	CHA	LEI	NAT	RIC	MOH	SHI	HEL
Clitic pronoun						2	4	7	3	10
Strong pronoun		1	1	2	2				2	
Lexical DP	3	1	6	2	2	1	1		1	1
Omission	1		1	3		1	1			
OBL clitic pronouns										
	GHI	MID	MRC	CHA	LEI	NAT	RIC	MOH	SHI	HEL
Clitic pronoun							2	5	3	2
Strong pronoun	1	1	1		1	1				
Lexical DP						1				
Omission			1	3					1	1

- (33) MRC Un carabiniere arriva, ma Charlie Chaplin non
 a policeman arrives but Charlie Chaplin not
 ha visto quel carabiniere
 has seen that policeman
 'A policeman arrives, but Charlie Chaplin has not seen that policeman'
- (34) LEI Il suo ragazza ha visto lui
 his girlfriend has seen HIM
 'His girlfriend saw HIM'
- (35) GHI Lei un po' aiutare
 she a little help
 'She helps (him) a little'

The third area is incorrect left dislocations, that is, constructions in which TOP_{OBJ} is not marked by the co-referential clitic, causing the listener to interpret the TOP_{OBJ} as SUBJ, as shown in (36). As Table 7 reveals, all learners produce at least some dislocation without the clitic, including the learners at the highest stages, who thus alternate between grammatical and ungrammatical structures. An interesting example is provided by LEI, who marks post-verbal SUBJ using an appropriate variation on the preposition *da*, as shown in (37). Given that in Italian this preposition marks agents in passive constructions, LEI's constructions may well be re-analysable as 'semi-passives', in a similar way to the Russian ones shown in (27), which exhibit post-verbal Subjects with an INST marker attached.

- (36) NAT Gli occhiali ha portato le ballerine
 the glasses.TOP_? has.AUX brought.V the dancers.focus_?
 'The glasses have brought the dancers'

- (37) LEI La torta porta dai poliziotti
 the cake. TOP_? brings.V by the policemen.*focus*_?
 ‘The cake brings [by] the policemen’

Table 7 shows that all learners but GHI have progressed to the next XP_{DF} Canonical Word Order stage, producing at least some structures with a fronted ADJ followed by canonical order. These canonical strings include both overt and null SUBJ. A word of caution is in order in relation to placing strings without an overt SUBJ following ADJ at this intermediate stage. If we assume that evidence is provided by the canonicity of the string following ADJ, null-SUBJ structures can be placed at the XP_{DF} Canonical Word Order stage, in so far as VO is a canonical string in a null-SUBJ language (see Bettoni & Di Biase, 2011; Di Biase & Bettoni, 2015). If, on the other hand, we wish to ensure that TOP has been uncoupled from SUBJ, only structures in which both TOP_{ADJ} and SUBJ are present provide convincing evidence of the uncoupling, and any null SUBJ sentence should be moved to the Canonical Word Order stage in Table 7 (see Di Biase et al., 2015), in so far as there is no overt SUBJ to compete with TOP. I have followed the first of these logics and placed all TOP_{ADJ} V(O) structures at the XP_{DF} Canonical Word Order stage due to the canonicity of VO in Italian. However, I acknowledge that these structures would not, by themselves, provide sufficient evidence for progress to this stage. This decision creates no problem for my analysis, because, as I note in Table 7, all the learners who use TOP_{ADJ} with null SUBJ use it also with overt SUBJ.

Six learners have progressed further to the Non-Canonical Word Order stage, and are able to resume topical OBJs by the obligatory co-referential clitic marker, as shown in (38). Interestingly, as already mentioned, MOH and SHI, who are among the more proficient learners (see Table 3), still produce several incorrect structures at this stage, involving not only omission of the clitic, but also agreement mismatches between the number/gender values of TOP and those of the clitic marker and/or the past participle, as in (39).

- (38) HEL Le calzine le ha portate
 the socks.PL.F.TOP_{OBJ} them.PL.F.CL has.3.SG.AUX brought.PL.F.V
 l’infermiera
 the nurse.SG.F.SUBJ
 ‘The socks, the nurse brought them’

- (39) SHI I panini l’ ha portato
 the sandwiches-PL.MASC him-SG.MASC/FEM has brought-SG.MASC
 il professore
 the professor-SG.MASC
 ‘The sandwiches, the professor brought (them)’

In sum, whereas most learners of Italian L2 show evidence of having reached the first two stages in the developmental stages associated with the Prominence Hypothesis, the same is not true in terms of accuracy and range of structures within these two stages. Nearly half of the learners overextend pronominal SUBJs, replace OBJ and OBL clitic pronouns by lexical NPs or strong pronouns, and omit clitics altogether in left dislocations. No learner, however, provides evidence that would contradict the implicational hierarchy hypothesised in Table 2.

5. Conclusion

The aim of this chapter was to investigate how learners of Russian L2 and Italian L2 progress from the unmarked, pragmatically neutral word order to marked, discourse-pragmatically motivated orders. I analysed learner progression along the path spelled out in the Prominence Hypothesis, which in Bettoni and Di Biase's (2015) new PT approach replaces the Topic Hypothesis and enhances the role of 'prominence' as a processing principle feeding syntactic development.

Marked word orders such as called for by the need to indicate 'prominence' are used to satisfy important communicative needs, because they open up the possibility for speakers to mark a constituent other than SUBJ as the discourse TOP. In order to produce these word orders without affecting the propositional content of their message, speakers may have to signal formally to their listener that the first prominent constituent is not SUBJ. Different languages resort to different means to express GFs – or rather, to a combination of different means, because languages may freely mix modes of organisation (Bresnan 2001).

Controlling these marked word orders in Russian L2 and Italian L2 is no mean feat for L2 learners, because in these languages the ability to assign GFs independently of position requires the acquisition of three sets of morphological resources: (1) SUBJ-V agreement in both languages, in order to identify SUBJ; (2) case in Russian, in order to identify all three argument GFs; and (3) clitic pronouns in Italian, in order to identify topical OBJ. Specifically, the latter two resources allow learners to resolve the functional uncertainty of TOP, preventing the listener from interpreting it as SUBJ.

The results of my two sets of cross-sectional data show that in both languages learners follow the path spelled out in the Prominence Hypothesis. First, they produce only canonical utterances in which TOP=SUBJ, and GFs are assigned positionally. Second, they begin to distinguish between TOP and SUBJ by adding some lexical material in the first prominent position, but still leaving the fixed frame intact. Third and finally, they acquire the resources to disrupt the canonical order frame and front OBJ as well as displace SUBJ post-verbally. Furthermore, for

learners of both languages, the data show interesting patterns of intra-stage variation in all stages of the developmental hierarchy. In the first two stages, learners of both Russian L2 and Italian L2 use no or few pronouns, whereas those towards the final stage use them abundantly. Within the XP Canonical Word Order stage, in Russian L2, it would seem that learners can first mark TOP/SUBJ by NOM and postverbal OBJ by ACC, but fail to mark OBL by DAT; and only later begin to supply a DAT form for marking OBL – or at least distinguish between an ACC and a non-ACC form. In a similar fashion, learners of Italian L2 initially produce few or no clitic pronouns; and when they start using them, they first produce accusative clitics and then also dative clitics.

The data also provide evidence that having case in the L1 does not affect the sequence in which case is learned in the L2. Indeed, none of the learners whose L1 has a case system (i.e. LEN, JOV, LIK and DAN) marked GFs by case in their respective L2 when the requirement for this marking occurred in non-canonical positions.

In conclusion, this study contributes to research within the PT framework in several directions. First, it explores Bettoni and Di Biase's (2015) new approach to the development of syntax, which has its foundation in learners' wish to enhance their communicative flexibility, rather than in the availability of the formal means required by the target language to signal grammatical relations. Secondly, this study begins to test the Prominence Hypothesis in Russian L2, whose exploration within PT was previously limited to morphological development, and confirms its validity in Italian L2. Thirdly, this work addresses issues in PT that have, to date only been explored in Di Biase (2004), such as the development of clitic pronouns in Italian L2, an area of particular interest at the interface of morphology and syntax with discourse-pragmatics.

Needless to say, the findings suggest the need for further investigation in several important directions. First, a wider range of structures should be included in the analysis. Among them, understanding the acquisition of Subject-Verb agreement is central to gaining a fuller understanding of the development of head-marking morphology. Secondly, although this study has identified important correspondences between syntactic and morphological development, a more systematic analysis is needed at the interface between the Prominence Hypothesis and Pienemann's (1998) hierarchy of processing procedures. Thirdly, with regard to syntax, including constituent questions is vital for testing further the Prominence Hypothesis (see Bettoni & Ginelli, 2015 for a PT account of their development in Italian L2). Finally, a more robust set of data, possibly longitudinal, or at least with a greater number of learners and structures would be needed to substantiate the hypothesised developmental sequence.

References

- Artoni, D., & Magnani, M. (2013). LFG contribution in second language acquisition research: The development of case in Russian L2. In M. Butt & T. H. King (Eds.), *Proceedings of the LFG13 Conference* (pp. 69–89). Stanford, CA: CSLI.
- Asudeh, A. (2004). *Resumption as resource management* (Unpublished doctoral dissertation). Stanford University, CA.
- Belletti, A., Bennati, E., & Sorace, A. (2007). Theoretical and developmental issues in the syntax of subjects: Evidence from near-native Italian. *Natural Language and Linguistic Theory* 25, 657–689. <https://doi.org/10.1007/s11049-007-9026-9>
- Bettoni, C., & Di Biase, B. (2011). Beyond canonical order. The acquisition of marked word orders in Italian as a second language. In L. Roberts, G. Pallotti, & C. Bettoni (Eds.), *Eurosla Yearbook* 11 (pp. 244–272). Amsterdam: John Benjamins.
- Bettoni, C., & Di Biase, B. (2015) Processability Theory: Theoretical bases and universal schedules. In C. Bettoni & B. Di Biase (Eds.), *Grammatical development in second languages. Exploring the boundaries of Processability Theory* (pp. 19–79). Paris: Eurosla.
- Bettoni, C., & Ginelli, G. (2015). Acquiring constituent questions in Italian as a second language. In C. Bettoni & B. Di Biase (Eds.), *Grammatical development in second languages. Exploring the boundaries of Processability Theory* (pp. 243–258). Paris: Eurosla.
- Bresnan, J. (2001). *Lexical-functional syntax*. Oxford: Blackwell.
- Butt, M., & King, T. H. (1996). Structural topic and focus without movement. In M. Butt & T. H. King (Eds.), *Online Proceedings of the first LFG Conference 1996*.
- Cardinaletti, A., & Starke, M. (1999). The typology of structural deficiency: A case study of three classes of pronouns. In H. Van Riemsdijk (Ed.), *Clitics in the languages of Europe* (pp. 145–233). Berlin: Mouton de Gruyter.
- Comrie, B. (2011). Russian. In B. Comrie (Ed.), *The major languages of the world* (pp. 274–288). London: Routledge.
- Dalrymple, M. (2001). *Syntax and semantics: Lexical functional grammar*. San Diego, CA: Academic Press. <https://doi.org/10.1163/9781849500104>
- Dalrymple, M., & Nikolaeva, I. (2011). *Objects and information structure*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511993473>
- Di Biase, B. (2004). Processability Theory and the course of acquisition of clitic pronouns in Italian. Paper presented at the 4th International Symposium on Processability, Second Language Acquisition and Bilingualism, 13th–16th April 2004, University of Sassari
- Di Biase, B. (2007). *A processability approach to the acquisition of Italian as a second language: Theory and applications* (Unpublished doctoral dissertation). Australian National University, Canberra.
- Di Biase, B., & Bettoni, C. (2015). The development of Italian as a second language. In C. Bettoni & B. Di Biase (Eds.), *Grammatical development in second languages. Exploring the boundaries of Processability Theory* (pp. 117–147). Paris: Eurosla.
- Di Biase, B., Bettoni, C., & Medojević, L. (2015). The development of case: A study of Serbian in contact with Australian English. In C. Bettoni, & B. Di Biase (Eds.), *Grammatical development in second languages: Exploring the boundaries of Processability Theory* (pp. 195–212). Paris: Eurosla.
- Dyakonova, M. (2009). *A phase-based approach to Russian free word order* (Unpublished doctoral dissertation). Universiteit Amsterdam.

- Ferrari, S., & Nuzzo, E. (2009). Task per l'elicitazione di strutture opzionali in italiano L2. *Rassegna Italiana di Linguistica Applicata* 1(2), 235–250.
- Kallestinova, E. D. (2007). *Aspects of word order in Russian* (Unpublished doctoral dissertation). University of Iowa, IA.
- Kempen, G., & Hoenkamp, E. (1987). An incremental procedural grammar for sentence formulation. *Cognitive Science* 1(1), 201–258. https://doi.org/10.1207/s15516709cog1102_5
- King, T. H. (1995). *Configuring topic and focus in Russian*. Stanford, CA: CSLI.
- Kroeger, P. R. (2005). *Analysing grammar: An introduction*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511801679>
- Leonini, C., & Belletti, A. (2004). Adult L2 acquisition of Italian clitic pronouns and subject inversion structures. In J. van Kampen & S. Baauw (Eds.), *Proceedings of Gala 2003* (pp. 293–304). Utrecht: LOT.
- Levelt, W. J. M. (1989). *Speaking: From intention to articulation*. Cambridge, MA: The MIT Press.
- Levelt, W. J. M., Roelofs, A., & Meyer, A. S. (1999). A theory of lexical access in speech production. *Behavioral and Brain Sciences* 22(1), 1–75. <https://doi.org/10.1017/S0140525X99001776>
- Lowe, J., & Mycock, L. (2014). Issues in the representation of information structure. *Paper presented at the LFG '14 Conference, July 17th-20th*, Ann Arbor, MI.
- Nordlinger, R. (1997). *Constructive case: Dependent-marking non-configurationality in Australia* (Unpublished doctoral dissertation). Stanford University.
- Nordlinger, R. (1998). *Constructive Case: Evidence from Australian languages*. Stanford, CA: CSLI.
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M., Di Biase, B., & Kawaguchi, S. (2005). Extending Processability Theory. In M. Pienemann (Ed.), *Cross-linguistic aspects of processability theory* (pp. 199–251). Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30.09pie>
- Renzi, L., Salvi, G. P., & Cardinaletti, A. (2001). *Grande grammatica Italiana di consultazione*. Bologna: Il Mulino.
- Rizzi, L. (1997). The fine structure of the left periphery. In L. Haegeman (Ed.), *Elements of grammar* (pp. 281–337). Dordrecht: Kluwer. https://doi.org/10.1007/978-94-011-5420-8_7
- Salvi, G., & Vanelli, L. (2004). *Nuova grammatica Italiana*. Bologna: Il Mulino.
- Schwarze, C. (2009). *Grammatica della lingua Italiana*. Roma: Carocci.
- Sorace, A. (2006). Possible manifestations of shallow processing in advanced second language speakers. *Applied Psycholinguistics* 27(1), 88–91.
- Sorace, A., & Filiaci, F. (2006). Anaphora resolution in near-native speakers of Italian. *Second Language Research* 22(3), 339–368. <https://doi.org/10.1191/0267658306slr2710a>
- Sorace, A., & Serratrice, L. (2009). Internal and external interfaces in bilingual language development: Beyond structural overlap. *International Journal of Bilingualism* 13(2), 195–210. <https://doi.org/10.1177/1367006909339810>
- Van Valin, Jr., R. D. (2007). Some thoughts on the reason for the lesser status of typology in the USA as opposed to Europe. *Linguistic Typology* 11(1), 253–257.

SECTION 3

Language use and developmental trajectories

Traditionally, PT has primarily focused on articulating and explaining L2 developmental schedules in relation to features of morphology and syntax. However, there is increasing engagement with wider views of the object of acquisition. One consequence of this widening is the need for

- a model of the communicative repertoire,
- clarification of the relationship between morphology, syntax and an individual's communicative repertoire and
- engagement with the issue of how to understand relationships between variation and development that are opened up by this wider view.

Within the established work on PT, morphological and syntactic features have been largely explored as part of a process of relating single features to one another. Therefore, a further question relates to how to understand the acquisition of sets of features that co-occur, for example the diverse features of relative clauses. Admitting discussion of these various aspects of function and communication raises the questions of how to frame the relationship between development and variation as well as whether acquisition and development are synonymous. Addressing such issues would also open up possibilities for exploring

- the attrition process as a potential mirror of this re-framed view of either the overall developmental process or relationships between specific points of acquisition of specific features,
- potential connections between discourse functions and morpho-syntax,
- relationships between knowledge and use of an additional language and
- the degree of uniformity that is in progress in acquiring an interlanguage.

In the first of five chapters in this section, Howard Nicholas and Donna Starks widen the focus of developmental trajectory research and provide a principled means of making connections across the traditional PT division between variational and developmental features. They propose a way to integrate the Multiplicity framework (Nicholas & Starks 2014) with perspectives that integrate development and variation in a richer understanding of Hypothesis Space.

Arnstein Hjelde, Bjørn Harald Kvifte, Ragnar Arntzen and Linda Evenstad Emilsen argue that relationships between features that have been identified within a PT framework for second language acquisition can provide a consistent framework for describing data for other fragile uses of language and for testing hypotheses about the underlying mechanisms, including whether incomplete acquisition or attrition has shaped these uses.

Yanyin Zhang argues for ways in which relationships between second language knowledge and use can be explored. She claims that once the relevant processing prerequisites have been met, particular discourse conditions, including perceptions of an interlocutor's knowledge, promote the frequency of use of various options and give rise to more or less 'Chinese-ness' in the learner's second language use.

Emilia Nottbeck provides a theoretical analysis of an area of enduring controversy in SLA, the acquisition of relative clauses, suggesting that it is possible (at least for relative clauses) to conceive of sequences of acquisition within developmental stages rather than only between developmental stages.

Satomi Kawaguchi and Yumiko Yamaguchi also look at relative clauses but on the basis of empirical, longitudinal data. While identifying features broadly consistent with a range of theoretical approaches, they argue that there is an early form of relative clause construction (possibly a proto form) that appears to be linked to the acquisition of finiteness in PT modelling.

Together, these different contributions suggest that widening perspectives on development can enrich PT theorising and offer considered, theorised and empirically-informed ways of addressing some fundamental issues in how learners gain control of an additional language.

Reference

- Nicholas, H., & Starks, D. (2014). *Language education and applied linguistics: Bridging the two fields*. London: Routledge.

Using the Multiplicity framework to reposition and reframe the Hypothesis Space

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In this chapter we explore how the Multiplicity framework of the communicative repertoire offers ways to expand understandings of Hypothesis Space and widens insights into the process of second language acquisition currently offered by PT. We focus on the potential of the Multiplicity framework for capturing and explaining variation in learners' communicative acts that occur in response to varied pressures in moments of communication. We suggest that these insights offer a different means of connecting the Hypothesis Space with learners' acquisition trajectories. seek to embrace both the concept of shared developmental stages that has been the centrepiece of PT to date and relate features of development to variation within moments of interaction.

1. Introduction: Processability Theory, Multiplicity and variation¹

Current work in Processability Theory (PT) dominantly engages with the acquisition of morpho-syntactic features. The approach taken means that these features are explored in relation to a two-pronged search that is driven by a desire to develop a consistent theoretical motivation for (1) the sequencing of emerging features in learner grammar and (2) how any variation in the use of those features relates to that developmental sequence. This approach is motivated by the goal of achieving precise, testable predictions with a focus on linguistic features. The framework used to define these features is Lexical-Functional Grammar.

The Multiplicity framework is a complementary approach to second language acquisition theory building. The framework offers a way of thinking about the larger whole that second language acquisition theory must ultimately come to address. This larger whole is the learner's communicative repertoire. The features of

1. We thank Manfred Pienemann, Anke Lenzen, Jana Roos and anonymous reviewers for detailed feedback and constructive critique. The problems that remain are ours.

the communicative repertoire are seen as multiple and diverse, both contributing to and constraining attempts at communication. In any moment of interaction individuals bring together these various parts of their repertoire as they respond to and seek to act on the world that they are experiencing. In these moments, learners have to respond to the complex, competing demands of what they need to do and the resources that they can call on to achieve their purpose(s). Variation is viewed as something that occurs in specific moments as learners seek to reconcile the competing pressures on their communication in situated interaction with others. Our approach requires a much larger frame that considers not only the complexity of learners' purposes but also the complex and interacting relationships within and between different communicative resources.

Multiplicity and PT do not necessarily seek to explain the same phenomena except at the most abstract of levels, namely 'SLA as an object of enquiry'. We see these purposes as complementary since description, theorisation and explanation require a continual dialogue between the large (e.g., the range of issues associated with Multiplicity) and the small (e.g., the tight focus of PT). The dialogue between these approaches helps identify how theories intersect and clarify where commonalities of framing are possible and where different framings are required.

Applying the Multiplicity framework to the complex ways in which speakers engage with morpho-syntactic variation enables us to show how the complexity of learning can be framed in relation to one of the central concerns of PT, understanding the constraints on learners' communicative resources at particular moments of interaction. While PT defines these constraints through a psycholinguistic lens on morpho-syntax, Multiplicity engages with the competition between diverse resources, learner experiences and purposes. To examine the complexity of variation in moments of interaction, we extend the PT construct of Hypothesis Space to highlight ways in which PT can evolve to create more in-depth understandings of morpho-syntactic variation and the potential implications this may have for understanding the resources that learners deploy in particular moments of interaction.

Our entry into this discussion is a focus on variation. We focus on variation because it helps us to understand how learners struggle with the multiple and competing pressures on their communicative resources. Processes involved in this struggle have been extensively documented in the work on interactionist perspectives (see Gass, 2010). However, simultaneously pressure of time or anxiety (see Dörnyei, MacIntyre, & Henry, 2015) or misinterpretation of the interlocutor's purpose (see Nicholas, Lightbown, & Spada, 2001) can also prevent the learner from making use of resources that are intended to support learning. To make our starting point more manageable, in this chapter our focus is on the resources available to or constraints

influencing particular individuals. This means that we do not explore the full complexity of what occurs when interlocutors work with or against one another during communication, but instead present the connections between available resources that shape utterances.

To understand the variation that may need to be acquired by learners, we explore data reported in studies on synchronous variation in English existential ‘*there*’ constructions. Even though many of the individual features that appear in English existentials have been researched in the PT framework, the structure as a whole has not been the subject of any study in PT.² We explore this structure because the range of features that it encompasses enables us to introduce a systematic perspective on the features that need to be considered if PT is to embrace wider aspects of communicative variation.

Using the Multiplicity framework means that our analysis relates variation in existential constructions to a systematically defined set of other variables. This focus helps us to identify points that frame the wealth of variation that learners may need to control, including attention to features as diverse as learner purpose or the utterance’s semantic subject. Multiplicity allows us to go beyond the grammatical notion of a structure to the more inclusive notion of a communicative act. As the examples below will show, the features that come into play are linguistic (e.g., the semantic qualities of the subject) and also non-linguistic (e.g., the gender of the speaker or accompanying movements of a hand). As outlined in Nicholas & Starks (2014), this perspective enables us to understand communicative acts as combinations of diverse communicative resources that speakers use to achieve momentary purposes in a specific interaction.

Communicative acts parallel utterances in their potential complexity, but also require consideration of diverse other resources that learners draw on while communicating, to allow the speaker to interpret the setting and read the (re)actions of their interlocutor. Because communicative acts are complex combinations of morpho-syntactic as well as other features (e.g., gesture or facial expressions), their production requires learners to combine many different features. Conceptually, this means that we need to elaborate a widened sense of Pienemann’s (1998) Hypothesis Space. For these purposes we need an understanding of the location of Hypothesis Space within PT and the theorising that led to its development.

2. Liu (2015) discusses the L2 acquisition of existentials in Chinese, but because of the structure of Chinese, his analysis was largely restricted to the emergence of various existential verbs and their semantic alignment with features of the subject.

2. Sociolinguistic issues and PT: A historical account

As outlined in the first chapter in this volume, the first step toward the development of PT can be found in the Multidimensional Model of second language acquisition that arose from the ZISA (Zweitspracherwerb italienischer und spanischer Arbeiter) project. This model was based on cross-sectional studies of Italian and Spanish migrant workers acquiring German (Meisel, Clahsen, & Pienemann, 1981; Clahsen, Meisel, & Pienemann, 1983). It broke new ground in offering a way of understanding how aspects of variation between learners in their use of an additional language (the variational dimension) could be systematically connected to the aspects of the L2 acquisition developmental process that were common to all learners (the developmental dimension). Key to the development of the Multidimensional Model was the articulation and consistent use of the emergence criterion for acquisition (see Meisel, Clahsen, & Pienemann, 1981; Nicholas, 1984). The purpose of the emergence criterion was to identify when a learner first gained the capacity to use a feature. This offered a consistent alternative to the more opaque issue of what constitutes full control of a feature. But it also offered a way of establishing when learners have similar capacities to produce features of a language, so that researchers could model how learners differed from one another in their exploitation of those capacities.

The Multidimensional Model also provided insight into how morpho-syntactic variation between learners was systematic while at the same time not a reliable indicator of the developmental position of the learner. This perspective meant that development over time and variation between learners at any one time are the result of different influences but are also locatable within a single (hence, Multidimensional) model. So, for example, once learners of German as a second language have moved beyond single words and formulaic utterances, the structures that they produce do not conflict with an SVX word order sequence, even though they vary systematically in the extent to which features such as the noun phrase in first position or the verb phrase in the following position are actually produced by the learner (for example, '*mag Käse*' [like cheese] or '*ich Käse*' [I cheese] rather than '*ich mag Käse*' [I like cheese]).

There have been some attempts to extend the model beyond morpho-syntax. Nicholas (1985) related the expression/omission of first, second and third person singular pronouns to interpersonal and discourse features of the interaction. The analysis showed that the frequency of omission of third person singular pronouns was usually higher than for first and second person singular pronouns. Thus, it was more likely for learners to not produce the subject pronoun in a string of connected utterances, often in third person narratives: '*he went to the shops/ bought a book/*

drank a cup of coffee/ went home' whereas subject pronouns would more frequently occur in learner speech where the subject referent of the utterance was not consistent such as *'I coffee/ you tea/ I no sleep/ you sleep deep'*. This general pattern in influences on the presence of subject pronouns reflected a general discourse principle of not supplying redundant material (i.e., not labelling actors who have been previously named in the discourse). However, for certain learners, even in contexts of highly variable agents, subject pronouns (usually first and second person) were also omitted – presumably because they were all deemed recoverable from the physical context (a different discourse principle that does not require explicit reference to actors who are physically present). In a second study, Meisel (1987) described another instance of variation attributable to discourse influences. He analysed the gradual way in which morpho-syntactic features took over from discourse-based features in the L2 development of past reference as learners moved from expecting the interlocutor to understand past reference from the context (e.g., *'in Spain'*) to the use of past tense markers to make that meaning explicit (e.g., *'when I was in Spain'*). However, because of the state of the theoretical frameworks at that time, the Multidimensional Model did not systematically address which features beyond morpho-syntax might be involved in learner choices and how different aspects of a learner's (potential) communicative repertoire would intersect in the language acquisition process.

In introducing PT, Pienemann (1998: 49ff.) radically changed the underlying theoretical framing for engaging with the multidimensionality of second language acquisition and argued that there was a need to provide a single explanatory framework for the relationship between learners' grammatical representations and the learner's use of those representations.

As discussed in the first chapter, the Multidimensional Model assumed that development was framed by psycholinguistic operations increasing in complexity based on a combination of the movement of items and the 'depth' of embedding of the operations in clause structure (see Clahsen, Meisel, & Pienemann, 1983: 157ff and more explicitly Clahsen, 1984). In the Multidimensional Model, development and variation were subject to different constraints. In contrast, Pienemann based claims within PT on how information links within and across constituents of increasing size (word, phrase, sentence). Levelt's (1989) theory of language processing was used to frame the L2 developmental sequence. Pienemann (1998) integrated Lexical Functional Grammar (LFG) as PT's theoretical linguistic frame because it took account of both typological and psychological issues. As a result, LFG enabled PT to make predictions about how variation would relate to specific developmental moments. Hence in PT, development framed variation.

As an alternative to the Multidimensional Model's way of understanding the relationship between L2 development and L2 variation, Pienemann (1998: 9) proposed the construct of Hypothesis Space "within which formal grammatical hypotheses can be entertained" in relation to both development and variation. Pienemann (1998: 231) characterised Hypothesis Space as the "range of structural hypotheses" constrained by the processing procedures available to the learner at any given stage of language acquisition. The introduction of Hypothesis Space was a systematic attempt to define "both [the developmental and the variational] dimensions of SLA in an *a priori* manner" (Pienemann, 1998: 233). The central claims associated with Hypothesis Space are that the hypotheses available to the learner are constrained by the processing capacity developed at each stage and that the structural options available to the learner expand predictably as the learner progresses through developmental stages. This relationship is depicted in Figure 1.

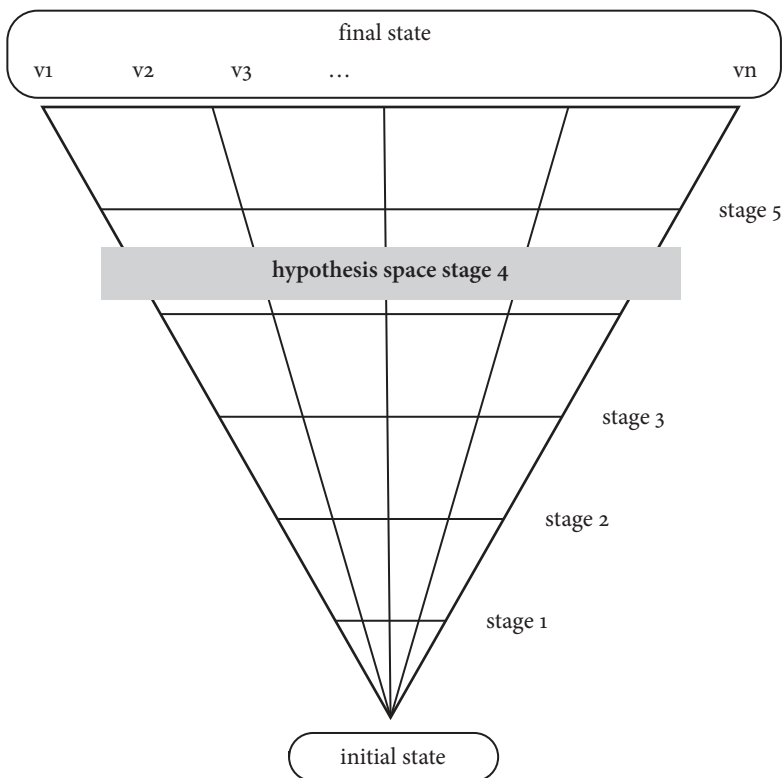


Figure 1. Hypothesis Space (Pienemann, 1998: 232)

The analysis remained tightly focused on morpho-syntax. As Pienemann (1998: 331) points out, the purpose behind Hypothesis Space was “a theory of processability of grammatical structures.” This focus introduced a testable research agenda relating the potential for variation to the stage of the learner’s interlanguage development.

In a subsequent expansion of PT, Pienemann, Di Biase, & Kawaguchi (2005) extended the scope of PT to embrace discourse features *that had a syntactic counterpart* by including functions such as ‘focus’ and ‘topicalisation’. This extension of PT has created space for aspects of momentary communicative behaviour to be incorporated in the theory, but only to the extent that the behaviour affected the operation of the learner’s underlying grammar (Pienemann, Di Biase, & Kawaguchi, 2005: 208ff.). This innovation connected with research in other traditions that related momentary discourse purposes such as introducing characters in a narrative to syntactic operations such as verb fronting in L2 German utterances (Klein & Perdue, 1992). However, work within PT has not been centrally concerned with relationships between morpho-syntactic features of the developing interlanguage and broader social/life influences. Nevertheless, studies by Bettoni & Di Biase (2015) as well as Zhang (this volume) constitute a small thread of exploration of aspects of the relationship between specific aspects of the communicative moment and learner language. This approach is consistent with the focus of Multiplicity on communicative acts elaborated here.

The approach taken in PT challenged the traditional overall focus on social factors (external or other aspects of the learners’ experiences of life) as explanations for interlanguage variation (e.g., motivation (Gardner & Lambert, 1972), anxiety (Bailey, 1983) or social access/inclusion (Schumann, 1978)). Such approaches assumed that there would be an overall connection between broad socio-psychological experiences and the extent/nature of L2 development (usually measured in terms of learner accuracy in morpho-syntax or pronunciation). Pienemann and Johnston (1987: 48) referred to the substantial divergences in findings within this body of research under the heading ‘the contradiction principle’ and therefore sought to exclude such issues from consideration within their approach (see also Chapter 1).

In the position that we will present below, social influences are understood differently from both the current PT approach to the inclusion of these influences and the overall view of social influences on interlanguage. We understand these influences as occurring in the moment of interaction. Our focus is on the relationship between the context of the communication and the choices that learners make in selecting and deploying diverse (and competing) features at the moment of communicating. These relationships between social features and momentary interlanguage production suggest ways that the PT tradition can embrace a wider view of the communicative repertoire. Incorporating a view of the communicative

repertoire into PT research means that we need a wider framework for what learners need to engage with. To this end we explore how the construct of Hypothesis Space could be extended for this purpose by using the insights from Multiplicity (Nicholas & Starks, 2014).

The extended view of Hypothesis Space takes Pienemann's (1998) idea portrayed in Figure 1 and integrates it within the four dimensions of Multiplicity's framing of the communicative repertoire. From this perspective, we see the 'space' in Hypothesis Space as progressively expanded by the increase in the resources and their possible combinations that are captured within the Multiplicity framework. In the next section we introduce the Multiplicity framework. We use the variation in English existential constructions in connection with features of Multiplicity to open up ways of expanding the Hypothesis Space.

3. The Multiplicity framework of the communicative repertoire

In the context of widening PT, our first step is considering what needs to be included in a wider framework of what learners have to acquire.

3.1 Introducing Multiplicity

Multiplicity is framed through four dimensions of communicative resources: Modes, Mediations, Varieties and Purposes (see Figure 2). From the names of the dimensions alone, it can be seen that Multiplicity incorporates a wider range of features than currently considered in PT.

The four dimensions of Multiplicity systematise the shaping of learners' communicative acts by delineating the resources that the user employs in communication. This complexity is the extended Hypothesis Space that the learner engages with. Framing the communicative repertoire through four intersecting dimensions means that multiple features are interacting at the same time. Each dimension contains multiple elements.

3.1.1 *Modes*

The elements within the Modes dimension contain all of the physical communicative features that an individual has acquired over their lifespan. The sound element includes features associated with sounds that have a linguistic value, such as phonemes, words or larger units as well as other types of sounds that convey other meanings such as humming or hiccoughs. While the linguistic features have a place within PT research, the other sounds do not. The image element includes features

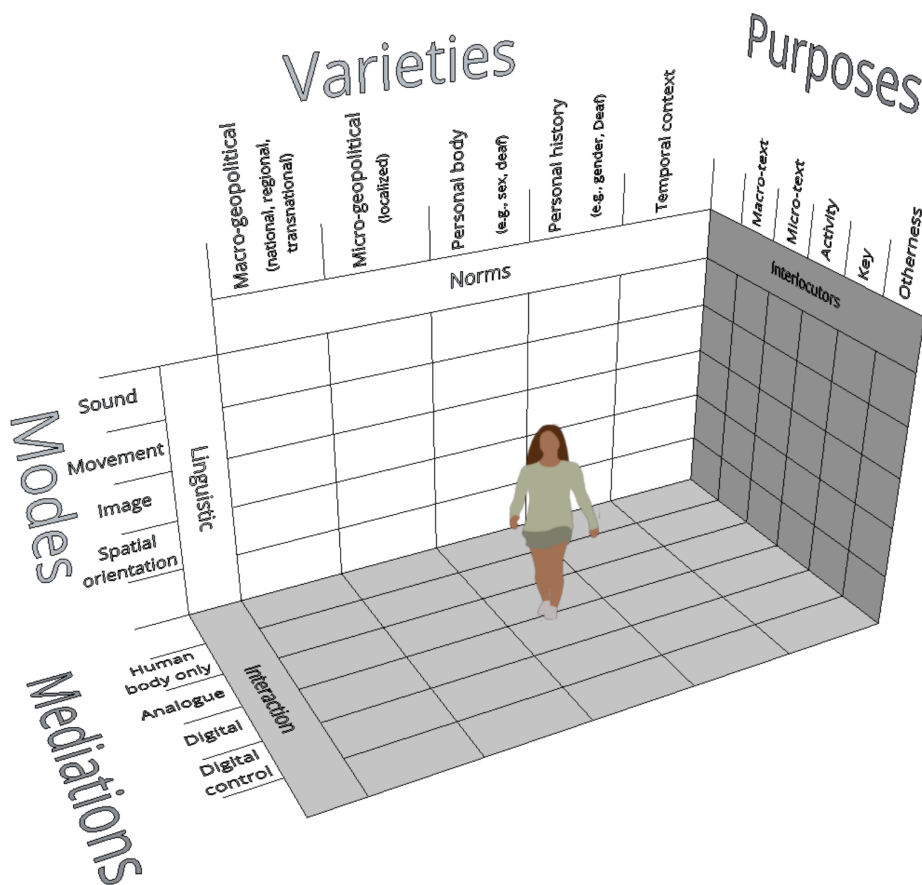


Figure 2. The Multiplicity Framework (Nicholas & Starks, 2014: 69)

such as appear in L2 writing. These features have been explored in PT research (e.g., Håkansson & Norrby, 2007; Schönström, 2014) but the element also includes other symbols with a communicative function (an emoticon; a non-smoking symbol) that have not yet been explored in PT studies.

Other elements of Modes that individuals can use in communication are movement and spatial orientation, particularly important for sign languages but also in sound-based systems, where features associated with movement (gestures) and spatial orientation (gaze, bodily positioning) are used to support or undermine sounds and images in the production of communicative acts. For example, an individual might move their hand in the direction of the object when uttering *'The book is over there'* but not have any pointing movement associated with the existential construction *'There is a book on the table'*. An additional element in this dimension

might be ‘touch’, possibly broadened to ‘contact’ to include visual contact. In other words, in relation to the Modes dimension the features of any communicative act may be more or less linguistic in their form and any communicative act may draw on combinations of features from different elements within that dimension. From a Multiplicity perspective, effective L2 communication will involve not only understanding what words to use, but also when and how to gesture in relation to the meanings that people are seeking to communicate. One issue that emerges from this recognition is how the acquisition of what is said relates to the acquisition of associated body movements or facial expressions. How do learners gain control of this kind of mode-related variation?

3.1.2 *Mediations*

The Mediations dimension contains the elements that are used to produce the features from the Modes dimension. For example, spoken text is usually produced only by the human body (even though it can be recorded on various kinds of devices and replayed later). However, sometimes other technologies are used to create synthetic speech. In contrast, written text typically involves the human body together with some other technology: either analogue (e.g., a pencil) or digital (e.g., a computer).

So far in PT research, the dominant element of the Mediations dimension that has been investigated is the human body. Studies have mainly focussed on spoken language although there has been some more or less incidental inclusion of analogue technologies (e.g., pens) in combination with the human body for written data (see Håkansson and Norrby’s 2007 study that compared parallel spoken and written tasks in L2 Swedish). Understanding the breadth of mediating tools that can be used in communication, e.g., digital technologies combined with image e.g., in computer-mediated writing opens up options that could be explored. The interesting question would be how to relate existing PT work to this wider view of Hypothesis Space. For instance, what aspects of learning to write in a new language with a computer would be susceptible to developmental regularities and what would not be?

The elements within the Varieties and Purposes dimensions provide users with resources that combine with Modes and Mediations to create varied and unique communicative acts, and to structure them for particular purposes in particular contexts. Both the Varieties and Purposes dimensions draw on the social resources used in communication, and (as with Modes and Mediations) are divided into various elements, each with their own feature sets. The effect of these influences is to shape the production and interpretation of communicative acts. Any learner must not only gain control of the morpho-syntactic components of their utterance but also of the other features that influence how the communicative act is realised.

The learner therefore has to both notice and learn to deploy features (in ways) that reflect these complex relationships between purpose, setting and the form of the communicative act.

3.1.3 *Varieties*

The Varieties dimension has elements that contribute to frames of reference (norms) for language use, an important construct for language acquisition. The four elements within Varieties are concerned with the way that language relates to how communication changes in response to places and people.

The macro-geopolitical element is concerned with languages and varieties in larger geographical places such as countries, states and towns. The cross-linguistic work of PT explicitly engages with this issue, at least at the level of national languages. There has been little PT work on issues of regional varieties. The micro-geopolitical element focuses on those features of communication that reflect the more local aspects of institutions (e.g., a school or a shop) and settings (e.g., the classroom or the playground) that learners have to also gain control over. The focus on national varieties that has generally characterised PT leaves open the question of how learners engage with the learning issues of register and situational variation. What place in learners' acquisitional trajectories does situational variation occupy? When is such variation recognised and how is it represented in the learner's interlanguage system?

Elements associated with person include features associated with issues such as sex or race and those associated with personal history. The latter includes ways in which communication is constructed in various kinds of social interaction. Examples include those features associated with issues of gender, life cycle and migration history. Personal history can pick up features such as the age of migration (recognisable in part through features such as accent). Many aspects of personal history have been extensively explored in SLA research as part of an overall influence on learner attainment. When associated with this perspective, these features were excluded from consideration in PT research in light of Pienemann & Johnston's (1987) contradiction principle. By re-positioning such features of individuals or groups in relation to momentary influences on communicative acts, Multiplicity re-frames both the resources that learners bring to the Hypothesis Space and the range of features and relationships that learners must notice, select and seek to control. This would open up further research that could, for example, build on Schönström's (2014) PT-based research comparing the Swedish L2 writing development of deaf and hearing students.

3.1.4 *Purposes*

As the fourth dimension of Multiplicity, Purposes captures how communicative features are associated with different relationships with interlocutors. The elements within this dimension focus on how communication is manifested in texts that are shaped by their larger purposes to form macro-texts (e.g., an argument compared to a conversation), how macro-texts are themselves shaped, for example in how they begin and end (micro-texts). In Multiplicity some aspects of the work on FOCUS and TOPIC as discourse structures (Pienemann, Di Biase, & Kawaguchi, 2005) could be related to the micro-text element because of the way that such a perspective incorporates local information structure, even though from a current PT perspective this relationship is understood in terms of morpho-syntactic realisation.

Multiplicity also sees Purposes in the ways that texts are negotiated in activities. As an activity, an interview or a lesson can contain, for example, story-telling, probing, challenging or joking. Depending on the key of the activity, challenges can be constructed as opportunities to think or threats to personal face. Similarly, jokes can contain features that create personal bonding or hurt. And the complexities of life mean that people communicating frequently occupy different roles, sometimes simultaneously (e.g., a member of more than one culture, a teacher and a friend, a friend and a superior or a speaker of more than one language). The ways that communicative acts change in relation to these different roles is through the element labelled otherness.

These wider issues of communication have no real history within PT. Some aspects of morpho-syntax contribute to the recognition of diverse text structures, but many of the other elements in this dimension would require PT to engage with a much wider feature set. A key issue is whether these other features are subject to developmental sequencing and, if so, what principles would underpin such a sequence.

3.2 Multiplicity and acquisition

As indicated above, the central idea advanced in this chapter in relation to the expansion of the Hypothesis Space is that the process of acquisition means that the learner's communicative repertoire gradually expands under the influence of both pressures and constraints. The pressures relate to the learner's attempts to convey a nuanced message as precisely as possible and in the process to position themselves as positively as possible in relation to their interlocutor(s). The constraints reflect two influences. The first of these is that not all resources are available to the learner when they 'need' them. In relation to this first constraint, as repeatedly demonstrated in PT studies, learners cannot process all aspects of the additional language system from the beginning of the acquisition process. Over time, learners'

experiences with various aspects of communication assist them to overcome constraints that limit access to a wider range of features and may help them to increase their control over the use of those features. The second constraint is that even when some aspects of a feature are potentially available to the learner, they may not function in the way that the learner needs/intends. For example, a learner may have noticed and selected informal ‘*du*’ (one option for ‘*you*’ in German) as a way to refer to an interlocutor. However, in a highly formal situation such as an immigration interview with unfamiliar officials the use of informal features such as ‘*du*’ is more likely to be interpreted as either lack of respect or lack of competence. In other words, the learner’s communicative act may be constrained by lack of full control of all features that they use.

Multiplicity provides a framework for systematically exploring how wider aspects of life and interaction shape communicative acts. The pressures and the constraints operating in relation to the features of Multiplicity overlap with but are also somewhat different from what is conventionally considered in PT. To be able to effectively deploy communicative acts, the learner must gain control over connections between diverse communicative features, including the deployment of features such as gesture, voice quality, humour and the relationship to the interlocutor. Not all of these features are linguistic. Not all of them are able to be shaped by the learner (e.g., any individual can do little about features of her personal body such as her skin colour and therefore faces major challenges in influencing the associations that others might make in race-based shapings of interactions with her). However, all features shape the process of communication in one way or another. These considerations mean that many of the features contributing to and constraining communicative acts will not be subject to the same kind of developmental schedule as has been identified for morpho-syntactic features. This does not make those psycholinguistic constraints irrelevant. Rather it means that the developmental sequences that have been established for morpho-syntax in PT are constraints on specific aspects of the learner’s options at particular points in the overall process of gaining control of communicative acts. We illustrate how some of these connections in the use of one type of morpho-syntactic structure, English existential constructions.

4. Existential constructions

Like many other aspects of language with a single name (e.g., passives), existential constructions such as ‘*There is hope*’ actually combine many different morpho-syntactic features. Consequently, they are not acquired as a result of a single psycholinguistic operation. Other structures made up of multiple features

discussed in this volume include case (Artoni; Magnani) and relative clauses (Nottbeck; Kawaguchi, & Yamaguchi) and the passive (Lenzing).

To consider the complexity of the acquisition trajectory for English existentials, we first need to focus on the characteristics of the construction. In English, existentials have a number of characteristics that present potential challenges to learners. First of all, there are different types of constructions described as existentials. They include: ‘*there is a grammar book on the table*’, ‘*it is a grammar book*’, ‘*a grammar book is on the table*’. Second, some of these grammatical structures are more frequent than others. Thirdly, the most frequently occurring structure, the *there* existential, is the least transparent in its form-meaning relationship (Martinez Insua, 2004: 9) since, at the lexical level, the ‘*there*’ in existential constructions is homophonous with its locative counterpart as in ‘*the book is over there*’. At the semantic level, the ‘*there*’ existential construction is semantically opaque as a result of the absence of defining features. It is non-locative, non-deictic and typically unstressed. At a syntactic level (from a traditional descriptive perspective), *there* is considered to be the syntactic but not the semantic subject of the sentence (Jespersen, 1924; Martinez Insua, 2004). In use, sometimes the form of the verb agrees with the syntactic subject, but at other times it agrees with the semantic subject.

The data in Example (1) provide a list of the utterance features associated with variation in subject-verb agreement in ‘*there*’ existentials from research into Niuean English (Starks & Thompson, 2009: 327).³ The bold label on the left indicates the influencing linguistic feature; the bold font in the right column shows the locus of that feature and the plain font text in the right column identifies examples from their data.

(1) Tense	there’s/there was Then there was five years There’s jobs going
Polarity	not There’s not many Niueans
Inversion	are there/there are Was there any other languages?
Distance	like, always There’s like three categories There’s always dangers and trade-offs

3. The Pasifika Languages of Manukau project focussed on speakers of four languages (Niuean, Samoan, Cook Islands Maori or Tonga). It was principally funded by the Marsden Foundation at the Auckland University of Technology between 2001 and 2003. See Bell & Starks (2002). <<https://www.aut.ac.nz/data/assets/pdf/0016/15514/marsdenfinalreport2002.pdf>>

‘No’	There’s no Niueans
Number	four There’s about four... questions
‘a’ quantifier	a couple There are a couple of ladies There is still a couple
Quantifiers	other, some, any There are some older Niuean people and if there’s any other you can mention it (add)
Definite article	these/the There were these subjects
Adjective	There were Niuean programmes
Bare NP	There are people

As some of the items in Example (1) indicate, the tension between the syntactic and semantic subject has consequences for verb agreement that are far from categorical. While traditional grammars dictate that the syntactic subject affects subject-verb agreement, in real-life contexts it is the semantic subject that increasingly triggers agreement patterns in varieties of English worldwide (see Britain & Sudbury, 2002 for Falklands and New Zealand Englishes; Cheshire & Fox, 2006 for London English; Crawford, 2005 for American English; Eisikovits, 1991 for Australian English; Meechan & Foley, 1994 and Tagliamonte, 2005 for Canadian English; Starks & Thompson, 2009 for Niuean English). In *there* existential constructions, variation in subject-verb agreement is greater than it is in non-existential structures and agreement is conditioned in quite nuanced ways. Many of the commonly cited variables that affect agreement patterns in *there* existential constructions draw on characteristics of the NP that forms the semantic subject. Commonly cited variables include the type of determiner, quantifying expressions and the overall length of the NP (Tagliamonte, 1998; Hay & Schreier, 2004; Walker, 2007). The same authors report other sentential features influencing subject-verb agreement such as intervening adverbs, polarity and declarative vs interrogative structures, as well as factors such as tense, that are marked solely on the verb. In specific relation to existentials, Crawford (2005) notes that speech (sound) contains significantly more singular verb forms (e.g., ‘*there is five boys*’) than writing (image).

While English existentials have not been investigated in PT-based research, other features that appear in existentials such as subject-verb agreement have been central to PT theorising. In accordance with the stage model outlined in Pienemann (1998), an existential structure such as ‘*there is a book to be read*’ requires the use of phrasal procedures that condition the emergence of Stage 3 (3rd person pronoun) as well as syntactic procedures that condition the emergence of Stage 4 (copula

agreement). Within the operations enabled by phrasal procedures, a systematic alternation in the features of the NP between 'a/the book', 'a/the pile of books', 'lots of books' and '(the) five books' would indicate the acquisition of plural concord (Stage 3, det*N agreement). However, the model also allows that feature sets can be available for use earlier than these points. A combination of features used in an unvaried manner, (e.g., 'there's' in all contexts regardless of the number in the subject), would suggest that this feature set has been acquired as (part of) a formula (Stage 1). These points mean that the different features in existentials will be acquired at different stages in the developmental sequence and therefore will not all be available for deployment at the same time.

Because of the different features involved, existential structures are also highly susceptible to variation. Thus, the developmental sequence implied in PT's progression through stages has to be located within and intersect with the trajectory of gaining control over the larger set of patterns in the variation of use of the communicative features that have been noticed and selected into the learner's repertoire.

We explore some examples of the features associated with existentials that learners would need to acquire, how learners might vary in the way they use those features and how Multiplicity offers a systematic framework for identifying what is associated with that variation. The examples are drawn from the language maintenance study reported in Starks & Thompson (2009).

We have two purposes in citing these examples: (1) to bring out the richness and complexity of the patterns associated with 'there' existential constructions as part of exemplifying the variation that needs to be learned and (2) to underline that there is no obvious, single pattern.

The examples found in the Niuean English data are consistent with patterns identified in the general literature, reflecting discursual, pragmatic, social and sentential influences. Broader discursual influences affect how frequently 'there' existentials are used. The nature of the interview format of the Niuean English corpus in Starks & Thompson (2009) means that there are very few existential sentences of the type 'There's a book on the table'. However, again reflecting the nature of the discourse involved, those that do appear have particular characteristics. The data contain many examples where the NP functioning as the semantic subject is quite elaborated with adjectives and quantifiers, as in Example (2) below, e.g., 'because there's still some people who live there' as well as the same sequence without 'because': 'there's still some people who live there ...' and between them 'because there're still a lot of people who speak Niuean everyday in everyday life'.

- (2) I: **okay**, for the first part of the question why do you think Niuean is not in danger of being lo- of being lost **yeah**
 R: **because there're still a lot of people who speak Niuean everyday in everyday life**
 I: here in New Zealand?
 R: yep
 I: **okay... and** what about in Niue why do you say it's not in danger of being lost in Niue?
 R: **because there's still some people who live there**
 I: **there's still some people who live there....**
 R: yep yeah

Pragmatic features also influence what learners need to acquire about how *'there'* existentials are used. For example, Crawford (2005: 54) notes that existential constructions may be used to list elements or to summarise previous information and can also be used to introduce a new topic when preceded by *'so'* (p. 57). In addition to the uses cited by Crawford, we have some evidence that for some Niuean speakers, (parts of) *'there'* existentials may be used for broader discourse roles. In Example (3) below, R uses the form *'there are'* and then stops to think, inserting *'there's'* before continuing with *'there are a couple of ladies who work there'*. Similarly, a couple of moments later, she again uses *'there's'* as a filler (perhaps associated with self-correction) before starting the clause with *'there was probably a couple of Niuean ladies who work there with me but-'*. This raises an additional issue as to what to label as an existential grammatical structure. These examples have some of the features of *'there'* existentials, and certainly interact with subject-verb agreement in existential constructions as they only appear in this context. These examples are not (as some of the examples later illustrate) unique to this speaker.

- (3) I: **now**, are there other Niueans where you work? You mentioned something, before about...
 R: **um**, yeah, **there are- there's- there are** a couple of ladies who work there
 I: **okay**
 R: that are Niuean but, yeah, it's just **like**, a couple
 R: there was, **like**, a lady, Niuean lady who worked there- **there's- there** was probably a couple of Niuean ladies who work there with me but-
 I: that's at-?
 R: at Farmers, yeah, but
 I: **mmm**
 R: **um**, yeah, I don't really interact with them too...
 I: **//okay**
 R: much, **so...**

A potential additional example of pragmatically-influenced variation in Example 3 relates to tense marking. The Niuean speaker uttered two almost identical structures within seconds of each other. One involved a present plural form and the next a past singular form: *'there are a couple of ladies who work there'* vs *'there was probably a couple of Niuean ladies who work there'*. Most likely, this tense variation is connected with the tensions between reference to a past context that is being reflected on in relation to current circumstances. These different aspects of personal history (and perhaps perception of the activity that the speaker is engaged in, e.g., distancing or connecting) will be explored in more detail in the next section.

In the sociolinguistic literature, there is widespread evidence of norms (frames of reference) that affect rates of subject-verb agreement in grammatical structures including existentials. Use is said to be differentiated by conventional social categories such as region (Collins, 2012), age (Hay & Schreier, 2004), social class (Feagin, 1979; Hay & Schreier, 2004), years of education (Tagliamonte, 1998; Meechan & Foley, 1994) and sex (Eisikovits, 1991; but see conflicting findings in Meechan & Foley, 1994: 75). Many of these variables operate in inter-connected ways. Eisikovits (1991) found that younger girls had more examples of singular verb marking in plural existential contexts than older ones, but that males patterned differently, remaining relatively stable regardless of age. In contrast, Tagliamonte (1998) found in her British corpus that both males and females with fewer than 16 years of education produced relatively high frequencies of non-standard features in their agreement patterns. While females with more than 16 years of education had slightly more frequent use of these non-standard features, for extensively educated males, the proportion of non-standard agreement patterns decreased substantially. For their New Zealand corpus, Hay & Schreier (2004: 217) noted similarly complex interactions between gender and (non)-professional status, but this time, non-professionals of both genders used more singular concord features than the professionals. Many of these studies refer to age differences. Tagliamonte (1998) for example notes a drop in singular concord features among 30 to 50-year-old males, but no corresponding drop among females. However, Hay & Schreier (2004) show similar patterns associated with gender and decade of birth (from the 1900s, even though they also note that there had been a different pattern in earlier periods). However, it is also possible to find younger speakers in many communities with rates of subject-verb agreement similar to some older speakers, showing that age is not the only variable involved. Within the Multiplicity framework this kind of variation would be understood as reflecting individuals as unique and creative, while simultaneously responding to the norms of the multiple communities with which they engage. As a result of these multiple influences, the system that learners are attempting to gain control of varies on a very nuanced basis. This important point indicates that the 'target' is not a series of discrete systems, with categorical

differences associated with particular social or status groupings. Consequently, we argue that learners are engaging with a complex and diverse feature set, which means that the variability within/across a feature set is an important part of what learners have to gain control of.

The diversity of potential non-linguistic influences on the use of existential ‘*there*’ constructions means that the ‘target’ of acquisition processes is both highly abstract and highly variable. Few speakers reference only one norm in all circumstances, and in many cases they potentially draw on multiple norms for the construction of any particular communicative act. This type of data suggests that we need a view of how learners acquire extensive variation. We turn now to how Multiplicity can provide a systematic framework of what is to be acquired in relation to variation in ‘*there*’ existentials and to explore how such information may be used to widen PT by extending what is included in the Hypothesis Space.

5. The Multiplicity Framework applied to the acquisition of ‘*there*’ existentials

In this section we use examples of existentials from Niuean English to illuminate the relationships between specific elements and features within the Multiplicity framework. In Section 3 we have identified the distinct roles played by diverse elements and dimensions of the Multiplicity framework. In this section we shift the focus to illustrate how these different influences come together to shape communicative acts as speakers seek to reconcile the different influences.

As discussed above in relation to the spoken data in Example 2, there are ample examples of singular verb forms in existentials with plural semantic subjects in the corpus of Niuean English. Both interviewees and the interviewer use singular and plural agreement with plural subjects in existential constructions. The best example of the variation and its complex relationship to Modes and Mediations is in the interviewer context. In Example 4, all the interviewer’s questions reflect the written script.

- (4) I: Okay. Now, uh, work, are you working at present?
 R: yes
 I: and, what is the job?
 R: uh, courier driver
 I: courier dri- okay, are there other Niueans where you work?
 R: don’t know

In Example 5, the interviewer also follows up responses to scripted questions with spontaneously-formulated parallel questions.

- (5) I: *okay, so, what if there was a group of, um, there's a group of you, like, and... there's anothe- a palagi⁴ here, doesn't know Niuean, and just happens to sort of, be around, where we are, and, would you talk to me in-in Niuean?*
- R: I will speak to you in Niuean
- I: *okay um... oh was there other members in your family... that uh in your current household?*
- R: no not living with me no I've other children but not living with me
- I: that's, that's cool

The research team had worked together to create a questionnaire in English. Each of the interviewers translated the English document into their own language which was then back-translated by another member of the research team fluent in the relevant language, in this case Niuean. This was to ensure that meanings were consistent no matter what language was used in the interview. In the English written script, where 'there' existential constructions appeared with plural subjects, they were all scripted with plural agreement. Yet, in the interview when the Niuean interviewer followed-up on the scripted questions, she sometimes re-phrased them and used a singular form of the verb. In other words, how she asked the question was affected by her use of different elements associated with the dimensions of Modes and Mediations (whether she was reading from the written script or speaking without the immediate support of a script). However, that was not all that was taking place here. The scripted examples were planned, whereas the activities associated with follow-up questions were spontaneous. In other words, she also drew on elements such as key and micro-text from the Purposes dimension while simultaneously engaging with the sound/image distinction from the Modes dimension and the human body (speaking only)/analogue (supported by written notes) distinction from the Mediations dimension.

As indicated above, in all of the Niuean interviewer's scripted existential questions, including Examples (4) and (5), there is standard subject-verb agreement. Yet in the unscripted follow-ups to participant responses such as in Example (5), there was much more variability in the interviewer's speech as different influences came into play.

These examples show how existentials may reflect combinations of different influences. The micro-text features of asking and responding to interview questions combine with the presence of a script to read in the activity of formal interviewing such as can be seen in Example (5), where the interviewer's first question is supported by interview prompts, but the second one is not.

4. A non-Pasifika person.

In interviewing, manipulation of features of key is crucial in engaging with participants (simultaneously checking and appearing friendly). However, in some cases an additional element, ‘otherness’ is involved. One such instance is where the interviewer echoes what the participant had just said, but in doing so the interviewer is not only herself, but also for a moment the ‘other’, the person with whom she is talking. In those moments, the features that she uses are the features of her interlocutor, as in the matching between R’s answer to I’s question and I’s echoing of that answer in Example (6). The ‘other’ element of the Purposes dimension is designed to capture this layered nature of communicative acts, where the speaker is conveying multiple messages at the same time and the form of the communicative act reflects those requirements.

- (6) I: okay... and what about in Niue why do you say it’s not in danger of being lost in Niue?
 R: because **there’s still some people who live there**
 I: there’s still some people who live there....

There are also other issues shaping communication. In the following instance, personal history is foregrounded. Any bilingual Niuean could deploy either English or Niuean in conversation with other Niuean participants. Yet in some instances the use of English itself reflects a sense of otherness. In Example (7) one young Niuean participant reports feeling that she is a ‘Niue’ in name only because of her cousins’ reactions to her use of Niuean. In these contexts, the use of English to communicate with other Niueans itself reflects an ‘othering’ in relation to Niuean. It remains to be determined whether the participant’s use of structures such as *‘there’s a lot of times ...’* in English reflects a mirrored ‘othering’ in which she attempts to show that despite English being her dominant language she still considers herself to be Niuean.

- (7) R: and it is embarrassing not to, I mean it, it sometime, **there’s a lot of times**, when you feel like being a Niue in name only
 I: *oh* okay
 R: mmm
 I: okay
 R: it becomes a label
 I: yeah
 R: so to speak yeah
 I: okay um what about um you said... that **there are situations** where you are uncomfortable speaking Niuean um... and that would be any other place other than to your mum?
 R: yeah, my mother’s the one I’m most confident in speaking with... mmm
 I: and... would that be for the same reasons that, tha- for the second one, that you said you feel embarrassed... uh

- R: yeah *oh* well also I mean growing up we had, I had cousins who were fluent and were born in Niue
- I: yep
- R: when we tried to converse, they would laugh and make jokes
- I: okay

These examples have shown that the Multiplicity framework offers a systematic way of relating social variables to the momentary construction of communicative acts in an additional language. The examples also reveal that features that have been associated with larger-scale corpus studies of variation in subject verb agreement in *'there'* existentials are echoed in individual data. This suggests that the individual examples that we have cited reflect larger patterns of relationships between the social circumstances of communication and the particular shapes of communicative acts in individuals. Thus, it suggests that learners are presented with a shifting, variable target where they have to gain control of not only the individual features but also the (partial) regularities that attach to the deployment of those features. What does this mean for a view of Hypothesis Space?

6. The potential of an expanded view of Hypothesis Space

We have made two broad claims in the preceding sections. First, we have argued that existential structures are collections of features that are not acquired either simultaneously or via a single process. Some aspects of this acquisition trajectory are governed by PT-defined regularities; others are not. Second, we have argued that variation in learners' deployment of these diverse features responds to multiple features, including how the communication takes place, personal identity and multiple aspects of the situatedness of the interaction in the moment of communication. We have used the Multiplicity framework to provide a systematic account of relationships between various situational variables in these moments of communication.

These two claims open up issues surrounding how learners notice, select and deploy diverse kinds of features as part of the relatively opaque task of identifying when and in relation to what influences diverse features are used, creating a context for an expanded Hypothesis Space.

The task of the learner is not only to identify which features are (variably) present in morpho-syntactic structures but, at the same time, what other variables align with the variation that they observe/experience. By presenting a way to integrate insights from PT and insights from Multiplicity, we point towards a framework for understanding (1) when the specific morpho-syntactic features involved in existential structures will become available to learners to use (be acquired) and (2) what relationships between those features and diverse other communicative resources

need to be understood and managed to be able to control the use of existential structures.

Consistent with the underpinning argument that Pienemann (1998) made for PT that a systematic way to relate development and variation is needed, the expanded Hypothesis Space that we have argued for places development over time and the multiple resources that contribute to and shape morpho-syntactic structures within a more encompassing single framework. What we have proposed is a potential way of understanding systematically how a defined set of different aspects of the overall process of learners gaining control of communicative acts can be consistently related to one another. If we begin with a view of the complexity of what is to be acquired and what the relationships are between the emergence of a specific feature (i.e., developmental stages) and the other influences on the availability and use of the feature, then we are in a better position to track (and perhaps ultimately to predict) the trajectories involved in learners gaining control of their wider communicative repertoire.

This is a complex task. Example (8) below exemplifies this complexity as it reveals intersecting and potentially competing influences between multiple variables that highlight aspects of L2 communication that need further consideration in SLA studies. In I's first turn in Example (8) by 'I', we see three formulations of existentials, all of which build on the '*what if*' structures in interesting ways: '*what if there was a group of ...*' followed by '*there's a group of you*' and finally in that turn '*there's anothe- a palagi*'. In I's second turn, we see '*was there other members in your family ... that uh in your current household*'. Most of the existentials in the first turn would appear to reflect a discourse of a formal sociolinguistic interview, but at the same time, the hypothetical expression '*if there was*' appears only once at the beginning of the first example. Later in the same turn it is replaced by '*there's*' for the same context. By the second turn the '*if there*' expression has been omitted from the question and the question is neither formulated nor understood as hypothetical.⁵

- (8) I: *okay, so, what if there was a group of, um, there's a group of you, like, and... there's anothe- a palagi*⁵ here, doesn't know Niuean, and just happens to *sort of*, be around, where we are, and, would you talk to me in-in Niuean?
- R: I will speak to you in Niuean
- I: *okay um... oh was there other members in your family... that uh in your current household?*
- R: no not living with me no I've other children but not living with me
- I: that's, that's cool

5. A non-Pasifika person.

There are other layers here that involve macro-geopolitical norms. In the first question from the interviewer she uses the noun phrase '*a group of ... a group of you*'. Consistent with broad norms within New Zealand English, a collective noun such as '*group*' is typically (but not consistently) interpreted as singular. This singular interpretation is exemplified in the interviewer's statement: '*...if there was a group of, um, there's a group of you, like, and ... there's another palagi here ...*'. In other varieties of English, there is a greater tendency to accept collectives as plurals (Bauer 1994). This can mean that when interpreting this example in relation to different macro-geopolitical varieties, there might be alternative interpretations of the nature or extent of control of this feature. There are additional factors here as the lexical items themselves can also vary in the extent to which they take singular concord, and this itself can be subject to whether the noun is written or spoken. In Hundt's (2009) analysis of the use of collective nouns in the *International Corpus of Written and Spoken New Zealand English*, for example, she found that the lexical item '*group*' exhibited greater singular agreement in the written corpus than in the spoken corpus (see Hundt, 2009: 221). This contrasted with collective nouns such as '*staff*', which not only exhibited fewer instances in the corpus, but also lower proportions of singular agreement. In other words, any engagement with norms is inherently complex.

There are other factors in addition to macro-geopolitical ones and these multiple influences intersect. Each of the forms in the first question are embedded in different morpho-syntactic structures (declarative vs interrogative structures). At this point in the interview, both utterances can be seen as diverging from the narrow script of the prompted interview questions. The change in activity to more spontaneous questioning and discussion is also accompanied by an associated shift in key to a less formal relationship that is signalled by the more personal comments such as '*that's cool*' and use of in-group identifiers of out-group members (*palagi*), potentially associated with signalling multiple membership categories (other).

In our argument that the developmental dimension of Hypothesis Space is located 'within' the Multiplicity space, the developmental stage of the learner both governs the selection of particular morpho-syntactic features into the learner's repertoire (their emergence) and constrains the relations between those morpho-syntactic features that become available for combination with other features (post-selection). However, the learner's developmental stage does not condition his or her connections between these specific morpho-syntactic features and other communicative features in particular moments or their (post-selection) readings of norms of use of features in particular circumstances because those relations are not governed by the tightly specified processing constraints governing the emergence of morpho-syntactic features.

In this chapter we have sought to introduce a perspective that might enable PT to map more complex aspects of learners' trajectories. We have sought to show that it is possible to bring together features previously associated with either developmental or variational aspects of SLA within a larger framework of the communicative repertoire and the momentary influences on communicative acts. We have shown how the complex aspects that shape the realisation of communicative acts can be systematically related to a wider view of the communicative repertoire that allows us to position understanding and deployment of variation as a key goal of second language acquisition. We have attempted to show how the Multiplicity view of the communicative repertoire can be connected with the detailed work of PT via the concept of an extended Hypothesis Space and how this extended view permits development and variation to be linked systematically in ways that overcome the limitations of previous attempts to incorporate learners' life experiences. Our approach has not been to offer an either/or view of the relationship between PT and Multiplicity, but rather to open up a question of how the different kinds of regularities and relationships addressed in the two approaches intersect with one another. Our approach has been to raise the issue of when and how the learning processes entailed in each of the approaches shape learners' additional language trajectories. In elaborating these proposals, we have sought to show how the detailed focus on predictability and testability in PT can dialogue with a larger framework to enable a more powerful and inclusive theoretical discussion to be begun.

References

- Bailey, K. (1983). Competitiveness and anxiety in adult second language learning: Looking at and through the diary studies. In H. Seliger & M. Long (Eds.), *Classroom oriented research in second language acquisition* (pp. 67–103). Rowley, MA: Newbury House.
- Bauer, L. (1994). *Watching English change*. London: Longman.
- Bell, A. & Starks, D. (2002). *Final report to the Marsden Fund: Pasifika languages of the Manukau project 2000-2002*. https://icdc.aut.ac.nz/_data/assets/pdf_file/0003/76935/marsden_final_report_2002.pdf
- Bettoni, C., & Di Biase, B. (2015). Processability Theory: Theoretical bases and universal schedules. In C. Bettoni & B. Di Biase (Eds.), *Grammatical development in second languages: Exploring the boundaries of Processability Theory* (pp. 19–79). Paris: The European Second Language Acquisition Association.
- Britain, D., & Sudbury, A. (2002). There's sheep and there's penguins: Convergence, 'drift' and 'slant' in New Zealand and Falkland Island English. In M. Jones & E. Esch (Eds.), *Language change: The interplay of internal, external and extra-linguistic factors* (pp. 211–240). Berlin: Mouton de Gruyter. <https://doi.org/10.1515/9783110892598.209>
- Clahsen, H. (1984). The acquisition of German word order. In R. Andersen (Ed.), *Second languages: A cross-linguistic perspective* (pp. 219–242). Rowley, MA: Newbury House.

- Clahsen, H., Meisel, J., & Pienemann, M. (1983). *Deutsch als Zweitsprache: Der Spracherwerb ausländischer Arbeiter*. Tübingen: Gunter Narr.
- Collins, P. (2012). Singular agreement in *there*-existentials: An intervarectal corpus-based study. *English World-Wide* 33(1), 53–68.
- Crawford, W. J. (2005). Verb agreement and disagreement: A corpus investigation of concord variation in existential *there* + *be* constructions. *Journal of English Linguistics* 33, 35–61. <https://doi.org/10.1177/0075424204274001>
- Dörnyei, Z., MacIntyre, P., & Henry, A. (Eds.). (2015). *Motivational dynamics in language learning*. Bristol: Multilingual Matters.
- Eisikovits, E. (1991). Variation in subject-verb agreement in inner Sydney English. In J. Cheshire (Ed.), *English around the world* (pp. 235–255). Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511611889.017>
- Feagin, C. (1979). *Variation and change in Alabama English: A sociolinguistic study of a white community*. Washington, DC: Georgetown University Press.
- Gardner, R., & Lambert, W. (1972). *Attitudes and motivation in second-language learning*. Rowley, MA: Newbury House.
- Gass, S. (2010). Interactionist perspectives on second language acquisition. In R. Kaplan (Ed.), *Oxford handbook of applied linguistics* (2nd ed., pp. 217–231). Oxford: Oxford University Press.
- Håkansson, G., & Norrby, C. (2007). Processability Theory applied to written and oral Swedish. In F. Mansouri (Ed.), *Second language acquisition research: Theory-construction and testing* (pp. 81–94). Newcastle upon Tyne: Cambridge Scholars.
- Hay, J., & Schreier, D. (2004). Subject-verb agreement in New Zealand English. *Language Variation and Change* 16, 209–235. <https://doi.org/10.1017/S0954394504163047>
- Horvath, B. (1991). Finding a place in Sydney: Migrants and language change. In S. Romaine (Ed.), *Language in Australia* (pp. 304–317). Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511620881.023>
- Hundt, M. (2009). Concord with collective nouns in Australian and New Zealand English. In P. Peters, P. Collins, & A. Smith (Eds.), *Comparative studies in Australian and New Zealand grammar and beyond* (pp. 207–224). Amsterdam: John Benjamins.
- Jespersen, O. (1924). *The philosophy of grammar*. London: Allen and Unwin.
- Klein, W., & Perdue, C. (1992). *Utterance structure: Developing grammars again*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.5>
- Levelt, W. (1989). *Speaking: From intention to articulation*. Cambridge, MA: The MIT Press.
- Liu, B. (2015). *A processability approach to the L2 acquisition of Chinese syntax (Unpublished doctoral dissertation)*. Canberra: The Australian National University
- Martinez Insua, A. (2004). *Existential there-constructions in Contemporary British English: A Corpus-driven analysis of their use in speech and writing*. Munich: Lincom.
- Meechan, M., & Foley, M. (1994). On resolving disagreement: Linguistic theory and variation – *there's* bridges. *Language Variation and Change* 6, 63–86. <https://doi.org/10.1017/S0954394500001587>
- Meisel, J. (1987). Reference to past events and actions in the development of natural second language acquisition. In C. Pfaff (Ed.), *First and second language acquisition processes* (pp. 206–224). Cambridge, MA: Newbury House.
- Meisel, J., Clahsen, H., & Pienemann, M. (1981). On determining developmental stages in natural second language acquisition. *Studies in Second Language Acquisition* 3(2), 109–135. <https://doi.org/10.1017/S0272263100004137>

- Nicholas, H. (1984). 'To be' or not 'to be', is that really the question? Developmental sequences and the role of the copula in the acquisition of German as a second language. In R. Andersen (Ed.), *Second languages: A cross-linguistic perspective* (pp. 299–317). Rowley, MA: Newbury House.
- Nicholas, H. (1985). Individual differences in interlanguage use. *Australian Review of Applied Linguistics* 8(1), 70–86. <https://doi.org/10.1075/aral.8.1.05nic>
- Nicholas, H, Lightbown, P. & Spada, N. (2001). Recasts as feedback to language learners. *Language Learning* 51(4), 719–758. <https://doi.org/10.1111/0023-8333.00172>
- Nicholas, H., & Starks, D. (2014). *Language education and applied linguistics: Bridging the two fields*. London: Routledge. <https://doi.org/10.4324/9781315818030>
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M. (Ed.). (2005). *Cross-linguistic aspects of Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30>
- Pienemann, M, Di Biase, B., & Kawaguchi, S. (2005). Extending Processability Theory. In M. Pienemann (Ed.), *Cross-linguistic aspects of Processability Theory* (pp. 199–251). Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30.09pie>
- Pienemann, M., & Johnston, M. (1987). Factors influencing the development of second language proficiency. In D. Nunan (Ed.), *Applying second language acquisition research* (pp. 45–141). Adelaide: National Curriculum Resource Centre.
- Quinn, H. (2000). Variation in New Zealand English syntax and morphology. In A. Bell & K. Kuiper (Eds.), *New Zealand English* (pp. 173–197). Wellington: Victoria University Press. <https://doi.org/10.1075/veaw.g25.11qui>
- Schönström, K. (2014). Visual acquisition of Swedish in deaf children: An L2 processability approach. *Linguistic Approaches to Bilingualism* 4(1), 61–88. <https://doi.org/10.1075/lab.4.1.03sch>
- Schumann, J. (1978). *The pidginization process: A model for second language acquisition*. Rowley, MA: Newbury House.
- Shin, N. (2016). Acquiring constraints on morphosyntactic variation: Children's Spanish subject pronoun expression. *Journal of Child Language* 43(4), 914–947. <https://doi.org/10.1017/S0305000915000380>
- Starks, D., & Thompson, L. (2009). Agreement patterns in existential constructions in the New Zealand Niuean community. *World Englishes* 28, 319–335. <https://doi.org/10.1111/j.1467-971X.2009.01595.x>
- Tagliamonte, S. (1998). Was/were variation across the generations: View from the city of York. *Language Variation and Change* 10, 153–191. <https://doi.org/10.1017/S0954394500001277>
- Tagliamonte, S. (2005). Sometimes there's universals; sometimes there aren't: A comparative sociolinguistic perspective on 'default singulars'. Paper presented at World Englishes: Vernacular Universals vs. *Contact Induced Change*, University of Joensuu, Finland.
- Walker, J. A. (2007). 'There's bears back there': Plural existentials and vernacular universals in (Quebec) English. *English World-wide* 28, 147–166. <https://doi.org/10.1075/eww.28.2.03wal>

Processability theory as a tool in the study of a heritage speaker of Norwegian

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In this article, we employ aspects of Processability Theory (PT) to study the language of one fourth generation heritage speaker of Norwegian in America. This man, who we refer to as Lars, was almost 50 years old when we first met and recorded him in 2010, and to our knowledge he is among the youngest Norwegian-Americans still able to speak Norwegian as a heritage language in the Upper Midwest. His dominant language was Norwegian until he started school, when English took over this role. When we met him the first time, he had not spoken Norwegian to any substantial extent for several decades.

When we examine his language, we find a number of grammatical deviations from the baseline – the language as spoken in the old world, and we discuss the possible explanations for these; are they related to the quality of the input, are they due to attrition or are they the result of incomplete acquisition? In the discussion, we include certain aspects of PT, and based on this, we claim that attrition is the most likely explanation for the reduced structures in Lars' Norwegian.

1. Introduction

Processability Theory (PT) deals with how a second language is acquired, including how the acquisition proceeds in sequential patterns or stages that are language specific, but at the same time based on some general linguistic principles (Pienemann, 1998). Since we employ PT in the study of a heritage speaker's language, and not in a study of second language acquisition, our approach is somewhat unorthodox. We argue that at least parts of our study involve language acquisition; however, an important difference from many other studies is that we do not look at language acquisition in a 'real time' perspective. Instead, we try to reconstruct an acquisition process by asking to what level the speaker's morphology and syntax was

developed when he changed his dominant language to English and the heritage language started to erode. The problem here is that we do not have any recordings or description of his language skills when his Norwegian was at its peak some time during his adolescence.

Thus, our study deals with some particular aspects of language use and developmental trajectories – metaphorically, through a mirror. In contrast to the other papers in this section that deal with how a second language is acquired from a PT perspective, we look at how a heritage language is weakened as a consequence of it hardly being spoken anymore.

The terms ‘heritage speaker’ and ‘heritage language’ (Montrul, 2013) refer to a special kind of bilingualism and are at least to some extent associated with migration. Typically, the heritage language is the language of an ethnic group that at one time immigrated to an area dominated by another language. Here, the children grew up in a home where the minority language was spoken; it thus became their first language. However, in the case discussed here, at some point during schooling, due to the pressure from and interaction with the mainstream society, the individual switched to using the area’s dominant language. After such a shift to the dominant language, the speaker’s use of the heritage language can evolve in different ways, depending on how well it was developed before the shift took place as well as to what extent it continued to be used after the shift (Montrul, 2013). When used frequently, the grammar will remain relatively intact, and to a great extent, in line with the baseline or the language of the input, which is normally that used by the speaker’s parents. In other cases, the language can be virtually lost, or more often, the speaker is able to use the heritage language but with a reduced register and with lexical and grammatical reductions, and with deviations compared to the baseline. One of the debates raised concerning the heritage language of individual speakers is to what extent such grammatical variation or deviations from the baseline are due to incomplete acquisition or attrition (Johannessen, 2015; Johannessen & Larsson, 2015; Johannessen & Salmons, 2015; Montrul, 2008; Pires & Rothman, 2009). In the latter case, such structures were at one time acquired and mastered, but due to lack of use, they gradually eroded, becoming unavailable to various degrees.

Most speakers of Norwegian in America today show features in their linguistic repertoire that represent variation (i.e., production of target-like as well as non target-like forms and structures) and some level of reduction or simplification when compared to the language as it is spoken in Norway (Eide & Hjelde, 2015). We can think of three possible explanations for this. First, these variations could be explained by the quality of the input. Second, it is possible that the input was cut off before the speaker acquired the full scale of linguistic features in question; thus, he or she never really learned to fully master the heritage language like a native speaker. Finally, the variational features found in the speech of a heritage speaker

could also be linked to attrition, where the speaker at some time had a higher level of control of the heritage language, but due to many years without using the language, he or she no longer masters all aspects of it as well as they once did.

One reason why PT might offer an interesting perspective on Norwegian as a heritage language is that many of the syntactic and morphological indicators used for the different PT levels for Scandinavian languages, including Norwegian (cf. Glahn et al., 2001; Håkansson, 2001), seem to be among the more vulnerable features in Norwegian as a heritage language (cf. Johannessen, 2015). We do not elaborate on why this is the case in the present study, but we note the relevance of the issue for future research.

To use grammatical features in the discussion over ‘attrition or incomplete acquisition’ is not something new (Johannessen, 2015), but previous studies which have addressed this question have focused on the typical age when such a feature is acquired. In this study, however, we rely on PT’s claims about the sequence in which a language is acquired and use this as a framework to evaluate the evidence.

PT was developed for second language acquisition, not for the study of heritage languages or language loss; therefore, it is clearly problematic to use this theory for studies of attrition and incomplete acquisition. However, we offer three arguments in favour of this exploratory approach. The first regards the heritage language as such – scholars such as Lynch (2003) and Montrul (2012) have argued that heritage languages and heritage speakers have more in common with L2 and L2 speakers than with L1 and L1 speakers, among other things, due to the way the languages are acquired. And Itani-Adams (2011) has found that the first language in a bilingual setting in general develops in accordance with the stages in PT. In the present study, we assume that speakers like Lars acquire the heritage language in accordance with the sequence of stages suggested by PT, or at least in a way not contrary to the sequence of acquisition proposed by this theory.

Another issue that arises is that a key feature of PT-based analyses is *the emergence criterion*, the first productive use of a feature, which is used as an indicator of the learner having acquired features assigned to particular PT stages, and the stage therefore having been reached. In the present study, the emergence criterion cannot be used because we have no documentation of when the features in question appeared. In the speech samples that we analysed, we found evidence showing that the individual produced features from all five hierarchical stages. However, as PT claims, the capacity to use a feature does not indicate full mastery. Glahn et al. (2001) argue that there is a relationship between the first documented occurrence of a feature and its subsequent use with 50% and 80% accuracy respectively, which, they claim, is also in accordance with the sequence in which features from each PT stage appear.

Based on the above, we find it fair to assume that Lars acquired Norwegian in accordance with the sequence of stages suggested by PT. Furthermore, we also assume that he developed a target-like and subsequent mastery of the PT stages, with a higher accuracy at the lower stages than at the higher, and that this continued until he had a target-like mastery of all PT stages, or until he changed the dominant language and thus halted the acquisition of Norwegian. If the last thing happened, even at the peak of performance, he would have a lower accuracy when producing features at a high PT stage than when employing features at lower stages.

Seen from a PT perspective, we could expect to find two different language profiles for a heritage speaker like Lars, who has not used the language for years, not to say decades. One scenario would be that features at the lower PT stages in his speech production are target-like, while the higher ones show increased variation. The other one would be that the lower PT stages are vulnerable just as the higher ones.

For the first scenario, where the variation affects features at a high PT level, while the low levels are stable, we find it fair to assume that what we see is the result of incomplete acquisition, a situation where the input was cut off before the higher PT levels were achieved and mastered. An alternative interpretation could be that the attrition follows the “first in – last out” hypothesis (Schmid, 2002: 12–14).

In the other possible scenario, our assumption is that if linguistic features associated with lower stages in PT are more prone to show variation or non-existence than features associated with higher stages, it is likely that this is the result of attrition, not incomplete acquisition.

It is also very important to stress that no matter how we address this kind of question, without actual real time data documenting how the speaker’s language profile develops, it is virtually impossible to gain a decisive answer on the ‘attrition – incomplete acquisition’ question. PT can only serve as an indication of possible responses to this question. Still, we think that PT might reveal some insight into this question that we could not access without it.

2. The speaker and the community

The heritage speaker we focus on in the present study, Lars, is a fourth-generation Norwegian American from the southwestern part of Wisconsin. He runs a small farm in addition to his work as an entrepreneur. When we recorded him for the first time, he was 49 years old; thus, he is among the youngest American Norwegian-speakers we could find. He was born into a Norwegian-speaking family and brought up on a farm by his grandparents and his Aunt Olga. In this household, Norwegian was, if not the only language spoken, at least the most used language. As a result, Lars’ dominant language during his first years was Norwegian.

According to what he reports, he was very surprised to learn that there were no other Norwegian-speaking children in his class, which meant that he did not have any classmates with whom he could speak Norwegian. The other school kids made fun of him for his language use, in other words, for his use of Norwegian and probably more so for his somewhat broken English. This experience, Lars reports, resulted in a rapid shift of his dominant language from Norwegian to English, and at the time he was first recorded (2010), he had not spoken Norwegian for decades.

Beginning school was no doubt a momentous experience regarding his language use. However, there are signs indicating that the cut-off in using Norwegian was not as radical as he retrospectively remembers it to be. First of all, Norwegian continued to be used in his home as long as his grandparents were alive; both he and his Aunt Olga reported this. Thus, the Norwegian input was present for as long as he lived at home. His grandmother also tried to teach him to read Norwegian, which indicates that Norwegian language activities continued after he began school. However, he never mastered reading Norwegian, a fact he explains with the Norwegian American community's use of *fraktur* (sometimes referred to as 'Gothic' script). Today, his Norwegian language does not serve any communicative function at all, but it might still have a symbolic function. His workmates are also of Norwegian American descent – at least one of them being a very fluent speaker – and even if they never use Norwegian to actually exchange information, from time to time, they exchange a Norwegian sentence or two, probably with the sole function of stressing solidarity and their common ethnic background.

Lars takes great pride in his Norwegian heritage and claims to be more Norwegian than American. At the same time, his ideas of Norway seem very vague, and he has never been to Norway, but states he would like to visit it one day. He has hardly any idea from where in Norway his ancestors came, except that he assumes that they are from Gudbrandsdalen, just like the majority of Norwegian Americans in his community. According to Lars, his great-grandparents immigrated from Norway in the 1870s.

The area where Lars lives is a farming community, and it has a large Norwegian American population. The first Norwegians arrived in the area in the late 1840s, and within a few decades, they had established a very strong Norwegian-dominated settlement (Hjelde, 2015). The majority of the Norwegians settling down here had an eastern Norwegian background, where people with a background from Gudbrandsdalen were numerous. This would favour the use of Norwegian as a community language, since the majority spoke more or less the same Eastern Norwegian dialect.

An important factor that ensured the use of Norwegian for such a long time is that this was a very compact settlement – the borders for the settlement were established quite early, and an increase in the number of residents happened within

these borders. The sociologist P. A. Munch studied this community in the 1940s and described a quite closed community, where much of the social interaction was governed by ethnic identity. Non-Norwegians had to adapt to this pattern, or they were socially isolated until they chose to leave (Munch, 1949: 784). Einar Haugen visited this area in 1942 as part of the fieldwork for his study *The Norwegian Language in America* (1953). Among those that he recorded is a person of German origin who spoke the dominant Norwegian dialect in this area without any accent. According to reports, there were several other non-Norwegians in this area who had mastered Norwegian at a near native-like level. And at the time Lars grew up, Norwegian was still commonly used, probably not by his peers, but certainly by many grown-ups. During the 1960s, Norwegian was frequently heard on the streets of the town where he grew up, and the local theatre still showed Norwegian movies without subtitles or dubbing in English (Ibarra, 1976).

3. Lars' language

The material the present study is based on is a 62-minute stretch of sound recording made by one of the authors, in which Lars produces around 360 utterances. The recording is a semi-structured conversation between Lars and the fieldworker, where the aim was partly to gain information on his linguistic background and experience and partly to make him use the language as freely as possible. Thus, at times the fieldworker introduced some topics to talk about, at other times Lars had stories to tell.

Lars' language contains many subsets of features that could be interesting to investigate further. First, he speaks a Norwegian dialect, not a standard variety. The dialect in the community where he lives has undergone a koineisation process, where the dialectal variation has leveled out to a certain degree (Hjelde, 2015). Thus, it is impossible to connect all of Lars' dialectal variables with one exact geographical location in Norway. Still, his dialect is definitely associated with the lower parts of the Gudbrandsdalen valley in Norway. Furthermore, at the lexical and idiomatic level, it is very obvious that he grew up in a Norwegian American community, as his vocabulary has many loanwords from English. In this way, his language is similar to the speakers who Haugen (1953) met in the area two generations prior.

There are two other aspects of Lars' language that are quite striking and consistent with other descriptions of heritage speakers. The first is that he appears to be a slow speaker of Norwegian, as his speech is filled with a high portion of pauses, hesitations, and repairs. In addition, there are traits in his language that appear to be incomplete or underdeveloped, including a number of deviations of a kind and

frequency that are inconsistent with what we find in the speech production of a healthy native speaker of Norwegian. In the remainder of this paper, we address the potential causes of these unstable and variational features in Lars' language. As mentioned earlier, we discuss three possible explanations for this. One possibility could be related to the quality of Lars' input – it is possible that these changes in the language evolved in the previous generation(s). Another explanation is that the input was cut off before Lars had acquired all of the necessary grammatical structures, resulting in his incomplete acquisition. A third explanation is that Lars had once mastered the grammar, but due to several decades of not speaking the language with any consistency, these structures had eroded. If this is the case, this can be understood as the result of attrition.

4. The input

In order to judge the quality of the input, we first determined which person(s) represent(s) the *default* input. Lars grew up on a farm, and the main input was without any doubt from his immediate family. However, in a family setting, it can be hard to decide which person provides the main input for the child who is acquiring the language. Lars did not grow up with his parents; instead, he was raised in his grandparents' home, where he lived with two grandparents and an unmarried aunt. His grandparents are now deceased, and to our knowledge, there are no sound recordings of them speaking Norwegian. We do, however, have a recording of Aunt Olga from 2012, created shortly before she died. Since she reportedly played a central role in Lars' upbringing, we considered her to provide the closest representation possible of the *default* input for Lars – this is also in accordance with how their relationship is described in her obituary in the local newspaper.

Another reason for doing so is that Olga's parents, Lars' grandparents, raised her, and if Olga and Lars shared the same input, both should have acquired a language resembling the language of the grandparents. In this way, we can be confident that Olga represents, or at least mirrors, Lars' input. We performed two different tests to compare the Norwegian spoken by Olga and Lars. First, we felt it was crucial to do what we could to substantiate that Olga did in fact represent Lars' input by comparing dialectal features. In this particular Norwegian American community, we found the dialect variation to be at a rather subtle level, and if Lars and Olga have a similar profile in the use of these features, this is a strong argument for Olga as a *default* input for Lars, or a mirror of his input. Secondly, we examined to what extent the features typical for attrition in Lars' speech are also present in the way Olga speaks.

Most people in this area speak a dialect with features from the middle and southern parts of the Gudbrandsdalen Valley, including the northern part of the Lake Mjøsa area. Features typical of the northern part of this continuum (i.e., the middle part of the Gudbrandsdalen Valley) are in this study referred to as the ‘northern system’, while features typical of the southern part of this continuum will be referred to as the ‘southern system’. Like many other speakers in this area, Olga speaks a variety with features from both of these systems, and with a few minor exceptions, her language is in line with the most prevailing variant that has emerged from the koineisation process that occurred here (Hjelde, 2015). As shown in Table 1, when we compared the speech of Lars and Olga, their variants of Norwegian were similar, and there is just one feature in which Lars deviated from Olga’s pattern: palatalisation of ‘old’ dental consonants. Olga’s realisation of the palatal consonants was more prominent and audibly clearer than Lars’. Lars still had these palatal consonants in his repertoire, and his less prominent pronunciation was very much in line with

Table 1. Comparison of some selected dialectal features in Olga’s and Lars’ Norwegian vernacular

	Southern variety	Northern variety	Olga	Lars
Personal pronoun, 1st person singular	<i>je</i>	<i>e</i>	<i>e</i> (1 documented instance of <i>je</i>)	<i>e</i> (2 documented instances of <i>je</i>)
Personal pronoun, 1st person plural	<i>vi</i>	<i>oss</i>	<i>vi</i>	<i>vi</i>
Negation	<i>itte</i>	<i>ikkje</i>	<i>itte</i>	<i>itte</i>
Nouns: final -r in plural indef.	Yes	No	Yes	Yes
Verbs: final -r in present, weak verbs	Yes	No	No	No
Verbs: suffix marking preterite of weak verbs, 1st class	<i>-e</i>	<i>-a</i>	<i>-a</i> and <i>-e</i>	<i>-a</i> and <i>-e</i>
Quantity: short root syllable	No	Yes	Yes	Yes
Palatalization of dental consonants: stressed syllables	Yes, but realized as segmentation	Yes	Yes	Yes, but with a weakened pronunciation
Palatalization of dental consonants: unstressed syllables	No	Yes	No	No
Vowels: realization of “u” as a “European u”	No	Yes	Yes	Yes

how the last generation of American Norwegian speakers rendered this group of consonants. Apart from this one feature, Lars' profile of features in Table 1 had a similar pattern to the one found in Olga's speech. Concerning features where Lars showed variation, we found that Olga had a similar pattern of variation. Thus, based on the distribution of these dialectal features and the co-occurrence of such traits in Olga's and Lars' vernacular, it is very likely that Olga represents the input, or at least mirrors the input, for Lars' acquisition of Norwegian.

However, the most striking feature in Lars' Norwegian repertoire was that in spite of having acquired almost all of the dialectal features that we found in Olga's speech, there was also a striking difference in the way they processed the language. This difference can be seen at several different levels. Most prominent was Lars' great difficulty when it came to accessing the lexicon, which resulted in many pauses, hesitations and repairs. The speed with which individuals produce language is idiosyncratic – some speakers are fast whereas others are slow. To provide some insight into Lars' speech rate when using Norwegian, we have compared his Norwegian speech with stretches in the recordings where he speaks English. We also compared these measures with Olga's speech rate when speaking Norwegian. We measured this rate of speech by counting the average number of syllables per second in randomly selected stretches of the recordings. We excluded stops/pauses between utterances and instances of turn-taking.

Table 2 illustrates that the difference in speed between when Lars speaks Norwegian and when he speaks English is considerable, giving a clear indication of what his dominant language is today. In the recorded stretches we investigated, Lars' speech rate when speaking Norwegian was only 55% of what it was when speaking English. This difference correlates well with Lars' description of how hard it is for him to find the right words when speaking Norwegian.

Table 2. Comparison of Olga's and Lars' speech rate using Norwegian and English

	Ratio syllable/second
Lars – Norwegian	1.9
Lars – English	3.5
Olga – Norwegian	3.3
Olga – English	No data

Besides experiencing difficulty finding the right words when talking, we found other features in Lars' phonology, morphology, and syntax that are commonly documented in heritage language use. Typically, these are structural reductions and simplification, which are associated with either language attrition or incomplete acquisition (Montrul 2008). The remainder of this article focuses on several such vulnerable features that are also relevant in the PT framework.

5. Lars' language and PT stages

Norwegian, like Swedish, is assumed to be acquired in five stages according to PT (Glahn et al., 2001). Stage 1 in PT is not relevant here and will not be further commented upon, as there is no doubt that Lars is able to form quite complex grammatical structures. In this section, we look at features related to Stages 2–5. From a linguistic point of view, Scandinavia can be seen as a dialectal continuum, and the state borders do not represent any clear-cut border for the spoken varieties. The different spoken varieties share most syntactic features, and the amount of inflectional and derivational morphology is quite similar. Thus, even if studies of Norwegian from a PT point of view are rather sparse, we can follow Glahn et al.'s (2001) comparison of the L2 acquisition of Danish, Norwegian and Swedish (see Table 3) and to a great extent base our work on the developmental features of PT identified and used there, as well as in other studies of Swedish (for example Håkansson & Flyman-Mattsson, 2010).

Table 3. PT stages in Norwegian and Swedish

		Morphology	Syntax
Stage 1	Words	Invariant forms	Single constituents
Stage 2	Word Class, Lexical morphology	Tense marking on verbs; definite-indefinite forms; singular – plural	Canonical sentence structure: (SVX)
Stage 3	Exchange of grammatical information within phrases	Attributive congruence of adjectives	Topicalization without V2
Stage 4	Exchange of grammatical information between phrases	Predicative congruence of adjectives	Topicalization with V2
Stage 5	Exchange of grammatical information between clauses		Distinction between main and subordinated clauses

5.1 Stage 2: Inflection

Stage 2 deals with local inflection such as tense marking for verbs and the distinction between indefiniteness/definiteness and singular/plural for nouns. Regarding verbs, our analysis of the recordings demonstrated that Lars had no doubt mastered the verb system, including the inflectional morphology. His sub-grouping of the verbs into different verb classes was also, for the most part, target-like. In the one hour recording, we find only two such deviations. In one case he treated a strong verb as weak: *Jidde* (not target-like) for *ga* (give, past tense). The other

example is a weak verb assigned to the wrong class of weak verbs: *Snakte*, not the target-like form *snakka* (northern system) or *snakke* (southern system) (talked, past tense).

The productive verb class in American Norwegian is the first class of weak verbs, as almost all loan verbs are assigned to this particular class. This group is often referred to as the ‘a-verbs’, since in many dialects, this group of verbs is marked with the suffix *-a* in the preterite. Norwegian dialects have different ways of treating this class of verbs; this is also the case for the two main variants traditionally found in this Norwegian American community that we refer to as the northern and southern systems, to reflect their respective places of origin in Norway. If we consider the two main distinctions expressed in a verb paradigm, *+/-past* and *+/-tense* (cf. Eide, 2012), then we can express the systems as in Table 4.

Table 4. A-verb paradigm in the northern and southern variants

Northern system	+tense	-tense
+past	Preterite: <i>hoppa</i>	Participle: <i>hoppa</i>
-past	Present: <i>hoppe</i>	Infinitive: <i>hoppe</i>
Southern system	+tense	-tense
+past	Preterite: <i>hoppe</i>	Participle: <i>hoppe</i>
-past	Present: <i>hopper</i>	Infinitive: <i>hoppe</i>

As Table 4 illustrates, the northern system has a distinction related to *+/-past*, employing the suffix *-a* to mark *+past* and *-e* to mark *-past*. On the other hand, the southern system has *-e* in all of the slots in the paradigm except for the present tense, where we find *-er* in most cases. Lars mostly used the northern system, but he also had a few instances where he employed the *-e* suffix for *+past*, thus using *-e* for all of the forms in the paradigm.

One interpretation of this phenomenon is that Lars employed the infinitive form in places where *+past* should be expected. If so, one could argue that he was showing some variation at Stage 2 in PT. On the other hand, this could also be interpreted as a tendency to merge the two systems (northern and southern – Table 4) into a hybrid system (Table 5). Arguments in favour of this interpretation are that a similar development is documented for other Norwegian heritage speakers (Eide & Hjelde, 2015). Thus, this might be the result of competing systems, not due to a lack of mastering inflections per se. A third explanation is that some of the dialects around Lake Mjøsa in Norway, from where some of the settlers in this area of Wisconsin came, have a system with *-e* in all the slots of the paradigm; this could also have had some influence on Lars’ verb system.

Table 5. A-verbs – A possible hybrid system for Lars

Possible hybrid system	+tense	-tense
+past	Preterite: <i>hoppe</i>	Participle: <i>hoppe</i>
-past	Present: <i>hoppe</i>	Infinitive: <i>hoppe</i>

Olga had similar tendencies of alternately using features from the northern and southern systems, yielding a pattern which is quite similar to the one we find in Lars' speech. This makes it more likely that his variation is linked to the input itself, not to any idiolectic development in Lars' verb system. This interpretation is further supported since we noted that all of the borrowed verbs in Lars' repertoire were inflected in line with the northern system.

Lars' inflection of nouns was also, for the most part, consistent with the baseline established by Olga's pattern of use. In general he had a target-like use of formatives in positions where the marking of definite and indefinite as well as singular and plural is expected. There were, however, a few instances in which he used a bare form of the noun in positions where we would have expected to find a definite and/or a plural marking of the noun. In (1) we find a target-like construction with the noun in the definite form:

- (1) *så 'n brukte på å ha en siggar i kjæften sin*
 so he used to to have a cigar in mouth.SG.DEF his
heile tida
 whole.DEF time.SG.DEF
 So he used to have a cigar in his mouth all the time

However, about fifteen minutes later into the recording we find the same noun phrase without definite marking of the head, which in the Norwegian baseline would be non-idiomatic:

- (2) *vi brukte på å vera nokså enterteind heile tid*
 we used at to be quite entertained whole.DEF time.SG:IND
 Target: ... *heile tida*
 We used to be quite entertained all the time

The utterances in (3) and (4) are examples demonstrating singular marking of the noun in a context where plural marking should be expected. As these three examples (2, 3 and 4) are the only ones found in the corpus, it seems possible to argue that in general, Lars has the Norwegian inflection system under control.

- (3) *bære tu tingen som en kunne forstå*
 only two thing.SG.DEF which one could understand
 Target: ... *tu ting* ...
 Only two things one could understand

- (4) ... kanskje et par tid på månen ...
 ... maybe a couple time.SG:IND at month
 Target (grammatically): ...et par tider ...
 (Or idiomatically: ...kanskje et par ganger i månen ...)
 ... maybe a couple of times a month....

Overall, we found only a few examples that can be interpreted as non target-like, and we cannot talk about any strong tendency toward an erosion of the inflection system. Our overall impression is that the inflection system has been maintained.

5.2 Stage 3: Phrasal information exchange

Regarding PT-defined stage 3 features, we have examined agreement within noun phrases (i.e., to what extent determiners and adjectives showed morphological agreement reflecting government by properties of the phrase head such as number, definiteness, and gender). Unfortunately, the recording we have based this study on does not contain many instances of NPs with attributive adjectives, and hardly any examples of adjectives contrasting singular and plural agreement. Nevertheless, the very few examples we do have of the latter are all target-like, such as in (5) and (6) below that display target-like agreement respectively for singular and plural:

- (5) gammel kjæring
 old.SG woman
Old woman
- (6) gamle bokstaver
 old.PL letters
Old letters

Even if we have very limited data on adjective agreement, it is worth noting that Lars' pattern is quite different from that documented in other studies. While other studies (see below) have reported that most borrowed verbs and nouns have been inflected according to a Norwegian pattern, this is not the case for adjectives. Haugen claims that "(r)elatively few of the borrowed adjectives were inflected according to the above [i.e., Norwegian] scheme" and that "adjectives were significantly less responsive to N(orwegian) structural rules" (1953: 454). He suggests that this phenomenon is related to the somewhat secondary role adjective inflection plays as number, definiteness and gender are already marked on the noun. Consistent with this position, previous studies have pointed to variation in adjective agreement in American Norwegian in general, and not only in relation to borrowed elements (Hjelde, 1992: 83).

In order to extend the foundation for evaluating Stage 3 in our study, we need to refer to other – and in some aspects less reliable – features, including inflection of possessives and gender agreement.

Gender is a very problematic indicator for stage 3 PT determination, as lack of gender agreement between noun and determiner and/or adjective can be caused by the fact that the noun has been assigned the wrong gender, and not necessarily as a result of reduced *information exchange* within the phrase. As pointed out Lohndal and Westergaard (2016), gender is a target for attrition or change in heritage American Norwegian, resulting in variation between individuals in the extent to which the baseline is intact. The data they have analysed indicates that some speakers have kept the gender system intact, some show no evidence of having a gender system at all, while the majority have a gender system, within which the assignment varies considerably compared to the target. The latter also applies to Lars. His variety also deviates from the Norwegian baseline. He also shows instability in his assignment of gender marking to some nouns. Examples can be seen in (7) and (8), where the baseline is neuter, in accordance with (8):

- (7) e kunne it forstå en ord
 i could not understand a.MASC word
I could not understand a word
- (8) e kunne itte forstå et ord
 i could not understand a.NEU word
I could not understand a word

On the other hand, when Lars demonstrates consistent use of gender agreement between noun and adjective, we find it reasonable to look at this as an indication of *phrasal information exchange*, as in (9), where the adjective is assigned a neuter suffix, and the same noun is marked as neuter in several other contexts as well:

- (9) rart stoff
 strange.NEU stuff
strange stuff

Possessive constructions are also relevant here, and these particular constructions in Norwegian exhibit several differences from the English counterpart. First, the unmarked word order in Norwegian is with the possessive pronoun to the right of the noun. Second, the possessive pronoun should agree with the head of the noun phrase for both number and gender. Lars' documented possessives show a capacity to appropriately differentiate agreement for number so as to distinguish plural in (10) from singular in (11), where *-e* is plural marking:

- (10) folkan mine
 folk.PL my.PL
my folk (family)

- (11) onkel'n min
 uncle.SG.DEF.MASC my.SG.DEF.MASC
my uncle

However, there are also some other features to comment on regarding gender agreement in possessive constructions in the material as in the next example:

- (12) *bæssmor* min
 grandmother mine.MASC
 my grandmother

In (12), we see that the possessive indicates the masculine gender, whereas the noun *bæssmor* (*bestemor* 'grandmother') in the Norwegian baseline is feminine. However, in the same context, Lars referred to *bæssmor* by using the feminine pronoun *ho* (she). This could be a discrepancy in gender assignment between grammatical and biological gender, a phenomenon found in other words in the baseline as well, like the neuter noun *kvinnfolk* (women).

As with the discussion of features associated with stage 2, overall, Lars had a good command of the morpho-syntactic structures relevant for stage 3. However, there was also a limited number of examples showing variation, including possible deviations from the target language. And all cases of such deviations can be explained by two factors. One is related to the irregular inflection of the adjective *liten*, which has a particular complexity since the singular referring form *liten* changes to *små* in plural contexts. The other is related to variation in the gender assignment system, and not by lack of *phrasal information exchange* as such.

5.3 Stage 4: Interphrasal information exchange

In relation to characteristics of PT stage 4, we examined two structures that are especially relevant in Scandinavian languages: V2 and predicatives.

Norwegian, unlike English, is a so-called 'V2 language'. This means that in declaratives, the finite verb has to act as the second constituent in the clause. In constructions where a non-subject is fronted, the subject will be placed to the right of the finite verb, and not to the left of it as in English. We show this contrast using two Norwegian declaratives (example (13) and (14)) and two parallel declaratives in English (example (15) and (16)):

- (13) *Kari kjøpte brød i går*
 Kari bought bread yesterday.
- (14) *i går kjøpte Kari brød*
 yesterday bought Kari bread.

- (15) Kari bought bread yesterday.
 (16) yesterday Kari bought bread.

When we analysed how Lars produced structures related to V2, we found two striking phenomena, one related to fronting as such, and the other related to V2 in declaratives. Some authors have claimed that topicalisation is more common in Norwegian than in English (Eide & Hjelde, 2015), but we were unable to find any detailed study of this in the literature. The percentage of declaratives displaying topicalisation is not totally fixed – it varies according to context, text type, etc. In Norwegian, the average percentage is estimated to range from just under 30% (Søfteland, 2014) to around 40% (Eide & Sollid, 2011).

In heritage Norwegian in America, it seems that the use of topicalisation has declined over time. Eide and Hjelde (2015) investigated this development. In a sample of recordings made by Haugen approximately 75 years ago in the early 1940s (published by Haugen in 1953), 40% of the declaratives had topicalisation, a number that appears to be in line with the norm found in the Norwegian baseline. However, in recordings made during the last seven years, there was a tendency toward a reduced use of topicalised constructions; in a sample of such recordings examined, the percentage of topicalised declaratives had decreased to 17%. In recordings made during the last five years, we have found speakers with a topicalisation rate as low as 7%. This last percentage is in line with Lars' use of topicalisation in the recorded excerpt examined here, which to a great extent consists of coherent narratives – 10% of the declaratives contain topicalisation. We do not believe that this low rate can be explained by the input, as Olga produces topicalisation in about 30% of her declaratives.

It is also apparent that for Lars, the V2 rule is quickly eroding. Because he so seldom topicalises, the material in which we can study his production of V2 is not very extensive. Of the 320 declaratives we examined, only 32 had a fronted non-subject. Of these, 24 exhibited V2 and eight exhibited V3. Thus, as much as one-quarter of these constructions violated the V2 rule in ways discussed below. In comparison, Olga had no violations of V2.

In Lars' data, V2 is most prone to being violated when the topicalised constituent consists of many words, such as in subordinate clauses (17). Utterances with shorter fronted elements, on the other hand, seem to display a much more robust structure. In all four cases where the fronted element was a subordinate clause without a supporting particle like *da* 'then' or *så* 'so', we found V2 violations (18). Four of the six cases where the fronted element was a subordinate clause with support of a particle were target-like V2 constructions. For fronted elements consisting of one-syllable words such as *da* (then) and *så* (when), eight out of ten had target-like constructions with V2 (19).

- (17) Når e jekk på skuuln de va itte noen som e kunne snakke med.
When I went at school it was not any who I could talk with.
When I went to school, it wasn't anyone I could talk to.
- (18) men ætti littegrann så bynte e å snakke engelsk nokså godt.
But after a bit then began i to speak english quite good.
But after a while I began to speak English quite good.
- (19) å da kom dem heimatt
and then came they home
And then they came home.

Subject-predicative constructions in Scandinavian languages are a second structure considered to involve inter-phrasal information exchange (Glahn, 2001). In Lars' data, these structures seem to reveal a much more stable pattern of information exchange than do Lars' potential V2 structures. In the following three examples (20–22), the main pattern of predicative agreement is present, where -e is plural marking, -t neuter and -o is masculine and feminine. This is exemplified here through the following features associated with variation in the adjective *god* (good) in the predicative position.

- (20) E va itte fæRt go me de
i.MASC was not terribly good.MASC with it
I was not terribly good at it
- (21) de e mesta godt å
it.NEU is mostly good.NEU and
It is mostly good, as well
- (22) dom e duglig gode dem
they.PL are very good.PL they.PL
They are very good

However, there is one adjective in particular which frequently demonstrates a deviation from the baseline pattern; the adjective *liten* (little) (see comments on *liten* in 5.2). In Lars' documented speech, we often found what looked like a lack of agreement in predicatives when the adjective *liten* (small) was involved, as in (23), (25) and (26), while (24) is target-like.

- (23) ... når e va dugleg lite så ...
... when I(.MASC) was very little.SG.NEU then...
Baseline: ... når e va dugleg liten så ...
... when I was very small, (then) ...

- (24) *E va nokså stor ner e va liten*
I was quite big when i was small.SG.MASC
 I was quite big when I was (a) small (boy)
- (25) *e va så små*
i.SG was so small.PL
 Baseline: *e va så liten*
 I was so small.
- (26) *e kunne jæra litt når e va små*
i could do a bit when i.SG was small.PL
 Baseline: *når e va liten*
 I could do a bit when I was (a) small (boy)

Example (25) is not target-like, and it is hard to explain this as anything else but a lack of agreement. The use of the plural form *små* of the adjective *liten* in contexts that actually require a singular form ((25) and (26)), is also of interest. This was not just a slip of the tongue – we found several instances of this form. One interpretation for this could again be a lack of agreement. On the other hand, we cannot rule out that this is the result of language contact – due to phonological similarities, the English *small* may have influenced Lars' choice of the Norwegian plural *små*.

To sum up stage 4, with one exception, Lars' predicative agreement was relatively target-like, while the use of V2 showed strong tendencies to deviation.

5.4 Stage 5: Distinguishing main and subordinate clauses

PT stage 5 for Scandinavian languages is related to the ability to distinguish main clauses from subordinate clauses. There are several types of main and subordinate clauses, but one significant difference between these two types of clauses is related to the placement of negation (as well as other sentence adverbials). In main clauses, this element is post-verbal as a consequence of the V2 restriction. In subordinate clauses, however, this element is normally pre-verbal. There is one important exception to this general rule: In subordinate 'that-clauses', which in Norwegian are initiated by the complementiser *at*, negation can be both pre- and post-verbal (Faarlund et al., 1997; Julien, 2010).

When examining Lars' subordinate clauses, we found negations only in connection with 'that-clauses'. All of these were with post-verbal negation, but they are within the acceptable variation of the baseline (Faarlund et al., 1997; Julien, 2010), and as such they are target-like. As far as we could tell, mother tongue speakers of the Norwegian baseline would use post-verbal negation in the same constructions, as in examples (27) and (28) from Lars.

- (27) *E e sikker på (at) de e itte fæRt mange ...*
 I am sure at (that) it is not terribly many
 I am sure that it is not terribly many
- (28) *men de e feRgæRi at e dreiv itte på me de*
 But it is too bad that I carried not on with it
 But it is too bad that I didn't do it

However, we have examples of subordinate clauses with other sentence adverbials that are in pre-verbal position, as in example (29). Such constructions indicate that Lars appears to be able to distinguish main clauses from subordinate clauses.

- (29) *du har itte folk som berre kjem bort å ha kaffi*
 You have not people who only come away to have coffee
 You don't have people who just come over to have coffee

Conclusive evidence that Lars had mastered the distinction between main and subordinate clauses can be found in his use of interrogatives. Main interrogatives normally have a V2 structure in Norwegian, even if there are dialectal differences in the Norwegian baseline. Lars used this pattern, as seen in example (30).

- (30) *hå va namnet?*
 what was name.DEF?
 What was the name?

In subordinate interrogatives, Norwegian has a V3 structure (i.e., with the subject to the left of the verbal element). Lars also produced such a structure, as evidenced in the examples below:

- (31) *hås'n dem kom from der åt her*
 how they came from there to here
- (32) *... hås'n dem farne*
 ... how they farm
- (33) *... hås'n tings e*
 ... how things are

Thus, there were no subordinate clauses in the investigated recording of Lars' speech with a structure that was not in accordance with similar constructions in the Norwegian baseline. Once we took interrogatives into account, we found that Lars treated main clauses and subordinate clauses as two distinct constructions. In relation to PT stage 5 features, there was no evidence to suggest that Lars had not achieved this level or that it had undergone erosion.

6. Language attrition or incomplete acquisition: Discussion and conclusion

We return now to the original question: Is the grammatical variation from the baseline in Lars' speech due to low quality input, attrition, or incomplete acquisition?

In Section 4, we investigated Olga's language use, and based on this, we ruled out low-quality input as the main explanation for variation in Lars' syntax and morphology. This prompts the question of whether Lars' current use of Norwegian is shaped by attrition or incomplete acquisition. Both factors probably play a role, affecting different aspects of the way he uses the language. Lars' dominant language until around the age of seven was Norwegian. Even if beginning school led to what he remembers to be a rapid shift to English as his preferred language, this does not mean that he totally lost contact with Norwegian. For some years, he was surrounded by Norwegian at home. When interviewed, he said that he had not spoken much Norwegian since his grandparents passed away, which happened more than 20 years ago. This statement indicates that he spoke Norwegian, at least occasionally, throughout his adolescence.

It is difficult to imagine that during his whole life, Lars has struggled to process features from the higher stages of acquisition of Norwegian. Indeed, the fact that he demonstrated consistent use of stage 5 features in his speech would seem to confirm this belief. Based on this observation and the context of Lars' uses of Norwegian in his early life, we find it very plausible that the difficulties we observed when he searched for words are related to attrition. The recording we studied here is the first one in a series of four with this speaker made over the last five years – it is our firm impression that he speaks Norwegian with more ease in the latest recordings, which suggests that the practice opportunities that our research is providing are enabling him to re-access structures and vocabulary that he was previously more familiar with. It is nevertheless reasonable to assume that his vocabulary is somewhat reduced compared to an adult speaker of the Norwegian baseline as native Norwegian speakers continue to expand their vocabulary throughout their lifetime, Lars has not had enough input to reach a similar level in Norwegian. Consequently, certain aspects of his current use of Norwegian, particularly vocabulary, should be understood as a result of incomplete acquisition.

Regarding the more fundamental morpho-syntactic structures used as indicators within PT, we demonstrated that in relation to PT stages 2 and 3, Lars had some variation compared to the baseline variety. At the same time, we must stress that Lars has kept features characterising these stages surprisingly intact. Most of the instances that revealed a lack of intra-clausal agreement in noun phrases might be related to gender assignment rather than gender agreement. The most important finding, however, is related to features from stages 4 and 5. Lars' documented use of subordinate clauses was target-like; thus, he demonstrated that he had not only acquired, but also mastered the structures associated with stage 5 in PT. Despite this

finding, he also showed quite a high rate of variation regarding the V2 rule, which is a PT stage 4 feature. This variation related to V2 is substantially more extensive than in other heritage language studies: Montrul (2008) placed a typical rate of deviation as around 5–10% in such a setting, whereas Lars' language had a deviation of 25%.

If, as PT would predict, Lars' features from PT stage 4 emerged before features from stage 5, but he went on to gain sophisticated control of stage 5 features, we align ourselves with Glahn et al. (2001) to argue that at one time, Lars had also mastered features from stage 4. This position would be consistent with an argument that Lars mastered these higher stages because his dominant language was Norwegian, at least until he began school. He also continued to hear and speak it on a fairly regular basis until he was in his twenties. The dominance of Norwegian in Lars' early life means that it is likely that his development of Norwegian has followed an L1 pattern either to a great extent or totally. Studies have shown that among L1 learners, topicalisation and V2 are established at a fairly early stage, usually around the age of two (Westergaard 2009), which would be consistent with their prevalence in our much later recorded data from Lars. Based on these arguments, we claim that Lars' more recent difficulties in mastering V2 are most likely due to attrition rather than to initially incomplete acquisition.

References

- Eide, K. M., & Sollid, H. (2011). Norwegian main clause declaratives: variation within and across grammars. In P. Siemund (Ed.), *Linguistic universals and language variation* (pp. 327–360). Berlin: De Gruyter. <https://doi.org/10.1515/9783110238068.327>
- Eide, K. (2012). Om tempus og aspekt i norsk [On tense and aspect in Norwegian]. In H. O. Enger, J. T. Faarlund, & K. I. Vannebo (Eds.), *Grammatikk, bruk og norm. Festskrift til Svein Lie på 70-årsdagen* (pp. 57–78). Oslo: Novus forlag.
- Eide, K. M., & Hjelde, A. (2015). Verb second and finiteness morphology in Norwegian heritage language of the American midwest. In B. R. Page & M. T. Putnam (Eds.), *Moribund Germanic heritage languages in North America: Theoretical perspectives and empirical findings* (pp. 64–101). Leiden: Brill. https://doi.org/10.1163/9789004290211_005
- Faarlund, J. T., Lie, S., & Vannebo, K. I. (1997). Norsk referansegrammatikk [Norwegian reference grammar]. Oslo: Universitetsforlaget.
- Glahn, E., Håkansson, G., Hammarberg, B., Holmen, A., Hvenekilde, A., & Lund, K. (2001). Processability in Scandinavian second language acquisition. *Studies in Second Language Acquisition* 23, 389–416. <https://doi.org/10.1017/S0272263101003047>
- Haugen, E. (1953). *The Norwegian language in America: A study in bilingual behavior*. Philadelphia, PA: University of Pennsylvania Press. <https://doi.org/10.9783/9781512820522>
- Hjelde, A. (1992). *Trøndsk talemål i Amerika* [The Trøndsk dialect in America]. Trondheim: Tapir.
- Hjelde, A. (2015). Changes in a Norwegian dialect in America. In J. B. Johannessen & J. C. Salmons (Eds.), *Germanic heritage languages in North America: Acquisition, attrition and change* (pp. 283–298). Amsterdam: John Benjamins. <https://doi.org/10.1075/silv.18.13hje>

- Håkansson, G. (2001). Tense morphology and verb-second in Swedish L1 children, L2 children and children with SLI. *Bilingualism: Language and Cognition* 4, 85–99.
<https://doi.org/10.1017/S1366728901000141>
- Håkansson, G., & Flyman Mattsson, A. (2010). *Bedömning av svenska som andraspråk* [Assessment of Swedish as second language]. Uppsala: Studentlitteratur AB.
- Ibarra, R. A. (1976). *Ethnicity genuine and spurious: A study of a Norwegian community in rural Wisconsin* (Unpublished doctoral dissertation). University of Wisconsin, Madison.
- Itani-Adams, Y. (2011). Bilingual first language acquisition. In M. Pienemann & J.-U. Kessler (Eds.), *Studying Processability Theory* (pp. 121–130). Amsterdam: John Benjamins.
<https://doi.org/10.1075/palart.1.10bil>
- Johannessen, J. B. (2015). Attrition in an American Norwegian heritage language speaker. In J. B. Johannessen & J. C. Salmons (Eds.), *Germanic heritage languages in North America: Acquisition, attrition and change* (pp. 46–71). Amsterdam: John Benjamins.
<https://doi.org/10.1075/silv.18.02joh>
- Johannessen, J. B., & Salmons, J. C. (2015). The study of Germanic heritage languages in the Americas. In J. B. Johannessen & J. C. Salmons (Eds.), *Germanic heritage languages in North America: Acquisition, attrition and change* (pp. 1–20). Amsterdam: John Benjamins.
<https://doi.org/10.1075/silv.18.001int>
- Johannessen, J. B., & Larsson, I. (2015). Complexity matters: On gender agreement in heritage Scandinavian. *Frontiers in Psychology* 6. <https://doi.org/10.3389/fpsyg.2015.01842>
- Julien, M. (2010). Embedded clauses with main clause word order in Mainland Scandinavian. Published on LingBuzz. <<http://ling.auf.net/lingBuzz/000475>>
- Lohndal, T., & Westergaard, M. (2016). Grammatical gender in American Norwegian heritage language: Stability or attrition? *Frontiers in Psychology* 7(344).
<https://doi.org/10.3389/fpsyg.2016.00344>
- Lynch, A. (2003). The relationship between second and heritage language acquisition: Notes on research and theory building. *Heritage Language Journal* 1(1), 26–34.
- Montrul, S. (2008). *Incomplete acquisition in bilingualism: Re-examining the age factor*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.39>
- Montrul, S. (2012). Is the heritage language like a second language? *Eurosla Yearbook* 12, 1–29. Amsterdam: John Benjamins. <https://doi.org/10.1075/eurosla.12.03mon>
- Montrul, S. (2013). Bilingualism and the heritage language speaker. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism and multilingualism* (pp. 168–189). Oxford: Blackwell.
- Munch, P. A. (1949). Social adjustment among Wisconsin Norwegians. *American Sociological Review* 14(6), (Dec. 1949), 780–787. <https://doi.org/10.2307/2086680>
- Pienemann, M. (1998). *Language processing and language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pires, A., & Rothman, J. (2009). Disentangling sources of incomplete acquisition: An explanation for competence divergence across heritage grammars. *International Journal of Bilingualism* 13(2), 211–238. <https://doi.org/10.1177/1367006909339806>
- Schmid, M. S. (2002). *First language attrition, use and maintenance: The case of German Jews in anglophone countries*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.24>
- Softeland, Å. (2014). *Utbrytingskonstruksjonen i norsk spontantale* [Clefts in Norwegian spoken language] (Unpublished doctoral dissertation). University of Oslo.
- Westergaard, M. (2009). *Acquisition of word order: Microcues, information structure, and economy*. Amsterdam: John Benjamins. <https://doi.org/10.1075/la.145>

Discourse-pragmatic conditions for Object topicalisation structures in early L2 Chinese

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In this chapter, I explore the connection between language processing and discourse-pragmatic factors in the L2 acquisition of three (Mandarin) Chinese Object topicalisation structures. Processability Theory (Pienemann, 1998, 2005) and Information Structure Theory (Lambrecht, 1994) are employed to investigate when the required processing procedures are in place in the learners' L2 Chinese, what facilitates the learners' discourse-pragmatic interpretation of the communicative context such that among various structural possibilities, they choose the non-canonical Object topicalisation structures. Two longitudinal studies of 6 *ab-initio* L2 learners of Chinese in two learning environments were examined. The findings show three types of discourse contexts to be particularly conducive for the production of the Object topicalisation structures: (1) Question and Answer (Q&A) sequences; (2) the presence of a local inanimate topic (an inanimate NP being the sentence topic at a particular point of a conversation); and (3) the 'disposal' situation. The study enhances our understanding of the discourse-pragmatic conditions that motivate and trigger L2 structural choices under the general constraints of processability.

1. Introduction

Second language acquisition involves learning L2 linguistic forms that encode grammatical, semantic and discourse-pragmatic information. Certain sentence forms can only be acquired when their grammatical features are learned, when necessary L2 processing procedures are developed, when the pragmatic import in transmitting the communicative intent is understood and grasped, and when the relevant discourse conditions are present in a communicative event. These four factors – the target language grammar, the language processing capacity, the discourse-pragmatic information, and the communicative context – interact to shape L2 sentence forms at each and every stage of the learning process.

In this chapter, I explore how these factors play out in the L2 Chinese Topic sentence structures in which the Topic expression is identified with the sentence Object instead of the sentence Subject. I am particularly interested in finding out, once the required L2 processing procedures are in place, what facilitates the learners' discourse-pragmatic interpretation of the communicative context such that among various structural possibilities, they choose the Object topicalisation structure.

I will situate the study in two theoretical paradigms: Processability Theory (PT) (Pienemann, 1998, 2005) and Information Structure Theory (Lambrecht, 1994). The former is concerned with the processing factors underlying the acquisition of L2 grammatical forms, and the latter centres on the discourse-pragmatic factors that motivate the structural choice at the moment of utterance. The theoretical and analytical focus in my study differs from that of Nicholas and Starks (this volume) which takes a wider social and communicative approach to language use. My study concentrates on specific moments in a verbal communicative event, in an effort to discover some of the motivations behind the speaker's decision to topicalise the grammatical Object. The analytical approach of my study resembles that of Kawaguchi and Yamaguchi, and Hjelde et al. (both in this volume) i.e., data-based analysis using various linguistic theories. In common with the studies in this volume that relate PT to different theoretical perspectives, my study is an attempt to explore the relationship between the processing factors and the emergence of L2 structural variations, and between the structural variations and their discourse-pragmatic conditions in terms of information structure. This venture beyond the psycholinguistic space while maintaining a link with it will, hopefully, shed light on the nature of the acquisition and production of L2 structural variations that are seemingly optional. The findings will inform task design in both L2 teaching and research.

I will first give an outline of the Chinese Object topicalisation structures at the centre of this chapter, along with their processing requirements and features of information structure. This is followed by the (re-)analysis of two longitudinal studies of L2 acquisition of Chinese, carried out in Australia and in China respectively (Liu, 2016; Zhang, 2001, 2007). I will examine two issues: (1) the processing factors behind the L2 emergence of the Object topicalisation structures using the Topic Hypothesis in PT (Pienemann et al., 2005) and (2) the discourse-pragmatic factors that motivate the production of the Topic-Object structures using Information Structure Theory (Lambrecht, 1994), a theory that is concerned with the discourse-pragmatic structuring of proposition in sentences.

2. Chinese Object topicalisation structures

The basic Chinese sentence structure has been variably described as [SVO], Topic-Comment, and [Topic + (S)VO] (Huang, 1982, 1984; LaPolla, 1995, 2009; Li & Thompson, 1975, 1976, 1981; Yuan, 1995). What these descriptions seem to broadly agree on is that a Chinese sentence is typically organised around a Topic-like expression. In a basic and pragmatically neutral sentence, the Topic expression is usually associated with the grammatical Subject. However, the sentence Topic can be any syntactic constituent as long as it is semantically relevant to the rest of the sentence (Xu & Langendoen, 1985). The (semantic) implication of the word order of a sentence is discussed in Chao (1968), and schematically represented in Figure 1.

[T]here is a very strong tendency for the Subject to have a definite reference and the Object to have an indefinite reference... , it is...not so much the Subject or Object function that goes with definite or indefinite reference as *position* in an earlier or later part of the sentence that makes the difference [*italics mine*].

(Chao, 1968: 76)

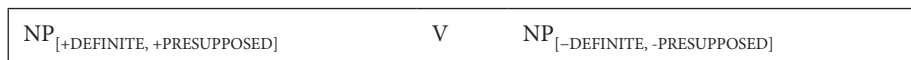


Figure 1. Semantic features of a basic Chinese sentence according to Chao (1968)

Having no grammatical articles to indicate the definiteness contrast, Chinese resorts to *position* or word order as one means to achieve this distinction.¹ While the post-verbal position may be associated with both [+/-definite] and [+/-presupposed] information, the pre-verbal position is reserved for the [+definite] and [+presupposed] features.² This means that the pre-verbal position is linked to the topic-like elements with a [+presupposed] feature, while the post-verbal position tends to favour focus-like constituents. The contrast between the positional alignment and information structure is shown in the ‘car-buying’ examples in (1) below, in which the proposition is expressed in three word orders: [SVO], [OSV] and [SOV]. The examples in (1) show that when the ‘car-buying’ information is ‘new’ [-presupposed], i.e., having never been activated either discourse internally or externally, only the canonical [SVO] reading in (1a) is appropriate. The bare noun *che* ‘car’ is annotated for [-definite] and [+assertion] by virtue of its post-verbal position, and is interpreted as ‘a car.’ In contrast, if this information has been evoked previously and is assumed to be known to the hearer, it needs to be encoded

1. In addition to demonstrative pronouns such as *zhe* ‘this’ or *na* ‘that’.

2. A pre-verbal indefinite reference is frequently marked with *you*. For example, *you ren* ‘someone/some people,’ *you yi tian* ‘one day.’

accordingly. The Object topicalisation structures such as (1b) [OSV] and (1c) [SOV] are appropriate because by positioning the bare noun *che* ‘car’ pre-verbally, it is endowed with the [+definite] feature ‘*the* car.’ The examples demonstrate that situated within a discourse context, the realisation of a particular word order structure is by no means random. The Chinese Object topicalisation structures are determined largely by the information status of the Object referent, i.e., whether, at the moment of utterance, the Object referent is assumed by the speaker to be known, identifiable, and shared by the interlocutors.

- (1) Car-buying
- a. *Wo mai che le.* [SVO]
 I buy *car* PF (perfective marker)
 ‘I’ve bought *a car*.’
- b. *Che wo mai le.* [OSV]
Car I buy PF
 ‘I’ve bought *the car*.’
- c. *Wo che mai le.* [SOV]
 I *car* buy PF
 ‘I’ve bought *the car*.’

Information structure theory (Lambrecht, 1994) is essentially concerned with the question: Why are there alternative linguistic forms for the same meaning (e.g., active and passive)? It claims that while languages often provide more than one sentence form to express a proposition, discourse circumstances, i.e., the “speaker’s assumptions about the hearer’s state of knowledge and consciousness at the time of the utterance” (Lambrecht, 1994: xiii), determine the final sentence form. In other words, the speaker packages his/her utterances in a way that reflects his/her understanding of the discourse situation such as shown in (1). A further example of this is shown in (2) (taken from a Chinese TV drama). The speaker, upon returning home, announces to the maid *Li Ma* an impending event: ‘Someone is coming.’ The information status of *keren* ‘guest,’ or indeed of the entire ‘guest-coming’ event, is key to the choice between [VS] in (2a) and [SV] in (2b). Both structures are grammatically permitted in Chinese, but only one is appropriate (or ‘correct’) at this discourse moment. The inverted Subject structure [VS] in (2a) is produced because at the time of the announcement, the speaker knows that this piece of information is new to the maid. Since the pre-verbal position in Chinese is typically reserved for an expression that encodes presupposed information, a brand-new referent such as *keren* ‘guest’ can only be placed post-verbally, hence the [VS] form in (2a). The semantic and the discourse-pragmatic contrast between ‘*a* guest’ in (2a) and ‘*the* guest’ in (2b) reflect different mappings of pragmatic and syntactic relations. Information structure determines the sentence form. In this sense, the syntactic

word order being produced in a communicative moment is in fact also a pragmatic word order (Lambrecht, 1994).

- (2) Speaking to the maid while walking into the house
- a. Man: *Li Ma, lai keren le.*
 Li Ma, come *guest* PF.
 Li Ma, a guest is coming/we have a guest.
- b. Man: *Li Ma, keren lai le.*
 Li Ma, *guest* come PF
 Li Ma, the guest is coming/is here.

At the syntactic level, Object topicalisation sentence forms can be regarded as structural variations of the Chinese canonical order [SVO] since the mapping between the a(rgument)- and f(unctional)-structure remains the same, as shown in Figure 2. The Agent role is mapped to the Subject, and the Patient role is mapped to the Object. From the discourse-pragmatic point of view, however, Object topicalisation

1a	<i>Wo (I) mai (buy) <u>che</u> (car) le (PERF).</i>		
	Agent	Patient	a-structure
	Subject	Object	f-structure
	“I have bought a car.”		
1b	<i><u>Che</u> (car) wo (I) mai (buy) le (PERF).</i>		
	Patient	Agent	a-structure
	Object	Subject	f-structure
	“I have bought the car.”		
1c	<i>Wo (I) <u>che</u> (car) mai (buy) le (PERF).</i>		
	Agent	Patient	a-structure
	Subject	Object	f-structure
	“I have bought the car.”		

Figure 2. A- to f- mapping of canonical and Object topicalisation structures

represents a fundamentally different way of information packaging in that the Object constituent in the sentence initial and pre-verbal position contains presupposed information, shared between the speaker and the hearer at the particular discourse moment.

The link between the position and the information status of a nominal constituent is also demonstrated in (3a) – the BA-construction [S BA-OV]. In this frequently used structure, not only is the Object constituent topicalised to the pre-verbal position, it is also marked by *BA*. Similar to other Object topicalisation structures such as [OSV] and [SOV] in (1), the information status of the Object referent marked by *BA* must be [+presupposed], hence [+definite]. In addition, the BA-sentence expresses the ‘disposal’ semantics (Zhu, 1998), and the VP must contain a complement to indicate the Object referent being ‘disposed of’ literally or figuratively. These are two essential semantic and discourse conditions underlying the structure (Wen, 2006). The two examples in (3), cited in Chen (1995:205), show the meaning contrast between the BA-sentence in (3a) and its canonical [SVO] counterpart in (3b). While expressing the same proposition ‘returning books,’ the information status of the Object referent *shu* ‘book(s)’ differs. In (3a), it is [+presupposed], i.e., shared or assumed by the speaker to be known to the hearer, whereas in (3b), it is not necessarily so (Chen, 1995).

(3) Book-return

- a. *Wo BA shu huan le.* [S BA-OV]
 I BA book return PF
 ‘I have returned the books.’
- b. *Wo huan shu le.* [SVO]
 I return book PF
 ‘I have returned some books.’

The examples in (1), (2) and (3) illustrate “the system of options which grammars offer speakers for expressing given propositional contents in different grammatical forms under varying discourse circumstance” (Lambrecht, 1994: xiii). From the information structure perspective, they may even be regarded as discourse-pragmatically default of canonical structures. While all options may be grammatically ‘correct,’ not all of them are discourse-pragmatically appropriate (or ‘correct’). At a specific discourse moment, word order variations are in fact not free. Sentence forms uttered by the speaker are reflections of pragmatically structured propositions within the rules and conventions of the sentence grammar of the language (Halliday, 1967; Lambrecht, 1994). Violation of the default word order [SVO] frequently occurs as the result of the need to accommodate the interlocutors’ state of knowledge in a moment-by-moment conversational exchange. Different sentence structures expressing the same proposition exist in languages, making it

possible for speakers to choose a form that best conveys his/her communicative intent at that discourse moment. For L2 learners, this is a learning task in addition to gaining L2 grammatical knowledge and sentence processing skills.

In language acquisition research since the 1970s, attention has been paid to the step-by-step development of linguistic structures (see Brown, 1973; Dulay & Burt, 1974; Dulay et al., 1982; Clahsen et al., 1983; Pienemann, 1998, 2005). Linguistic forms are the prime focus in these research endeavours. Beginning from the 1990s, the discourse aspects of language and language acquisition have been systematically taken into consideration in linguistic theories such as Lexical-Functional Grammar (LFG) (Bresnan, 2001) and SLA theories such as PT (Pienemann, 2005). The Topic Hypothesis (Pienemann et al., 2005) within PT was formulated in an effort to incorporate the acquisition of discourse-pragmatic aspects into the L2 structural acquisition by focusing on the learner's manipulation of the sentence Topic in L2 syntactic development. The Topic expression is defined in terms of position, which means that the sentence-initial element – the Topic – could be either Subject NP, Object NP or XP_{ADJUNCT}.

In this chapter, I explore the connection between the discourse context for the L2 production of Chinese Object topicalisation structures and its relationship to L2 processing skills on the one hand, and information structure on the other. Three types of Object topicalisation are examined. They are [OSV] in (1b), [SOV] in (1c), and the BA-sentence [S BA-OV] in (3a). In these sentence forms, the Object constituent is not in its canonical position after the verb, but in the sentence-initial or pre-verbal position, where it functions as the sentence Topic. Unlike the [SVO] structure, the mapping between the f- and c(onstituent)-structures in the Object topicalisation sentences is non-canonical, and they are only processable when the PT S-procedure is in place, i.e., when the learner has developed the skill to differentiate the TOP from the SUBJ, and to link the 'displaced' Object to the TOP function on the one hand, and to its vacated default (post-verbal) position on the other.³ The main research interest of this chapter is the question: Once the S-procedure is in place, what types of discourse context are conducive to the L2 production of the Object topicalisation structures? This question is motivated by the observation that after all, many complex structures are 'optional' and that the same proposition can be expressed through alternative structures (see Kawaguchi & Yamaguchi, this volume).

3. I thank the reviewer for this point.

3. The studies: Informants, data collection and data analysis

The current study re-analysed two longitudinal L2 Chinese speech data corpuses collected in China and Australia by Zhang (2001) and Liu (2016) respectively. Both studies were carried out using PT and adopted the methodological approaches required by the theory as further outlined below.⁴

Six *ab-initio* L2 learners of Chinese (three male and three female, aged between 19 and 27) participated in the study. Three informants (Aiko, Leo, Ross) were enrolled in a beginning Chinese language course at a university in China, and the other three (Sara, Cate, Dan) were university students in a first-year Chinese language course in Australia. Aiko was a native speaker of Japanese, Leo a native speaker of Spanish, and the others were L1 speakers of English.⁵

The L2 speech data were collected over the course of one academic year. Data collections occurred more frequently in China because the in-country learners were expected to progress faster and therefore, a more frequent collection schedule was implemented to capture the emergence of new structures. The data collection also lasted longer for the China group due to a longer academic year there. A total of 24 data sets were obtained from the informants in Australia, and 45 data sets from the informants in China.

In both studies, the data was elicited through a variety of tasks designed to target particular grammatical features. Most of the tasks had been trialled with native speakers of Chinese to ensure that they effectively included the structural and discourse-pragmatic contexts for the targeted L2 features. The Object topicalisation structures were not always the target in the elicitation. Some tasks seemed to provide more favourable conditions for them in terms of Topic nomination (e.g., Q&A), while others (e.g., role plays, problem-solving tasks, conversations) were less so and more open to pragmatic interpretation and Topic selection. In any case, the embedded contextual clues for the Object topicalisation structures offered the informants opportunities to use these structures. They did not, and could not possibly, guarantee the production of the anticipated target forms.

The majority of the data was collected in one-on-one verbal communication between the informants and the researcher (R). In a few instances, the informants worked together on problem-solving tasks and roleplays. The task instruction was delivered in English.

4. Subsequent publications (e.g., Zhang, 2007, 2015) were consulted and have also been incorporated in the present study.

5. These are fictitious names.

The verbal output was audio-recorded and transcribed. Aspects of syntax such as the word order of each utterance were tagged. The discourse context surrounding Object topicalisation structures was noted, categorised and further analysed. Excluded from the analysis were false starts, verbatim repetitions, non-verbal utterances (*oh, ah, ahmm*), single words, fixed expressions, and incomplete sentences. Though rich in communicative value, they have little relevance in the current study.

4. Results

4.1 The processing factor in Object topicalisation

The Topic Hypothesis (Pienemann et al., 2005) postulates three steps in its account of the L2 development of sentence structures from canonical to non-canonical, focusing on the mapping processes between constituent structure and functional structure. In the first step, the L2 learner identifies the sentence Subject with the default Topic. This results in language-specific canonical word orders, e.g., [SVO] in Chinese and English, and [SOV] in Japanese. Following that, XP constituents such as adverbials, *Do* and *Wh*-words (in English) can become the sentence Topic [TOP_{XP} SVO] by virtue of their sentence initial position. This leads to the separation between the Topic and the Subject elements, which are marked either morphologically (e.g., in Japanese) or syntactically (e.g., in German and Swedish). Finally, the canonical order is disrupted by Object topicalisation, resulting in the emergence of structures such as [OSV] and [SOV] in Chinese, for example.

The results of the two studies reported in this chapter are consistent with the developmental course depicted in the Topic Hypothesis. No Object topicalisation structures were found in the first four or five data collection sessions. They began to emerge after the [SVO] and [TOP_{ADJ} + SVO] stages.⁶ There was a large gap between the time of the [SVO] emergence and the [OSV] emergence of 110 instructional hours in the data of the Australia group and 220 hours in the data of the China group (see Table 1). This gap suggests that there had been a fundamental change in the informants' L2 processing system that enabled the non-canonical

6. Unlike Japanese and the V2 languages such as German and Swedish in which [XP + SVO] is a significant stage because XP is either differentiated from the Subject morphologically, or triggers SV inversion, the [XP + SVO], in my view, is not such a significant stage in Chinese because it does not require any structural changes. Its exact developmental status in the L2 Chinese processing hierarchy is yet to be clarified. In Zhang & Lantolf (2015), a study that showed OSV emerging before ADJ, learners did not seem to have trouble with the [XP + SVO] structure. In Zhang (2007) and Liu (2016) the emergence of OSV closely followed [SVO]. In the present study, it emerged in D2 (omitted in Table 1).

Table 1. Emergence of Topic-Object structures

AUS	D1	...	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15
T wk	2		12	14	16	18	19	22	25	28	31	34
T hr	48		288	336	384	432	452	512	572	632	692	752
Aiko	SVO		+	+	+	+	+	+	+	+	+	+
			OSV	+	+	+	+	+	+	+	+	+
								SOV	+	/	/	+
											BA	+
Leo	SVO		+	+	+	+	No	+	+	+	+	+
(-sov)			OSV	/	/	+	data	+	+	+	+	+
(-BA)												
Ross	SVO		+	+	+	+	+	+	+	+	+	+
(-sov)				OSV	/	/	+	+	/	+	/	+
											BA	+
CHN	D1 ...	D5	D6	D7	D8	D9						
T-wk	5	16	19	22	25	27						
T-hr	50	160	190	220	250	260						
Sara	SVO	+	+	+	+	+						
(-BA)				OSV	/	/						
												SOV
Cate	SVO	+	+	+	+	+						
(-sov)				OSV	/	/						
												BA
Dan		+	+	+	+	+						
		OSV	/	+	+	+						
				SOV	/	+						
												BA

mapping between the functional and the constituent structure. This capacity development not only created the possibility for other non-canonical structures to be acquired subsequently, but more importantly paved the way for the learners to learn to structure propositional content differently in specific discourse circumstances.

Table 1 shows the year-long picture of the informants' progress. Each data collection session is indicated by 'D' (D1...D5...), their corresponding teaching calendar by 'T wk' (teaching week) and the cumulative instructional hours by 'T hr' (cumulative classroom teaching hours). The emergence point is indicated by the word order abbreviations 'SVO', 'SOV', and 'BA' (i.e., [S BA-OV]). The plus sign '+' means the presence of the relevant structure in the data, and the slash '/' indicates that there was no evidence in the data. The vertical line in the data collection schedule (top row) marks the semester break.

Table 1 shows clearly that of the three Topic-Object structures, both groups favoured [OSV] and neither seemed to make extensive use of [SOV].⁷ It also shows a prolonged time gap between the canonical [SVO] structure and the emergence of Object topicalisation structure in all the informants. Finally, only two informants (Aiko, Dan) produced all three Topic-Object structures.

The acquisition profile of the Object topicalisation structures indicates the challenge of acquiring a procedure that involves the re-alignment between c- and f-structure as well as the semantic and the discourse requirements associated with the re-alignment. Learners are unable to handle Object topicalisation structures without having attained the S-procedure first. This is illustrated in Example (4) in which the same discourse context – comparing two apples – appeared twice, first in week 12 and then in week 14. In this episode, the referent NP *pingguo* ‘apple’ was the Topic expression, established through both verbal (the Researcher’s question) and non-verbal (a picture) prompts. It was known to the interlocutors and clearly identifiable. It was also the most active piece of information in the consciousness of the interlocutors at the moment of the conversation. This NP takes the semantic role of Patient, and is grammatically associated with the Object function. These discourse and syntactic factors strongly compel a sentence structure that positions the NP *pingguo* ‘apple’ in the Topic position pre-verbally. Yet in week 12, Ross produced a canonical [SVO] sentence in (4a) *Ta chi le pingguo* ‘He has eaten an apple.’ The Topic expression *pingguo* ‘apple’ was relegated to the focal position, incompatible with either its Topic status established in the preceding question, or the [–definite] and [–presupposed] features of the post-verbal position for a bare NP. Indeed, Ross’ reply, although grammatically correct, did not sound ‘appropriate’ because it was not structured around the Object topic *pingguo* ‘apple,’ but around the Subject topic *wo* ‘I’. Note that at this point (week 12), the non-canonical Object topicalisation structures had not emerged in Ross’ L2. Two weeks later in week 14, facing the same question and picture, Ross was able to structure his answer around ‘apple,’ effectively producing an Object topicalisation sentence [OSV] for the first time (see 4b).

The examples in (4) captured the transition point of Ross’ L2 Chinese processing skills from the time when he could not structure a pragmatically appropriate non-canonical sentence to the time when he could. Contexts being equal, the ‘allosentences’ (Lambrecht, 1994) (4a) and (4b) attest to the key role played by the L2 processing capacity in the development of the Object topicalisation structures. These instances confirm that without the necessary processing procedure, structural variations in the form of Object topicalisation remain unprocessable and consequently, unlearnable.

7. A caveat is in order: The [SOV] structure was not taught to the China group, although Aiko, the Japanese informant, produced it.

(4) R = Researcher

- R: (Showing two apple pictures. One of the apples had a bite mark on it)
 What's happened to this apple (pointing to the apple with a bite mark)?
 What's the difference between these two apples?
- a. Ross: *Ta chi le pingguo.* [SVO] (Week 12, T7)
 He eat PF apple
 'He has eaten an apple/apples.'
- b. Ross: *Zhe ge pingguo youren chi le.* [OSV] (Week 14, T7)
 This CL apple someone eat PF
 'Someone has eaten this apple.'

4.2 Discourse-pragmatic conditions for Object topicalisation

Once the necessary L2 processing procedure for the non-canonical structure is in place, the Chinese Object topicalisation structures are in principle processable. Learners will begin to venture into L2 discourse-pragmatic space in which structural variations serve discourse-pragmatic purposes. However, learners must be able to first 'see' and grasp the pragmatic import of the discourse context before they can make choices between the Object topicalisation sentences and other structural options.

The data elicitation interview is a form of communication in which the informants and the researcher engaged in goal-oriented conversation exchanges. In the elicitation sessions, sometimes the informants were asked to produce a self-introduction and picture description, or say something about their family, study, vacation, etc. At other times they were engaged in dialogues through Q&A, casual conversations, or responses to prompts. Occasionally they worked together to complete tasks or perform role-plays. The contexts that triggered or motivated pragmatic structuring of meaning were potentially present in all of these verbal activities, although some were more transparent or constraining than others.

Three types of discourse contexts were found to be particularly conducive to the production of the Object topicalisation structures. They were (1) the Q&A sequence, (2) the local inanimate topic, and (3) the 'disposal' situation. Each of these is outlined below with examples from the data.

According to Conversation Analysis (Sacks et al., 1974), the Q&A sequence forms an 'adjacency pair' in which the first pair part – the question – activates a referent into the conversation, endowing it with [+presupposed] [+identifiable] [+definite] features. If this referent is linked to the Patient argument and the grammatical function of Object, a link is then established between the syntactic and the discourse-pragmatic levels such that the referent is strongly favoured to be designated as the sentence Topic in the second pair part – the answer. In order to be semantically and communicatively relevant, the respondent must continue with the Object referent by placing it in the Topic position of the sentence (see (4b) for example).

A large number of Object topicalisation sentences, especially in the China group, were found in the Q&A sequences after their emergence. Examples are shown in (5), (6) and (7). They were usually short, consisting of two turns, 'Q + A'. The discourse context in these instances was clearly concerned with a Patient referent, which was being nominated as the Topic of the Q-part: *zidian* 'dictionary' in (5), *pingguo* 'apple' in (6), and *biede ke* 'other classes' in (7). In the A-part, these referents were picked up and linked to the Object function, mapped onto the Topic expression and placed in the Topic position.

- (5) R = Researcher (Week 33, T11)
 R: (*Pointing at a picture*)
haode. Na zhe ge zidian ne?
 Ok. Then this CL dictionary NE
 'Ok. Then what about this dictionary?'
 Leo: *zhe ge zidian wo gei ta. Yinwei tade gongzuo shi en zenmeshuo* [OSV]
This CL dictionary I give her. Because her work is en how to say
 'This dictionary, I gave it to her because her work is en how to say that?'
- (6) R: (*Pointing at a picture*) (Week 30, T10)
na zhe ge pingguo ne?
 Then this CL apple NE
 'Then what about this apple?'
 Aiko: *Pingguo chi le, wo gen pengyou yiqi chi le.* [OV, (O)SV]
apple eat PF, I with friend(s) together eat PF
 Apples were eaten. My friend(s) and I ate them together.
 R: (*Pointing at a picture*)
Na zhe ge cai ne?
 Then this CL dish NE
 Then what about this dish?
 Aiko: *Cai women dou chi le.* [OSV]
dish we all eat PF
 We have eaten it all.
- (7) R: (*Conversation*) (Week 29, T7)
Biede ke hai shang ma?
other class still have Q-marker?
 'How about other classes?'
 Sara: *Biede ke wo bu shangke.*⁸ [OSV]
Other class I no have-class
 'I don't have other classes.'

8. This is an ungrammatical sentence because the Object *ke* 'class' appears twice. It could be due to a number of reasons. For example, flawed lexical learning of the noun *ke* (class, lesson) and the verb *shangke* (have a class), or a lack of annotation of the verb *shangke* (V+O), or the

Similar contextual motivations for the Object topicalisation structures were found in a role-play in which the informants had collaborated to produce three Q&A sequences, two of which resulted in the Object topicalisation sentences. In Example (8) below, the informants were each given a cue card (in English) in which the situation (to borrow an item), their respective roles (borrower, lender), and their response (to refuse) were specified. Cate, the borrower, asked a series of questions in (a), (c) and (d) about the items she intended to borrow. These items were thus introduced into the local discourse environment, acting as the Topic element that then occupied the attention of the participants. At the sentence level, these to-be-borrowed items were associated with the Patient argument and mapped onto the grammatical function of Object. Although structural choices such as [S_{TOP} VO] and [O_{TOP} SV] were both available in these contexts, a pragmatic rendition in the answer would only assign the items the Topic status in these Q&A events, because they were endowed with Topic features such as [+presupposed], [+definite], [+identifiable] in this stretch of conversation. These Topic features thus determine the position the 'to-be-borrowed-item' must occupy in a sentence in order to convey the intended communicative meaning.

In the answers, Dan in (b) and Sharon in (f) continued with the discourse topic – the 'items' to be borrowed – and associated them with the grammatical Object. The [OSV] and [SOV] sentences they produced were reflections of the underlying information structure being perceived. Note the word order contrast in (f) between 'a CD player' in *Wo mai le yi ge xin CD player* 'I bought a new CD player' [SVO] and 'the tape-recorder' in *Wo luyinji bu yong* 'I the tape-recorder not use' [SOV]. The different information status in terms of [+/- presupposed] was duly noted and expressed in structures in which the new information 'a CD player' was placed post-verbally while the established information 'the tape-recorder' was positioned pre-verbally.

The interactive sequence in (8) also contains a counter example. Given the same discourse context for 'the chair' in (c), the [SVO] order in (d) is not appropriate discourse-pragmatically although it is grammatically well-formed. The discourse topic of the moment being 'the chair,' the utterance should be structured in such a way that this piece of topical information occupies the sentence Topic position, resulting in an Object topicalisation sentence.

functional linking of the Object NP *ke* to the Topic expression *ke* (as suggested by one of the reviewers). The point here is Sara's ability to maintain the Object-topic expression nominated in the question and produce a pragmatically appropriate though structurally imperfect Object topicalisation sentence.

- (8) Roleplay: To borrow house items
- a. Cate: *Yiqian ni you yi ge dianshi. Ni de dianshi zai nar?*
 past you have one CL TV. You POSS TV in where?
 ‘You had a TV in the past. Where is it?’
- b. Dan: *women de dianshi shi women de dianshi en shang ge xingqi*
 we POSS TV is we POSS TV en last CL week
gei wo de pengyou jie le. [OSV]
 give I POSS friend borrow PF
 ‘Our TV was given to our friend(s) last week.’
- c. Cate: *Keshi zuijin ni mai le yi ba yizi... keshi xianzai wo*
 But recently you buy PF one CL chair... but now I
bu kanjian yizi. Yizi zai nar?
 not see chair. Chair in where?
 ‘Recently you have bought a chair. But now I don’t see it. Where is it?’
- d. Sara: *Wo gei charity de ren wo de yizi.* [SVOO]
 I give charity POSS people I POSS chair
 ‘I have given the chair to the charity.’
- e. Cate: *Ni de luyinji ye bu zai zher. Luyinji*
 You POSS tape-recorder also not in here. Tape-recorder
zai nar?
 in where? [SVO]
 ‘Your tape-recorder is also not here. Where is it?’
- f. Sara: *Wo mai le yi ge xin CD player. Wo luyinji bu yong.*
 I buy PF one CL new CD player. I tape-recorder not use.
Wo gei wo de pengyou. [SOV]
 I give I POSS Friend’
 ‘I’ve bought a new CD player. I don’t use my tape-recorder, and have given it to my friend.’

In the Q&A sequence, the Topic referent is explicitly nominated in the first pair part. This allows the interlocutors to assess its information status within the discourse environment. In the second type of context – the local inanimate topic – the Topic referent, usually an inanimate item associated with the Patient role and grammatical Object, is created collaboratively by the interlocutors in the conversation. Being the discourse centre of the moment, it occupies the attention and consciousness of the interlocutors, creating the condition for the Object topicalisation structure. Examples (9) and (10) illustrate this point. First, a new referent is introduced into the conversation in an earlier utterance through the canonical order. Once evoked, this referent becomes the focal point or the discourse Topic in the subsequent utterance(s) (until it is abandoned). This is reflected in the linguistic encoding either

positionally or lexically.⁹ In (9), for example, Cate, being a travel agent in a role-play, was explaining to the customer (Researcher) the accommodation arrangements. The hotel ‘Top of the Town’ was introduced as the grammatical Object in a [SVO] sentence. Once activated, it became the Topic in the subsequent utterance and was placed in the sentence-initial position. The information structure is syntactically expressed in the Object topicalisation structure [OV].

Similarly, in (10a), Aiko first reproduced a Chinese sentence she had heard elsewhere, and then asked a question about its grammaticality through topicalising the referring expression *zhe ge* ‘this (sentence)’, and associating it with the grammatical Object. Following the confirmation from the Researcher, she expressed her experience in (10b) (‘never heard of it’) by once again topicalising the same Object referring expression *zhe ge* ‘this (sentence)’. Both utterances are in the [OV] order, having the referring expression *zhe ge* ‘this (sentence)’ positioned pre-verbally.

(9) Roleplay: Travel agent (Week 29, T7)

R = Researcher

Cate: *Zai Xini ni zhu zai Top of the Town. Zhe ge lüguan zai ditu*
in Sydney you live in Top of the Town. *This CL hotel in map*
xie zhe.

write DUR (durative marker) [OV]

‘In Sydney you stay in Top of the Town. This hotel is written on the map.’

(10) a. Aiko: “*Di liu ke xue wan le wo.*” ... *Zhe ge*
“number 6 lesson study finish PF I.” ... *This CL*
shuo ma? [OV]

say Qma?

“‘Lesson 6 finished study I’... Do you say that?’ (Week 42, T14)

R: *Zhe ge keneng shao, danshi youshihou ye shuo.*

This CL maybe few, but sometimes also say

‘This may not be used a lot, only sometimes.’

... ..

b. Aiko: *Danshi zhe ge mei tingshuo.* [OV]

But *this CL* not heard

‘But I have never heard of it before.’

Similar instances were found in the data of Dan in (11) and Leo in (12). In both instances, a piece of new information such as ‘a film’, ‘a piece of paper’, was first introduced into the discourse as grammatical Object in a canonical [SVO] form, and was then made into a conversation topic and associated with the grammatical function of Object. The sentence in which they were positioned sentence-initially

9. With a definite pronoun *zhe* ‘this’, *na* ‘that’.

in (12) or pre-verbally in (11) meant that the Object constituent functioned as the Topic that the rest of the sentence was about. In these examples, the Object topicalisation expressions were all inanimate elements. They entered the discourse through the locally managed flow of conversation rather than contextual manipulation in the form of elicitation tasks. The participants needed to attune themselves to the discourse context of the conversation moment by moment, and structure their structural contributions accordingly.

(11) R = Researcher

Dan: *Oh zuotian wo qu kan Hercules.* [SVO] (Week 29, T7)

Oh yesterday I go see Hercules

‘Oh yesterday I went to see Hercules.’

R: *Haokan ma? Bu haokan. Hercules donghuapian.*

Good-see Qma? Not good-see. *Herculus cartoon*

‘Is it good? Not good. Hercules is a cartoon film.’

Dan: *Wo xiang [laoshi zheyang de dianying bu xihuan].* [SOV]

I think teacher *this kind DE film* not like

‘I don’t think you like this kind of film.’

(12) Leo: *Wo qu ta de fangjian, wo wen ta weishenme*

I go he POSS room, I ask him why

ni + xie bu hao?

(Week 13, T13)

you write not good

‘I went to his room and asked him why you wrote so badly?’

R: *Ni xie de bu hao.*

You write DE no good

‘You write badly.’

Leo: *xie de bu hao. Laoban weishenme ni xie de bu hao? Ni*

write DE not good. boss why you write DE not good? You

shi hen zhongyao de ren zai zhe ge gongsi. Suoyi ni

are very important ADJ person in this CL company. So you

xuyao xie de hen hao. Xiaci

need write DE very good. Next.time

gei wo yi ge zhi, yinwei [VOO]

give me one CL paper, because

wo kanbudong, zhe ge wo kanbudong. [OSV]

I look-not-understand, *this CL I look-not-understand*

‘Write badly. Boss why did you write so badly? You are a very important person in the company. So you must write well. Next time you give me a paper, because I cannot understand this one.’

The third type of discourse context conducive to the Object topicalisation structure is the ‘disposal’ situation. This is a situation in which ‘disposal’ semantics are present literally or figuratively. According to Wen (2006: 95), “[t]he more the message concerns the affectedness of the object, the more likely the *ba* construction is used.” In other words, the BA-construction canonically expresses a strong sense of disposability of something or someone. Example (13) illustrates this point. It was a problem-solving task involving the moving of a locomotive from positions A and B to its destination C. The solution involved several intermediate steps, each one requiring the locomotive to be pushed or pulled to and from a particular position – a series of ‘disposal’ throughout the entire process. Inherent in this situation was the following information: A topical inanimate Patient ‘locomotive’ and a focal locative (positions A, B, C) selected by the transitive verbs *tui* ‘push,’ and *la* ‘pull,’ both of which strongly favour the BA-construction.¹⁰ Unlike the Q&A and local inanimate topic contexts, no overt clues were present. The challenge for the informants was to construe the situation as ‘disposal,’ associate it with BA-semantics, and encode the proposition around the Topic expression *huochetou* ‘locomotive.’

The collaborative and scaffolded discourse episode in (13) shows that although *huochetou* ‘locomotive’ was produced as a bare noun by all three informants, its information status as the central component of the task, i.e., the Topic, was immediately grasped. Its grammatical function, however, was not grasped by all. Sara’s attempts in (a) and (c) illustrate the point. Topicalised in the incompleting subordinate clause in (a), the NP *huoche* ‘train’ seemed to be associated with the grammatical function of Subject in the completed sentence in (c), resulting in a sentence meaning ‘The train should push #1.’ Dan’s interruption in (b) in which he supplied the ‘disposal’ marker BA did not alter Sara’s production in (c) and (g); she did not pick up the ‘disposal’ information. On the other hand, both Dan and Cate not only detected the ‘disposal’ semantics of the task, but used the BA-construction to acknowledge the Topic status of the Object (see (d), (e)). The question is why Sara did not acknowledge this.

A possible answer is that Sara did not yet have the processing capacity for the BA-construction. Her emergence profile displayed in Table 1 shows that the BA-construction had not yet emerged in her L2 Chinese. Consequently, no priming effect of explicit and immediate linguistic clues eventuated in her BA-sentence even though the on-going discourse condition strongly favours the BA-sentence.

Example (13) also shows the choice of a canonical structure [TOP_{AGENT} VO] by Dan. In (f), the hitherto topical *huochetou* ‘locomotive’ resides in the post-verbal

10. I thank the reviewer for the suggestion.

Object position.¹¹ The example indicates Dan's skill to handle L2 Chinese word order variations that express the same proposition.

- (13) Problem-solving task: To get the locomotive from Positions B and C to Position A. (Week 27)
- a. Sara: *Wo xiang...huoche yinggai=*
I think...train should=
'I think the train should'
- b. Dan: *ba*
BA
- c. Sara: *=tui yi hao*
=push #1
'=push to #1'
- d. Dan: *ba ba huochetou tuidao B.*
BA BA locomotive push.to B
'Push the locomotive to B.'
- e. Cate: *Dui. Women ba huochetou tui guolai.*
Yes. We BA locomotive push over.come.
'Yes. We push the locomotive over here.'
- f. Dan: *Dui, tuiguo A yihou, women yinghai tui huochetou guo qiao*
yes, push.over A after, we should push train over bridge
'Yes, after pushing it over A, we should push the train over the bridge.'
- g. Sara: *Yeah, wo xiang huochetou yinggai tui yi hao, dao Position B.*
yeah, I think locomotive should push #1, to Position B
'Yeah, I think the locomotive should be pushed to #1, to Position B.'

To sum up, sentence forms are syntactic representations of propositional content. While the same proposition can be expressed in different sentence forms, one key factor contributing to the choice of a particular form is the speaker's assumption of the information status of the various referents in the consciousness of the hearer at the moment of utterance, as illustrated in Examples (1) 'car-buying' and (2) 'guest-coming.' However, in L2 acquisition, a prerequisite – the L2 processing skill – must be developed before these responses to the perceived information status can linguistically be materialised. Only when the prerequisite capacities are available would the learner be in a position to potentially follow through the pragmatic implications associated with structural variations on the one hand, and with discourse contexts on the other. To answer the question posed earlier, 'Once the S-procedure is in place, what types of discourse context are conducive to the L2 production of

11. I thank the reviewer for pointing out this example.

the Topic-Object structures?’ the following conditions seem to be conducive for the production of these structures.

1. The Q&A sequence: The Q-part nominates a Topic referent.
2. The local inanimate topic: The Topic referent is an inanimate constituent associated with the Patient role and grammatical Object in a locally managed conversation moment.
3. The disposal situation: The discourse context is inherent with ‘disposal’ semantics.

And these conditions will only be effective when the S-procedure has been developed in the L2 Chinese.

5. Discussion

Within a year, all six beginning L2 Chinese learners, in both second and foreign language settings, attained the necessary skills to process Chinese Object topicalisation structures. They became more sensitive to the discourse context, and were beginning to exercise structural choices to negotiate form, meaning and use relationships in oral communications.

While languages provide structural alternatives for encoding propositional content, the realisation of a form at a particular communicative moment depends on many factors. One of the factors is information structure – “the relationship between the structure of sentences and the linguistic and extra-linguistic contexts in which sentences are used as units of propositional information” (Lambrecht, 1994: xiv). As such, the choice of sentence forms in a verbal communication event is to a large extent motivated as well as constrained by discourse circumstances in which the speaker and hearer organise their contributions on the basis of their perceptions of each other’s knowledge and consciousness of the information at the moment of utterance.

In second language acquisition, the ability to choose and structure a sentence form has additional layers of constraint, i.e., the learner’s knowledge of the target language grammar, his/her current L2 processing skills, his/her grasp of the discourse-pragmatic features of the context, and his/her ability to encode the meaning in a syntactically correct and pragmatically appropriate form. The present study shows that the emergence of the non-canonical Object topicalisation structures follows that of the canonical form but only after a long time gap, suggesting a fundamental change in learners’ L2 processing skills. In the study, three types of discourse circumstances tended to prompt Object topicalisation production: the Q&A

sequence, the local inanimate topic, and the ‘disposal’ situation. These discourse contexts offer varying degrees of information transparency for Object topicalisation, ranging from the most explicit in the Q&A sequence, to the rather opaque in the ‘disposal’ situation. These different contexts offer different challenges for learning how to ‘see’ and to ‘think’ like a native speaker in order to ‘talk’ like one. The data also show certain grammatical patterns within these discourse contexts: The Object referents tended to be inanimate elements associated with the Patient role and the grammatical function of Object. Although the inanimate Object is not a must in Chinese grammar, it certainly seems to facilitate the learning and production of the Object topicalisation structures in the early L2 Chinese. These combinations reveal the delicate but systematic interplay between processing requirements, discourse-pragmatic features and grammatical constraints in the course of second language acquisition.

6. Conclusion

This study examined some of the key factors underlying the L2 acquisition of Chinese Object topicalisation sentence forms. The structures are non-canonical in the c-structure and reflect the pragmatic packaging of propositions within the rules of Chinese grammar. They tend to occur when the topical constituent is associated with the Patient role and grammatical Object.

The study reveals the prerequisite L2 processing skills required for the Chinese Object topicalisation structures to be used in response to the information status of the Object referent. Once the prerequisite capacities have emerged, the Q&A sequence best facilitates the learners’ discourse-pragmatic interpretation of the discourse context and encourages the production of the Object-Topic structure in which the Topic expression is connected to the grammatical Object. These findings lend further support to the processing-based claims of second language acquisition as articulated in PT, as well as the role of information structure in the acquisition, production and use of non-canonical sentence forms such as Object topicalisation structures in L2 Chinese. The findings of the discourse contexts that support the production of Object topicalisation sentences may provide assistance to task design in both research and teaching. In the former, they offer options for contextual manipulation for the elicitation of optional structures. In the latter, they provide ideas about relevant pedagogical task design.

Exploratory in nature, the present study leaves many questions unanswered and issues unresolved. For example, the findings displayed in Table 1 show a clear emergence sequence among the three Object topicalisation structures, starting

from [OSV] to [SOV] and finally to [S BA-OV]. Further studies should look more closely at it at both theoretical and empirical levels to confirm the validity of the sequence. Furthermore, is inanimacy of the Object an accidental artefact of the tasks, or a required constraining element for Object topicalisation to materialise in early L2 Chinese? What did instances of inappropriate structures and their discourse contexts reveal about the state of the informants' interlanguage? To what extent did Aiko's L1 Japanese assist her acquisition and production of the [SOV] structure? These questions and issues may inform future studies that employ various theoretical frameworks and approaches to explore the processes and dynamics of L2 acquisition of Chinese.

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References

- Brown, R. (1973). *A first language: The early stages*. Cambridge, MA: Harvard University Press. <https://doi.org/10.4159/harvard.9780674732469>
- Chao, Y-R. (1968). *A grammar of spoken Chinese*. Berkeley, CA: University of California Press.
- Chen, R. (1995). Communicative dynamism and word order in Mandarin Chinese. *Language Science* 17(2), 201–222. [https://doi.org/10.1016/0388-0001\(95\)00010-5](https://doi.org/10.1016/0388-0001(95)00010-5)
- Clahsen, H., Meisel, J., & Pienemann, M. (1983). *Deutsch als Zweitsprache. Der Spracherwerb ausländischer Arbeiter*. Tübingen: Narr.
- Dulay, H., & Burt, M. (1974). Natural sequences in Child second language acquisition. *Language Learning* 24, 37–53. <https://doi.org/10.1111/j.1467-1770.1974.tb00234.x>
- Dulay, H., Burt, M., & Krashen, S. (1982). *Language two*. Oxford: Oxford University Press.
- Halliday, M. A. K. (1967). Notes on transitivity and theme in English: Part 2. *Journal of Linguistics* 3(2), 199–244. <https://doi.org/10.1017/S0022226700016613>
- Huang, C-T. J. (1982). *Logical relations in Chinese and the theory of grammar* (Unpublished doctoral dissertation). MIT.
- Huang, C-T. J. (1984). On the distribution and reference of empty pronouns. *Linguistic Inquiry* 15, 531–574.
- Lambrech, K. (1994). *Information structure and sentence form*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511620607>
- LaPolla, R. J. (1995). Pragmatic relations and word order in Chinese. In P. Dowing & M. Noonan (Eds.), *Word order in Chinese* (pp. 297–329). Amsterdam: John Benjamins.

- LaPolla, R. J. (2009). Chinese as a Topic-Comment (not Topic-Prominent and not SVO) language. In J. Xing (Ed.), *Studies of Chinese linguistics: Functional approaches* (pp. 9–22). Hong Kong: Hong Kong University Press.
- Li, C., & Thompson, S. (1975). The semantic function of word order in Chinese. In C. Li (Ed.), *Word order and word order change* (pp. 163–195). Austin, TX: University of Texas Press.
- Li, C., & Thompson, S. (1976). Subject and topic: A new typology of language. In C. Li (Ed.), *Subject and topic* (pp. 457–490). New York, NY: Academic Press.
- Li, C., & Thompson, S. (1981). *Mandarin Chinese: A functional reference grammar*. Berkeley, CA: University of California Press.
- Liu, B. (2016). A processing approach to the L2 acquisition of Chinese syntax (Unpublished doctoral dissertation). The Australian National University.
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M., di Biase, B., & Kawaguchi, S. (2005). Extending Processability Theory. In M. Pienemann (Ed.), *Cross-linguistic aspects of Processability Theory* (pp. 199–252). Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30.09pie>
- Sacks, H., Schegloff, E., & Jefferson, G. (1974). A simplest systematics for the organization of turn-taking for conversation. *Language* 50(4), 696–735. <https://doi.org/10.1353/lan.1974.0010>
- Wen, X. (2006). Acquisition sequence of three constructions: An analysis of the Interlanguage of learners of Chinese as a foreign language. *Journal of the Chinese Language Teachers Association* 41(3), 89–113.
- Xu, L., & Langendoen, T. (1985). Topic structures in Chinese. *Language* 61(1), 1–27. <https://doi.org/10.2307/413419>
- Yuan, B. (1995). Acquisition of based-generated topics by English-speaking learners of Chinese. *Language Learning* 45(4), 567–603. <https://doi.org/10.1111/j.1467-1770.1995.tb00455.x>
- Zhang, Y. (2001). Second language acquisition of Chinese grammatical morphemes: A processability perspective (Unpublished doctoral dissertation). The Australian National University.
- Zhang, Y. (2007). Testing the Topic Hypothesis: The L2 acquisition of Chinese syntax. In F. Mansouri (Ed.), *Second language acquisition research: Theory-construction and testing* (pp. 145–172). Newcastle upon Tyne: Cambridge Scholars.
- Zhang, Y. (2015) The Emergence of sentence Topic in a Topic-prominent language: A descriptive study of L2 Chinese. In K. Baten, A. Buyl, K. Lochtmann & M. Van Herreweghe (Eds.), *Theoretical and methodological developments in Processability Theory* (pp. 45–70). Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.4.03zha>
- Zhang, X., & Lantolf, J. P. (2015). Natural or artificial: Is the route of L2 development teachable? *Language Learning* 65(1), 152–180. <https://doi.org/10.1111/lang.12094>
- Zhu, D. (1998). *Yufa Jiāngyì [Lectures on grammar]*. Beijing: Commercial Press.

Modelling relative clauses in Processability Theory and Lexical-Functional Grammar

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This chapter formally analyses English relative clause (RC) constructions within the framework of Processability Theory (PT) (Pienemann, 1998, 2005) using the grammatical formalism of Lexical Functional Grammar (LFG) (Bresnan, 2001) as an analytical tool. A theoretical account of (a) the classification of RCs in terms of the PT hierarchy of processing procedures and (b) a processing hierarchy of different types of RCs is provided that is based on the linear and non-linear mapping processes between c- and f-structure. This approach is extended by the discussion of the syntactic role of the head noun phrase (NP_{head}) in the matrix clause considering general assumptions about working memory (Kuno, 1974) and the grammatical memory store (Levelt, 1989).

1. Introduction

Relative clauses have been discussed in the context of Second Language Acquisition (SLA) for a long time (see Schumann, 1980). It seems to be a structure involving various processes which cannot be analysed and classified easily. Several studies address processing difficulties with regard to either the grammatical function of the relative pronoun (RP) in the modifying clause or the syntactic function of the head noun phrase in the matrix clause (Doughty, 1988; Gass, 1979; Hyltenstam, 1984; Romaine, 1984). As pointed out by Kawaguchi and Yamaguchi (this volume), in most studies the focus is more on comprehension of RCs and less on their production. Interestingly, different approaches yield different and seemingly contradictory results (e.g., Gass & Ard, 1980; Kuno, 1974; Sheldon, 1974). Consequently, it is still unclear which types of RCs impose which kind of processing challenge for the L2 learner.

In terms of developmental sequences, no clear-cut classification of RC constructions in the PT hierarchy of processing procedures has been provided so far. One reason might be the fact that several processes, for instance subject-verb

agreement and subordination, are involved in RC production and not all of them are necessarily acquired at the same time. As there are different types of RCs, their acquisition might occur at different stages. Alternatively, different clause types might be sequentially acquired within one stage. To add a further, more practical point, RCs as such are not an obligatory structure and a proposition expressed with a subordinate RC could just as well be expressed through, for example, two main clauses. For researchers, this fact makes it difficult to elicit simple RCs not to mention all different types of RCs that could potentially be produced.

Nevertheless, Pienemann (1998) hypothesises that subordinate clauses will emerge in the interlanguage of a learner at stage 6 because of the requirement for information exchange between subordinate and main clause. Since, at first glance, the structure of RCs is similar to subordination, it is appealing to suggest that they will all be acquired at the same stage. It is however not certain to what extent this suggestion is accurate. A theoretical account that could provide support for such a claim is presented in Section 2.2. Empirically however, specific early kinds of RC forms, such as Amalgam RCs, seem to appear in the interlanguage of learners at earlier stages (see Kawaguchi & Yamaguchi, this volume). Additionally, Kawaguchi and Yamaguchi's data show that not all aspects of RCs are acquired at the same time, i.e., that not necessarily all types of RCs emerge at the same stage. This chapter focuses on a theoretical framework for positioning the different kinds of RCs that are considered as features of English. It does not attempt to consider any of the alternative types such as Amalgam RCs that are discussed by Kawaguchi and Yamaguchi. The relationship between the two chapters is therefore in ways of understanding the acquisition of the more elaborated versions of RCs.

There are other reasons to suspect that not all RCs are identical in their processing demands. In relation to the function of the RP in an RC construction, Keenan and Comrie (1977) proposed the Noun Phrase Accessibility Hierarchy (NPAH) to classify relative clauses in one particular language on a continuous scale from most accessible, i.e., easy to form, to least accessible, i.e., most difficult to form. In this hierarchy, Keenan and Comrie (1977) claim that the subject position is generally the most accessible one in all kinds of typologically different languages. Although originally there were no implications for L2 acquisition, it will be shown in Section 4 that the NPAH can at least partly be explained by the mapping principles proposed in LFG, which suggests that there may well be implications for sequences in SLA.

In line with the idea of the NPAH, there is general consensus that different types of relative clauses might impose different challenges for L2 learners with regard to the processing of the relative pronoun's grammatical function (see Doughty, 1988). If all RCs emerge at a particular stage because of the information exchange condition, then differences in relation to NPs could be a reason why the different types of RCs could follow a sequential acquisition within that one stage of development.

As for the syntactic function of the NP_{head} in the matrix clause, there seem to be various controversial assumptions addressing possible processing difficulties for the L2 learner (see Diessel, 2004). Some studies assume processing ease on the basis of the NP_{head} having the same function in the matrix clause as the RP in the modifying clause (Sheldon, 1974). Some, on the other hand, hypothesise processing ease depending on the position of the modifying clause in relation to the matrix clause (Kuno, 1970). These two different interpretations suggest that RCs that would emerge earlier within a particular stage would respectively have either a match between the functions of the NP_{head} in the matrix clause and the RP or (in English) the modifying clause to the right of the matrix clause.

This chapter attempts to classify relative clauses according to the hierarchy proposed by PT and to explain the possible processing difficulties with the mapping principles delineated in LFG. The proposals that are made are then further refined with reference to the grammatical function of the NP_{head} in the main clause.

In the following section, a general representation of RCs as conceptualised in LFG and in PT is provided to shed light on the subsequent discussion of the processing difficulties for the L2 learner.

2. Relative clauses

To limit the scope of the discussion, only the traditional structure of English relative clauses, i.e., those having a relative pronoun which relates a restrictive clause to a head noun phrase, will be considered in this chapter. For an empirical analysis of infinitival and participial RCs, see Kawaguchi and Yamaguchi (this volume).

A relative clause construction consists of a noun phrase (NP) and its modifying clause. The noun in the NP functions as the head of the whole phrase (NP_{head}). In English, the modifying clause can be introduced by a relative pronoun (who, which) or a ‘relativiser’ (that) which is co-referential with the NP_{head} (Kroeger, 2004: 165). Example (1) serves as an illustration (see Kroeger, 2004: 165):

- (1) [The girl [whom I love]_S]_{NP} is moving to Argentina.

The sentence in (1) consists of a subject NP with the head noun ‘girl’ and a modifying clause ‘I love’ which is introduced by a relative pronoun. The position relativised by the RP is the object position. The RP is an anaphoric NP, i.e., an element that refers back to its antecedent (the NP_{head}) and encodes the role of the head noun within the relative clause (Kroeger, 2004: 178). Keenan and Comrie (1977) assume that in a relative clause, there is an element which is co-referential with the NP_{head}. Kroeger (2004) refers to this element as *the gap* and to the NP_{head} as *the filler*. The co-referential element is reflected in the relative pronoun.

The RP is bound to change depending on certain features of the head noun. In English, one crucial feature is ANIMACY. ANIMACY is the feature that makes (2) a grammatical sentence in English and renders (3) an ungrammatical one.

- (2) Jonathan ate the cookie which I had bought for myself.
 (3) *Jonathan ate the cookie who(m) I had bought for myself.

As for the NP positions which can be relativised in a sentence, Keenan and Comrie (1977, 1979) propose the Noun Phrase Accessibility Hierarchy (NPAH) for relative clause formation within the formalism of transformational grammar. Example (4) outlines the NPAH as taken from Keenan and Comrie (1977: 66). The symbol '>' designates that the element to the right is 'less accessible', i.e., more difficult to relativise. Examples for each position can be found in Kawaguchi and Yamaguchi (this volume).

- (4) SUBJ > DO > IO > OBL > GEN > OCOMP¹

The hierarchy in (4) gives a “ranking on grammatical functions that constrains relative clause formation by restricting the grammatical function of the argument in the relative clause that is interpreted as co-referent with the modified noun” (Dalrymple, 2001: 8). In other words, some languages, such as Malagasy (Keenan & Comrie, 1977: 69), only have relative clauses which relativise the subject (SUBJ) position. In other languages, e.g., Welsh, it is also possible to relativise the object position and yet others have strategies for every possible position, e.g., English (Keenan & Comrie, 1977: 69). The hierarchy works implicationally. This means that if a language can relativise the indirect object, it will also be able to relativise the direct object.

The overall pattern predicted by the NPAH has found great support in several first (L1) and second (L2) language studies (Doughty, 1988; Gass, 1979; Hyltenstam, 1984; Romaine, 1984), showing that frequency and accuracy of RC production follow the outlined accessibility hierarchy. However, it is not the aim of the NPAH to predict difficulty in processing RCs for an L2 learner but to provide a typological analysis of accessibility. Nonetheless, in this chapter, I argue that the NPAH can be utilised in the context of SLA to predict a natural sequence of RC acquisition for a number of reasons that will be presented in subsequent sections. I thus show how the hierarchy can be supported on the basis of mapping processes formalised in

1. The terminology used by Keenan and Comrie differs slightly from the one commonly used in LFG. DO refers to the direct object, which is labelled OBJ in LFG; IO is the indirect object; OBL is an oblique noun phrase; GEN is a genitive/possessor of an argument; and OCOMP stands for object of comparison.

LFG and why relative clauses which relativise the SUBJ position are easier for L2 learners to process than those relativising the OBJ, OBL or GEN position.

As the distinction between direct and indirect object is not adopted in LFG and sentences relativising the OCOMP position are not generally considered to be grammatical in English, a simplified version of the NPAH (5) will henceforth be employed in the present context as the RC Processability hierarchy (see Kroeger, 2004: 181):

(5) SUBJ > OBJ > OBL > GEN

As for the role of the head noun in the main clause, controversial views exist among researchers studying the L1 and L2 acquisition of RCs. In the Parallel Function Hypothesis, for instance, Sheldon (1974) proposed a syntactic relationship between the head noun and its function in the matrix clause on the one hand and the co-referential relative pronoun and its function in the embedded clause on the other as the basis of acquisition sequences. He assumed difficulties in the processing of co-referential noun phrases with different grammatical functions and predicted “a strategy of interpreting the grammatical function of the relative pronoun as being the same as its antecedent” (Sheldon, 1974: 274). However, an early study of L2 relativisation by Gass and Ard (1980) did not support the claim that non-parallel functions of NP_{head} and RP determine difficulty in processing relative clauses. Alternatively, Kuno (1974) suggested in the Perceptual Difficulty Hypothesis that RCs interrupting the processing of the matrix clause as opposed to relativisation involving right-embedding would be perceptually more challenging due to limitations of human Working Memory (see Doughty, 1991: 437). Put differently, sentences containing a RC appearing after the matrix clause are claimed to be easier to process than those embedding the RC in the centre of the matrix clause. Several studies have confirmed the Perceptual Difficulty Hypothesis (see Schumann, 1980) whereas others seemed not to be able to do so (see Ioup, 1983).

An alternative option is available for this claim since processing difficulties might be explained by mapping processes in LFG. Consequently, the conceptualisation of RCs in LFG will be presented in the next section.

2.1 Relative clauses in LFG

In LFG, RCs are an example of a long distance dependency (LDD) which, by definition, is a “construction [...] in which a displaced constituent bears a syntactic function usually associated with some other position in the sentence” (Dalrymple, 2001: 389). An LDD reflects a separation of elements that belong together by “an arbitrary number of nested clause boundaries” (Kroeger, 2004: 167). In the case of

relative clauses this means that the filler (the NP_{head}) might be separated from the gap (co-referential ‘missing’ element in the RC) by one or several clause boundaries.

There are two alternative long distance dependencies that are involved in a relative clause construction. The first LDD holds between “the fronted phrase and the within-clause grammatical function it fills” (Dalrymple, 2001: 400). Bresnan and Mchombo (1987) proposed that the fronted phrase bears the TOPIC function which is a syntacticised ‘overlay’ discourse function. As stated by the Extended Coherence Condition, the TOPIC function must also be linked to another grammatical function within the clause (Dalrymple, 2001: 400).²

The second long distance dependency is a syntactic dependency, which is represented in f-structure. It involves the relative pronoun itself and its position within the fronted phrase. In an f-structure of a relative clause the attribute RELPRO (relative pronoun) corresponds to the value of the relative pronoun’s f-structure. This representation is illustrated in the following example (Figure 1), taken from Dalrymple (2001: 401) for the phrase ‘a man who Chris saw’.

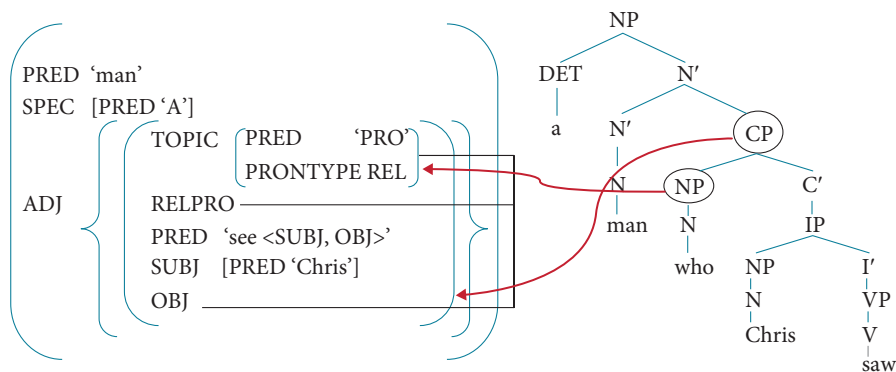


Figure 1. F-structure and c-structure for the phrase ‘a man who Chris saw’ (Dalrymple, 2001: 401)

The relative clause in Figure 1 is treated as an ADJUNCT. It begins with the RP ‘who’. The attribute RELPRO and TOPIC have the value of the relative pronoun’s f-structure corresponding to it. In LFG, the feature PRED depicts meaningful elements that are relevant to the syntax (Falk, 2001: 13). The value for the feature PRED is either the word itself (‘man’) or “[f]or pronouns, which are meaningful but get their reference elsewhere in the sentence or discourse, the special PRED value

2. The Extended Coherence Condition states, according to Dalrymple (2001: 390), that “FOCUS and TOPIC must be linked to the semantic predicate argument structure of the sentence in which they occur, either by functionally or by anaphorically binding an argument”.

‘PRO’ is used” (Falk, 2001: 13). The feature PRONTYPE specifies the type of the pronoun, which, in this case, is REL, i.e., a relative pronoun (Dalrymple, 2001: 400). Following the Extended Coherence Condition, the relative pronoun’s f-structure is also assigned the value of OBJ which means that the relative pronoun ‘who’ is assigned two grammatical functions (TOP and OBJ), which overlay.

In the c-structure tree, the relative clause is part of a Complementiser Phrase (CP), which is a functional category that can be filled by complementisers such as ‘that’ or ‘if’, as well as finite verbs (Dalrymple, 2001: 54). The category I indicates a specified position where a finite verbal element, either an auxiliary (AUX) or a main verb, can appear (Dalrymple, 2001: 53).

Dalrymple (2001: 402f.) proposes the following phrase structure rules for RCs, which are presented in (6) and (7) in a simplified way:

$$(6) \quad N' \rightarrow \left(\begin{array}{c} N' \\ \uparrow = \downarrow \end{array} \right) \quad \begin{array}{l} CP^* \\ \downarrow \in (\uparrow ADJ) \end{array}$$

$$(7) \quad CP \rightarrow \left(\begin{array}{l} RelP \\ (\uparrow TOPIC) = \downarrow \\ (\uparrow TOPIC) = (\uparrow RTOPICPATH) \\ (\uparrow RELPRO PRONTYPE) = {}_c REL \end{array} \right) \left(\begin{array}{c} C' \\ \uparrow = \downarrow \end{array} \right)$$

These rules entail that the c-structure of the CP is mapped onto the ADJ function. Furthermore, in a CP relative clause, different phrase structure categories can appear in phrase initial position. The c-structure metacategory RelP is a representation of these categories and is defined as follows (Dalrymple, 2001: 403):

$$(8) \quad RelP \equiv \{ NP \mid PP \mid AP \mid AdvP \}$$

Thus, the relative pronoun can be a noun phrase (*a man who I selected*), a prepositional phrase (*a man to whom I gave a book*), an adjectival phrase (*the kind of person proud of whom I could never be*) or an adverbial phrase (*the city where I live*) (Dalrymple, 2001: 403).

The first constraint on the RelP daughter ($(\uparrow TOPIC) = \downarrow$) “requires the f-structure corresponding to the RelP node to fill the TOPIC role in the f-structure” (Dalrymple, 2001: 403). The constraint $(\uparrow TOPIC) = (\uparrow RTOPICPATH)$ ensures that “the TOPIC f-structure also fills a grammatical function within the clause” (Dalrymple, 2001: 403). In other words, the relative pronoun has to be assigned two grammatical functions. The constraining equation $(\uparrow RELPRO PRONTYPE) = {}_c REL$ guarantees that the RELPRO attribute corresponds to the feature value PRONTYPE with the value REL. That means a relative pronoun must correspond to the RELPRO attribute (Dalrymple, 2001).

As the aim of the present paper is to outline a PT-based framework for understanding when L2 learners acquire RCs and whether there is a difference between the different types of RCs in terms of their acquisition sequence, the conceptualisation of RCs will be integrated into the framework of Processability Theory in the next section.

2.2 RCs in Processability Theory

It is stated in PT that subordinate clauses of the type '*I wonder what he wants*' appear in the interlanguage of L2 learners at stage 6 of the Processability hierarchy (Pienemann, 1998: 176). The syntactic structure of subject-verb inversion, which an L2 learner acquires at stage 5, needs to be cancelled for subordinate clauses at stage 6 to avoid sentences such as '**I wonder what does he want*'. The distinction between matrix and subordinate clauses, which creates the prerequisites for the processing of Cancel Inversion is claimed to occur at stage 6. Consequently, one might assume that the same mechanisms work for RCs as RCs are a type of subordinate clause. However, it may be necessary to propose a more nuanced solution since there are at least some instances that are not covered by this single principle, e.g., it is assumed that subordinate clauses, along with Wh-words, adjuncts etc. can appear in TOPIC position (Pienemann, 1998: 103), which is true for indirect questions as in '*What he wants, I wonder*'. However, this cannot hold true for relative clauses ('*Whom Chris saw, a man*'), which points to the assumption that RCs are different to other subordinate clauses.

In order to distinguish the subordinate clause from the matrix clause, the complementiser (COMP) is specified with the annotation (Root= -) as in (9) (see Pienemann, 1998: 176).

$$(9) \quad S \rightarrow (\text{COMP})_{\text{Root}=-} \text{NP}_{\text{subj}} (\text{V}_{\text{INF}=+}) (\text{V}_{\text{INF}=-}) (\text{NP}_{\text{obj1}}) (\text{NP}_{\text{obj2}}) (\text{ADJ})$$

This rule ensures that Aux-2nd, Do-Fronting and ADV are blocked in subordinate clauses. Root= - indicates that the subsequent clause is a subordinate clause. In the next section I will explore whether this rule can account for all the different types of RCs.

3. Classification of RCs

The following section provides the central theoretical support for the claim that all relative clauses can be classified as emerging at stage 6 of the Processability hierarchy together with other subordinate clauses. This claim is based on the assumption that inter-clausal information exchange and the syntactic process of Cancel Inversion are the key features uniting RCs.

3.1 Inter-clausal information exchange

Feature unification is the crucial factor in classifying language structures according to the Processability hierarchy. In RCs, information has to be exchanged across phrase boundaries. Consequently, RCs are assumed to appear in the learner's interlanguage in later stages.

Information exchange also takes place within embedded clauses, between the head noun and the relative pronoun. The feature sets for possible lexical entries are hypothesised to look as follows:

$$\begin{array}{l}
 (10) \text{ girl, N (ANIMACY) = + } \quad \text{who, RELPRO (ANIMACY) = +} \\
 \quad \quad \quad \text{(NUMBER) = PL} \quad \quad \quad \text{(NUMBER) = PL} \\
 \quad \quad \quad \text{(PERSON) = 3} \quad \quad \quad \text{(PERSON) = 3}
 \end{array}$$

The most important feature in English RCs containing a RP is ANIMACY as the pronoun 'who' only refers to animate entities. In contrast, 'which' would refer back to inanimate entities and be ungrammatical in the context of Example (10). Hence, the values for the attribute ANIMACY have to be exchanged between the NP_{head} and the RP.

In English, the feature of ANIMACY is not indicated morphologically on the RP but is incorporated in a different lexeme. The information exchange across clause boundaries becomes evident in the matching of the feature ANIMACY in the NP_{head} and the RP. The NP_{head} is dominated by the S-node whereas the RP is dominated by the CP-node (or S'-node).

In summary, the feature unification processes taking place across phrase boundaries are the reasons why RCs should be acquired at stage 6.

An alternative account suggested by a reviewer assumes that instead of the relative pronoun and the NP_{head} being matched through feature unification, the whole structure could also be an instance of anaphoric control. In that case the RP and the NP_{head} would be co-referential and behave in the same way as an anaphoric pronoun connected with the antecedent NP of a preceding sentence, as in *John lives across the street. He is kind.* Following this logic, these two NPs involve

the same referent but access two separate independent conceptual structures. The only relevant information that needs to be maintained is that the two clauses have the same referent. This means that learners might be able to produce an RC with a matching pronoun across a clausal boundary as soon as they can produce the appropriate pronoun.

However, in LFG this kind of anaphoric control applies to non-overt subjects of non-finite clauses and extending it to RCs does not seem to account for the question of which processes are actually involved in matching ‘John’ and ‘he’ and ruling out non target-like matchings such as ‘John’ and ‘she’. Similarly, co-reference alone does not explain why *‘the girls who live next door’* is correct and *‘*the girls which live next door’* is not. Furthermore, in terms of anaphoric control or general binding theory, the RP behaves more like a reflexive pronoun that is bound rather than a non-reflexive that is free. A reflexive pronoun must, however, be bound to its antecedent in a minimal complete clause nucleus, which cannot apply to the RP as its antecedent is across a clause boundary.³ Thus, the difference between *‘Mary_i washed herself_i’* and *‘Mary_i washed her_i’* is that although both instances share the same index ‘*i*’, the reflexive pronoun is bound in the minimal complete clause nucleus and the non-reflexive cannot be bound in the minimal complete clause nucleus. Similarly, in the example *‘the girls_i who_i live next door’* the RP is clearly bound to the NP_{head} (they also share the same index), but the processes that make these two agree are not evident from the fact that they are bound.

Given that this alternative logic does not seem to result in a satisfactory solution, in this chapter, feature unification will be assumed to be the reason why we should classify the production of RCs as belonging to stage 6. The next section will discuss syntactic processes, providing additional support for that assumption.

3.2 Syntax and phrase structure rules

The syntactic procedure of Cancel Inversion is assumed to be located at stage 6. If RCs are to be classified as emerging at stage 6, then we have to assume that Cancel Inversion also applies in the production of relative clauses as the RP (in spite of being a Wh-word identical in form to the respective question pronoun) does not just appear in the XP position, in which Wh-words or adverbs can normally be found. As seen in stage 5, a Wh-word in XP position calls for the sentence mood to be Inversion. In contrast, a relative pronoun after an NP_{head} requires the sentence mood to be Cancel Inversion. That way, phrases such as *‘*the man, to whom does*

3. According to Dalrymple (2001: 281) a Minimal Complete Nucleus is the smallest *f*-structure that contains an *f*-structure *f* and a SUBJ function.

Chris give the book' are ruled out. In the syntactic rule for relative clauses, the feature $\text{Root}=-$ is attached to the RP in order to rule out inversion.

The phrase structure rule for subordinate clauses provided in (9) can only account for relative clauses introduced by the relativiser '*that*'. The feature $\text{Root}=-$ is attached to the COMP '*that*' to indicate a subordinate clause and rule out inversion. Additionally, the NP_{subj} must be optional in order to account for RCs relativising the SUBJ position. In that case, the relativiser '*that*' takes the SUBJ function and its features are matched with those of the NP_{head} .

However, RCs containing a relative pronoun (e.g., '*who*') must be treated differently. RPs are not considered complementisers in LFG. They belong to the category RelP. They carry the same features as the NP_{head} and are assigned a grammatical function within the embedded clause. Thus, in an RC relativising the SUBJ position, the NP_{subj} must be optional as the RP is the SUBJ of the embedded clause. To put the rule into a similar representation as the general rule for subordinate clauses, the c-structure node of COMP is replaced by RelP. The RelP is then annotated for $\text{Root}=-$ to indicate the embedded clause (and exclude marking as the matrix clause) and to rule out inversion. This is presented in (11).

$$(11) \quad S \rightarrow (\text{RelP})_{\text{Root}=-} (\text{NP}_{\text{Subj}}) (V_{\text{INF}=+}) (V_{\text{INF}=-}) (\text{NP}_{\text{obj1}}) (\text{NP}_{\text{obj2}}) (\text{ADJ})$$

To summarise the ideas outlined so far, two phrase structure trees are presented in Figures 2 and 3. They show feature unification processes at the inter-phrasal and inter-clausal levels and follow specific phrase structure rules.

The RelP is annotated with two constraining equations. The first one ($\text{Relpro} = \text{c Rel}$) guarantees that the RC is introduced by a relative pronoun. The second ($\text{Root} = \text{c } -$) states that the following clause is a subordinate clause. The equations ($\uparrow \text{TOPIC} = \downarrow$) and ($\uparrow \text{TOPIC} = \uparrow \text{RTOPICPATH}$) ensure that the RP is mapped onto the TOPIC function and additionally onto another grammatical function.

In both figures, feature unification processes are indicated with bold arrows and mapping processes are depicted with dotted arrows. In Figure 2, the feature ANIMACY has to be matched between the NP '*girl*' and the RP. This information is unified across the clause boundary, i.e., between S and S'. Also, as the RP has the SUBJ role, the verb has to agree with the RP. Therefore, the inter-phrasal 3SG-s morpheme is attached to the verb '*see*'. As for the mapping operation that is involved, the RP is mapped onto the TOPIC and SUBJECT function to satisfy the defining equations. The NP '*Chris*' is mapped onto the OBJ function. The relevant f-structure is shown on the right hand side of the figure.

An RC relativising the OBJ position also shows agreement between the NP_{head} and the RP. In Figure 3, the NP_{head} is an inanimate entity and thus not the RP '*who*' but the RP '*which*' is selected from the mental lexicon. However, as the RP is the

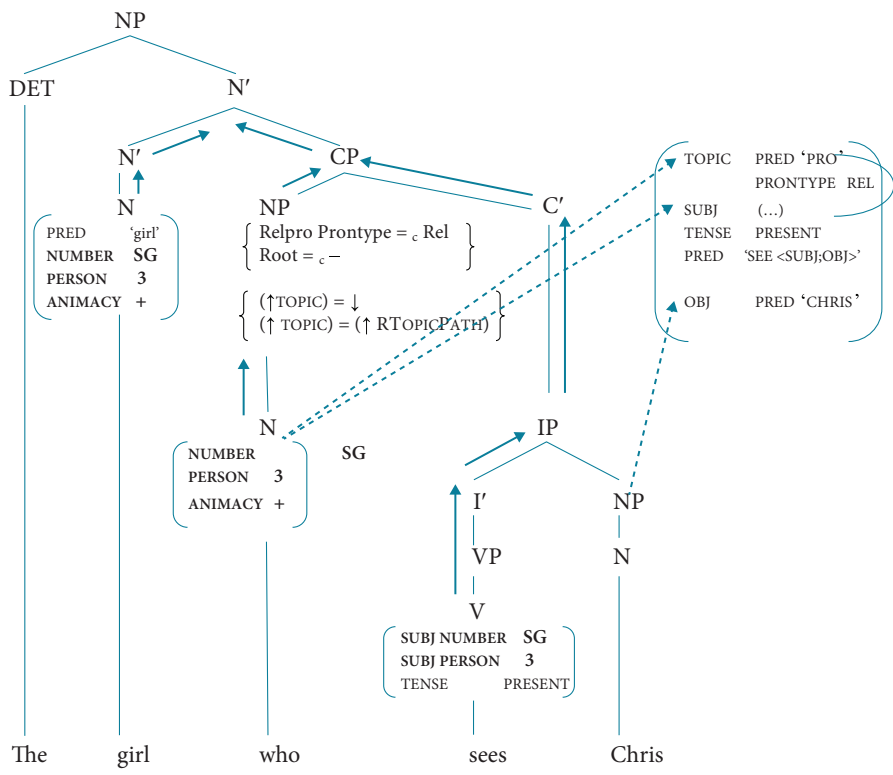


Figure 2. Feature unification and mapping processes for RCs relativising the SUBJ position

OBJ of the clause, the verb does not agree with the RP but with the subject of the clause, i.e., 'Chris'.

The classification of RCs at stage 6 results from underlying feature unification processes which need to take place between the matrix and the subordinate clause and form the syntactic process of Cancel Inversion. These two processes are the minimal requirement for the processing of RCs.

The data presented in Kawaguchi and Yamaguchi (this volume) are only partly related to these theoretical assumptions, as only morphological development is considered in their study and no predictions are made as to when the learner has acquired the subordinate clause procedure. Their claim is that finiteness in (potential) relative clauses is acquired by the learner together with a more accurate use of the S-procedure (see Kawaguchi & Yamaguchi, this volume).

Following the suggestion of a reviewer, alternatively to assuming Cancel Inversion as a minimal requirement one should consider that learners can initially only rely on already familiar structures to produce RCs. From this perspective, the

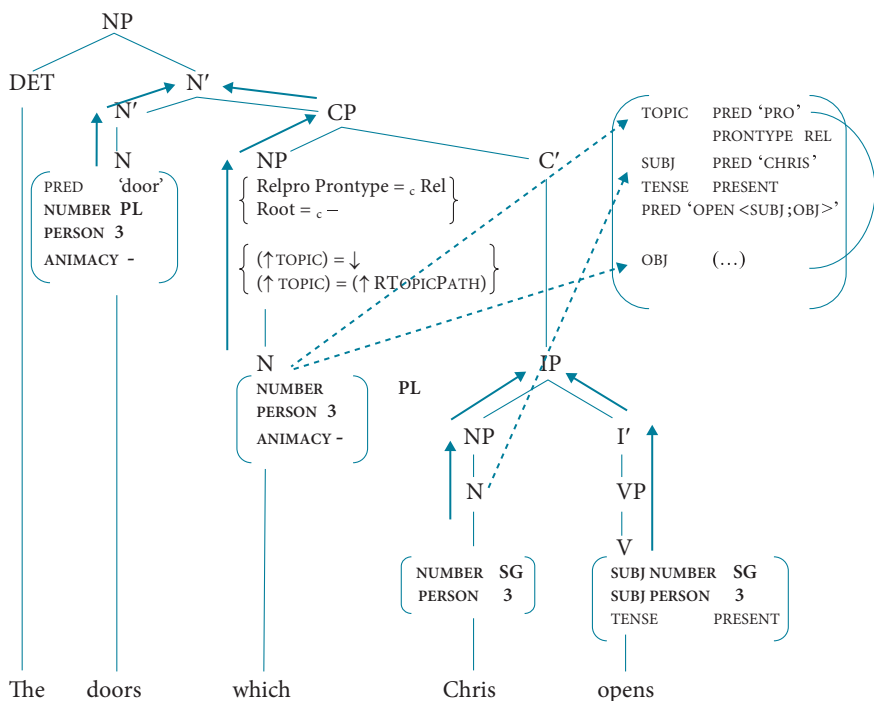


Figure 3. Feature unification and mapping processes for RCs relativising the OBJ position

Topic Hypothesis (Pienemann, 1998) would suggest that learners are initially able to match the SUBJ and the TOP function and in a further step they might be able to produce simple RCs such as *'the door that is open'* at the phrasal level (stage 3). This kind of SUBJ RC is simple in terms of feature unification as the relativiser *'that'* can be used for animate and inanimate entities. Following this line of argument, learners are hypothesised to acquire SUBJ RCs as soon as they can embed a clause. As they advance in their interlanguage development, learners are hypothesised to produce OBJ RCs such as *'the door that I opened'* as soon as they can assign the TOP function to a core argument other than SUBJ. According to the Topic Hypothesis, this structure occurs at stage 4 or 5. Following this analysis, SUBJ RCs with *'that'* could be classified at stage 3. However, the analysis also implies that not all types of RCs are acquired at the same time. Instead, this approach would suggest that different kinds of RCs are rather acquired sequentially across different stages.

What I have sought to demonstrate in this chapter is that although the pre-conditions for the emergence of the elaborated relative clauses are established in stage 6, there is a further sub-sequence that governs the emergence of the different RC types defined by their different mapping processes within that stage. As

Kawaguchi and Yamaguchi have demonstrated, there are additional forms of RCs that can emerge earlier than stage 6 because their processing requirements are radically different from those of the more elaborated relative clause types. In the next section I will discuss the extent to which the hierarchy presented in (5) can be explained by a contrast between (1) linear mapping processes resulting in processing ease and (2) non-linear mapping processes resulting in processing difficulty.

4. Differences in mapping processes

Different NP positions which are relativised in a RC are assumed to show distinct patterns and present different processing difficulties to the L2 learner. This section will concentrate on mapping processes as conceptualised in LFG to allow for an explanation of the hypothesised hierarchy of relative clause processability. Additionally, I will discuss whether the mapping between the three levels differs according to whether the NP_{head} is the SUBJ or the OBJ of the matrix clause.

4.1 The NP_{head} as SUBJ of the matrix clause

The sentences in (12) contain an NP_{head} in the SUBJ position of the matrix clause but each mapping relationship to the RC is different.

- (12) a. The girls who see Chris laugh.
 b. The girls who Chris sees laugh.
 c. The girl to whom Chris gives the book laughs.
 d. The girl whose books Chris read laughs.

The example sentences above are depicted in the following four figures. Each figure shows the mapping principles between the three levels of representation, i.e., the mapping from a(argument)-structure to f(unctional)-structure on the one hand and the mapping from c(onstituent)-structure to f-structure on the other. The two grammatical functions assigned to the RP are indicated with a slash, whereby the TOP function is always the first grammatical function as it does not change depending on the relativised position. The syntactic role of the NP_{head} and the grammatical function of the RP are given in bold print to indicate parallel or non-parallel function.

Figure 4 depicts the Example (12a) relative clause that relativises the SUBJ position. Within the RC, the first NP, i.e., the relative pronoun '*who*', is mapped onto the TOPIC and the SUBJ functions (c- to f- structure mapping). The NP '*Chris*' is mapped onto the OBJ function, which is the next available grammatical function according to the Partial Ordering of Argument Functions (see Bresnan, 2001: 309). The thematic role of agent is assigned to the SUBJ, i.e., the RP, and the

role of patient to the OBJ, i.e., the NP ‘Chris’ (a- to f-structure mapping). This is in line with the Hierarchy of Thematic Roles (Bresnan, 2001: 307), which assumes the agent to be the most prominent thematic role and the patient to be located further down the hierarchy. Most importantly, the mapping of constituents onto grammatical functions is linear and follows the Unmarked Alignment Hypothesis (UAH) (Pienemann, 1998). The UAH predicts a default alignment of subject, verb and object in the initial state. Also, according to the Topic Hypothesis (Pienemann et al., 2005), SUBJ and TOP are not differentiated initially, which is true for the RP in RCs relativising the SUBJ position. Furthermore, the most prominent role (agent) is mapped onto the SUBJ (the RP). This is in line with the Lexical Mapping Hypothesis (LMH) (Pienemann et al., 2005), which assumes that canonical word order and default mapping underpin utterance processing in the first stage of SLA. Thus, learners should acquire RCs relativising the SUBJ position first, as linearity is maintained in the mapping between all three levels.

a- structure	agent	agent		patient	
	↓	↓		↓	
f- structure	SUBJ	TOP/SUBJ		OBJ	
	↑	↑		↑	
c- structure	The girls	who	see	Chris	laugh.

Figure 4. Linear mapping from c- to f-structure and a- to f-structure for a RC relativising the SUBJ position

In contrast, in an RC relativising the OBJ position (Example 12b) (see Figure 5), non-linearity results from OBJ topicalisation. The RP appears in (subordinate) clause initial position but is mapped onto the TOPIC and the OBJ function. This is because the default OBJ position in the subordinate clause is an empty gap and the OBJ function is satisfied by the RP as “the topic phrase is interpreted as bearing the grammatical relation which corresponds to this gap” (Kroeger, 2004: 137).

a- structure	agent	agent		patient	
	↓	↓		↓	
f- structure	SUBJ	SUBJ		TOP/OBJ	
	↑			↑	
c- structure	the girls	who	Chris	sees	laugh.

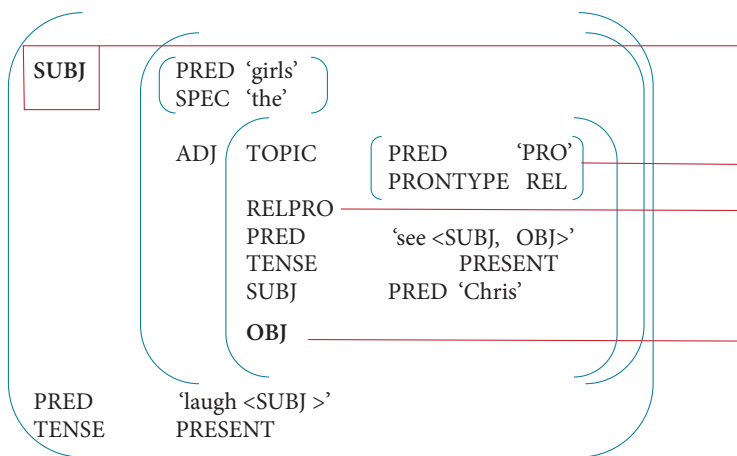
Figure 5. Non-linear mapping from c- to f-structure and linear mapping from a- to f-structure for a RC relativising the OBJ position

Figure 5 shows how the first NP of the clause (the RP) is not mapped onto the SUBJ function but onto the TOP and OBJ function. The second NP 'Chris' is mapped onto the SUBJ function. This assignment of grammatical functions to constituents deviates from the unmarked alignment of subject, verb and object as the OBJ precedes the SUBJ.

The non-linearity involved in the non-canonical mapping of constituents onto grammatical functions is assumed to create processing difficulties for the L2 learner. Thus, RCs relativising the OBJ position are predicted to be acquired later than those relativising the SUBJ position. This interpretation is in line with the Topic Hypothesis (Pienemann et al., 2005) and based on the assumption that at this point in the acquisition sequence the same mechanisms are able to operate in both main and embedded clauses. Thus, at first, the learner does not differentiate between SUBJ and TOP and the SUBJ function is assigned to the TOP function as a default setting (as in 12a). Only at a later stage of L2 development can other core arguments be topicalised, i.e., the TOP function can be assigned to a core argument other than SUBJ (as in 12b).

The f-structure in (13) for the example sentence (12b) additionally depicts the discrepancy between the NP_{head} being the SUBJ of the matrix clause but functioning as the OBJ of the embedded clause.

(13) The girls who Chris sees laugh.



The grammatical function assigned to the RP is independent of the role of the NP_{head} in the matrix clause. In fact, the RP can have any argument function apart from COMP.

To demonstrate this point, Figure 6 illustrates the mapping of the RP onto the TOP and OBL function from Example (12c).

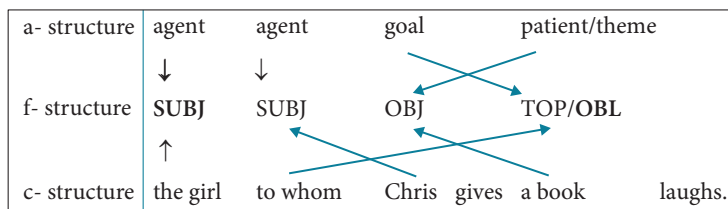


Figure 6. Non-linear mapping from c- to f-structure and from a- to f-structure for a RC relativising OBL₀ position

Example (12c) requires non-linear mapping from a-structure to f-structure and from c-structure to f-structure. In the modifying clause, the RP appears in clause-initial position. It is preceded by a preposition which indicates the OBL function of the gap. Hence, the RP is mapped onto the TOP function and simultaneously satisfies the empty OBL function. The NP ‘Chris’ is mapped onto the SUBJ function and the NP ‘a book’ is mapped onto the OBJ function. This is a further example of non-linearity in c- to f-structure mapping.

As for the mapping of thematic roles onto grammatical functions, non-linearity can be observed in the mapping of the thematic role GOAL onto the TOP/OBL function, i.e., onto the RP and the PATIENT/THEME role onto the OBJ function, i.e., the NP ‘a book’. However, as the most prominent thematic role (agent) is not affected, the extent of the non-linearity and its effect on the L2 learner is hard to estimate.

Even though a precise assessment of relative complexity is not available, the complex structure of RCs relativising the OBL position is predicted to appear in the interlanguage of a learner after both SUBJ and OBJ relative clauses have been acquired. This hierarchy would suggest the sequential acquisition of different RC types within one stage (stage 6) of L2 acquisition.

Lastly, the least accessible position of the RC processability hierarchy, the GEN position (Example 12d), will be discussed briefly. The RP ‘whose’ differs from other RPs in relation to its category. It cannot stand alone as in ‘*the girl whose I like’. Also, the NP_{head} does not function as the filler for the gap as it is not ‘the girl’ who is the OBJ of the modifying clause but whichever element is possessed by ‘the girl’. Hence, the whole NP containing the RP and the noun indicates the OBJ of the modifying clause. The RP functions as a specifier (SPEC) for the noun designating the possessed element. This results in the same mapping process observed in RCs relativising the OBJ position (see Figure 7).

The mapping processes in Figure 7 also hold true for a complex possessor phrase such as ‘the girl whose brother’s books Chris read’. The NP containing the RP as specifier is further specified by another NP but the RP still functions as a single unit and is mapped onto the OBJ function as a whole. The RP must be marked for

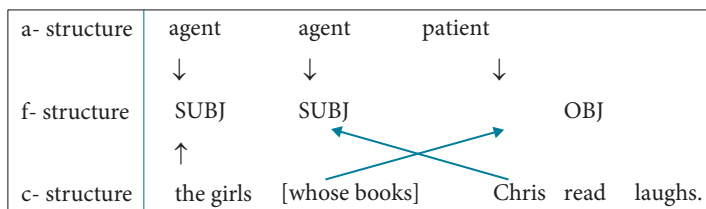


Figure 7. Non-linear mapping from c- to f-structure and linear mapping from a- to f-structure for a RC relativising the GEN position

case and ANIMACY and matched with the NP_{head} . Through the obligatory feature of case (GEN), the role of the NP_{head} in the embedded clause is clearly encoded. Thus, even though the mapping processes underlying the formation of RCs relativising the GEN position seem to be less complex than in the case of RCs relativising the OBL position, the GEN position still seems to be more constrained by lexical entry annotations at the c-structure level. Hence, the hierarchy of RC processability in terms of underlying mapping principles for the first three positions appears to be SUBJ > OBJ > OBL. The GEN position can be but is not necessarily less accessible than the OBL position. The mapping process mirrors the process underlying the relativisation of the OBJ position and the possible processing difficulty results from non-linearity not only in a- or f-structure but must also be present at c-structure level.

The above four positions of the hierarchy barely touch the surface of relative clause formation. Like main clauses, subordinate relative clauses can contain raising verbs or causative constructions as in *‘The man who Jonathan made work nightshifts lives next door.’* These types of verbs will add processing difficulty to relative clauses in the same ways as they do in main clauses. In the example sentence, the RP *‘who’* is mapped onto the TOP and OBJ function. Additionally, the roles of both agent and patient are mapped onto the OBJ function. As the role of agent is not usually associated with the OBJ function, non-linearity results from deviation from Unmarked Alignment. This is also in line with the Lexical Mapping Hypothesis (Pienemann et al., 2005), which states that the most prominent thematic role is mapped onto the SUBJ function. As deviations from Unmarked Alignment, the mapping of other roles onto the SUBJ function, as in passive or causative constructions, is only gradually achieved by the L2 learner. This shows that subordinate clauses display the same types of non-linearity as main clauses, which are assumed to pose additional processing load for the learner. This leads to the assumption of a possible processing hierarchy within the hierarchy of RC processability.

In sum, the hierarchy of RC processability can be accounted for by non-linear mapping processes modelled in LFG. RCs where the RP is in the SUBJ position are hypothesised to be acquired first as the mapping process is linear and SUBJ and TOP are not differentiated. RCs where the RP is in the OBJ position emerge

subsequently but prior to RCs relativising the OBL position. The GEN position appears to have a special status as the mapping process is equivalent to the one found in RCs relativising the OBJ position but is more lexically constrained. The fact that RCs where the RP is in GEN position emerge later than RCs with the RP in OBL position cannot be explained solely in terms of non-linear mapping operations. Instead they need to be explained with the integration of other aspects. These aspects are not part of the current discussion.

Even though the position of the RC in the matrix clause structure has consequences for the sequence of acquisition of relative clauses, non-linearity is not an issue in understanding the consequences for acquisition of the grammatical role of the NP_{head} that the RC modifies. Non-linearity in terms of mapping processes between the three levels of representation does not differ according to whether the NP_{head} is the SUBJ or the OBJ of the matrix clause. The examples discussed so far each contained an NP_{head} which functioned as the subject of the matrix clause. Figure 8 depicts a clause with an NP_{head} functioning as the OBJ of the matrix clause.

a- structure	agent	patient	agent		patient
	↓	↓	↓		↓
f- structure	SUBJ	OBJ	TOP/SUBJ		OBJ
	↑	↑	↑		↑
c- structure	I see	the girls	who	see	Chris

Figure 8. Linear mapping from c- to f-structure and a- to f-structure for a RC relativising the SUBJ position

In Figure 8, the mapping is linear on both levels, just as depicted in Figure 4. Thus, as far as the mapping process is concerned, there seems to be no difference between the NP_{head} being the SUBJ or the OBJ of the matrix clause.

Rather than linearity being the explanation for the acquisitional consequences of the grammatical role of the NP_{head} in the matrix clause, psycholinguistic considerations about human working memory and the assumption of a grammatical memory store may offer an explanation.

4.2 Processing of the NP_{head} as SUBJ vs. OBJ of the matrix clause

In keeping with Kuno (1974), RCs modifying the NP_{head} in the OBJ position of the matrix clause should impose less processing load on working memory and the grammatical memory store than RCs modifying the NP_{head} in the SUBJ position. This is illustrated in Example (14).

- (14)

The girl	who sees Chris	laughs.
P1a	P2	P1b
3 rd SG		3 rd SG –s

In an RC relativising the SUBJ position, the first proposition (P1) is interrupted by another proposition (P2) specifying and referring back to the first. As propositional content is stored in working memory (Levitt, 1989), the speaker needs to keep the second part of the first proposition in mind until the second proposition has been processed. Theoretically, the embedded clause could be endlessly long. Thus, while processing the content of the embedded clause, the content of the first proposition has to remain in the memory store for a potentially unlimited time. Since the capacity of working memory is limited, the length of the embedded clause and its propositional content might exhaust working memory capacity before the embedded clause has even been concluded. Additionally, grammatical information (e.g., PERSON and NUMBER) needs to be deposited in the highly task-specific grammatical memory store until the respective features of the subject can be matched with the features of the verb in the main clause (see Pienemann, 2011). Thus, the features assigned to the NP_{head} ‘the girl’ (3rd-SG) need to be stored in the grammatical memory store until the embedded clause has been processed so that the verb of the matrix clause ‘laughs’ can be checked against these features and matched with the NP_{head}. In other words, there is a potentially unlimited memory task that has to occur during the processing of the embedded clause can be concluded.

In contrast, in an RC relativising the OBJ position, the first proposition has been both fully produced and processed before the second proposition is added. Hence, there is no need to store propositional content in working memory for any amount of time. Similarly, grammatical features do not need to be kept in the grammatical memory store as there is no agreement between verb and object. Example (15) illustrates the point.

- (15)

Peter	sees	the girl	who Chris likes.
P1			P2
3 rd SG	3 rd SG –s		

In (15), two propositions occur in succession without interrupting one another. The lack of interruption limits the demand imposed on both working memory and the grammatical memory store. This is also in line with Lutz (1981: 21), who notes that our general communicative behaviour is based on the speaker tending to organise TOPIC and COMMENT into one unit, which is only possible if the embedded clause is not too extensive. Furthermore, speakers tend to provide additional information about the new entity, i.e., the participant introduced in the COMMENT part of the

clause rather than further describe an entity which is supposedly already known, i.e., the TOPIC of the clause (Lutz, 1981).

Hence, it is hypothesised that L2 learners acquire RCs modifying an NP_{head} in the OBJ position earlier than RCs modifying an NP_{head} in the SUBJ position as there is less processing load imposed on working memory and the grammatical memory store. However, this hypothesis competes with, for instance, psycholinguistic theories of anaphoric reference. According to these theories, syntactic subjects are assumed to be easier to refer to than direct or prepositional objects (Gordon & Hendrick, 1997; Gordon & Scearce, 1995) and first-mentioned participants are easier to refer to than any of the other participants (Gernsbacher, 1989; Gernsbacher & Hargreaves, 1988). The findings of these studies are not directly applicable to RCs since their focus was anaphoric reference containing full NPs, proper names or pronouns. However, as RPs also establish anaphoric (co-)reference, there needs to be analysis and empirical testing of the extent to which these findings also account for the processing of relative clauses.

Available research suggests that the function of the NP_{head} in the main clause would seem to play a role in the processing of relative clauses, but what kind of a role is unclear. On the one hand, Kuno (1974) stated that RCs involving right-embedding are easier to process than those involving centre-embedding. On the other hand, Gordon & Hendrick (1997) assumed that syntactic subjects are more focused and learners “have less difficulty resolving an anaphor that refers back to a syntactic subject [...] than an anaphor that refers back to words in non-syntactic subject position” (Traxler, 2012: 244).

5. Future research

Regarding the proposed hypothetical assumptions, there is a need for empirical evidence to support the claims outlined in this chapter. A first longitudinal study focussing on infinitival, participial and finite relative clauses of one learner is provided by Kawaguchi and Yamaguchi (this volume). However, their study did not explore reduced RCs. As one learner strategy seems to be the omission of elements (see Pienemann, 2011), it might be the case that learners initially avoid the use of relative pronouns, even those that may be grammatical. Therefore, we do not yet have a complete account of how RCs can be located within developmental stages.

On the other hand, learners might use the relativiser ‘*that*’ instead. The relativiser may be connected with reduced processing requirements in relation to feature unification processes. Thus, initially, learners might use ‘*that*’ to introduce any RC. If this is correct, RCs relativising the SUBJ position will not be produced in a target-like manner until at least stage 5 is reached due to subject-verb agreement

within the embedded clause (*'the girl that sees Chris'*). It will be necessary to test whether clauses such as *'the dogs that see Chris'* do appear at stage 3.

At any rate, the actual appearance of RCs in learner language and the solutions each learner chooses for the developmental problem of constructing an RC at an early stage is surely worth investigating empirically.

6. Summary and conclusion

In this chapter, issues in the acquisition of English relative clauses have been introduced with regard to the NPAH proposed by Keenan and Comrie (1977). The focus was on RCs relativising the SUBJ, OBJ, OBL and GEN position. The aim was to consider the different types of RCs present in English and to classify them in relation to the hierarchy of processing procedures introduced in PT. LFG provided the grammatical formalism for this classification with the principle of information exchange between constituents and the unification of these constituents' features across clause boundaries. Furthermore, I showed that the procedure of Cancel Inversion as outlined in PT can account for both subordinate clauses and relative clauses.

Additionally, I hypothesised a hypothetical order of acquisition of RCs based on different types of mapping processes conceptualised in LFG. Using these mapping processes, it was possible to propose a hypothetical order of acquisition of RCs by L2 learners – the hierarchy of RC processability. I assume an increasing difficulty in the processing of RCs based on an increase in non-linearity in the underlying mapping processes; starting with RCs relativising the SUBJ position over those relativising the OBJ position and subsequently the OBL and/or GEN position respectively (SUBJ > OBJ > OBL= / > GEN).

Furthermore, the role of the head noun phrase is hypothesised to play a major role in RC processing. RCs modifying an NP_{head} in the OBJ position are hypothesised to be easier to process and impose less difficulty on the L2 learner than those modifying an NP_{head} in the SUBJ position of the matrix clause. This is due to the fact that the interruption of the matrix clause by an embedded clause (as in RCs modifying the NP_{head} in SUBJ position of the matrix clause) imposes a greater processing load on working memory as well as on the grammatical memory store than when the embedded clause follows the matrix clause (as in RCs modifying the NP_{head} in OBJ position of the matrix clause). This is in line with theories advocating processing ease with right-embedding over processing difficulty with centre-embedding.

Even though it is assumed that RCs can be classified on stage 6 of the PT hierarchy, it is suggested that the different RC types and the position of the NP_{head} in the matrix clause point to a possibly hierarchical sequence of acquisition within that one stage.

References

- Bresnan, J., & Mchombo, S. A. (1987). Topic, pronoun and agreement in Chicheŵa. *Language* 63(4), 741–782. <https://doi.org/10.2307/415717>
- Bresnan, J. (2001). *Lexical-functional syntax*. Malden, MA: Blackwell.
- Dalrymple, M. (2001). *Syntax and semantics. Lexical functional grammar* 34. San Diego, CA: Academic Press. <https://doi.org/10.1163/9781849500104>
- Diessel, H. (2004). *The acquisition of complex sentences*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511486531>
- Doughty, C. (1988). *The effects of instruction on the acquisition of relativization in English as a second language* (Unpublished doctoral dissertation). University of Pennsylvania, Philadelphia.
- Doughty, C. (1991). Second language instruction does make a difference. Evidence from an empirical study of SL relativization. *Studies in Second Language Acquisition* 13(4), 431–469. <https://doi.org/10.1017/S0272263100010287>
- Falk, Y. (2001). *Lexical-functional grammar: An introduction to parallel constraint-based syntax*. Stanford, CA: CSLI.
- Gass, S. (1979). Language transfer and universal grammatical relations. *Language Learning* 29(2), 327–344. <https://doi.org/10.1111/j.1467-1770.1979.tb01073.x>
- Gass, S., & Ard, J. (1980). L2 data: Their relevance for language universals. *TESOL Quarterly* 14(4), 443–452. <https://doi.org/10.2307/3586233>
- Gernsbacher, M. A., & Hargreaves, D. J. (1988). Accessing sentence participants: The advantage of first mention. *Journal of Memory and Language* 27(6), 699–717. [https://doi.org/10.1016/0749-596X\(88\)90016-2](https://doi.org/10.1016/0749-596X(88)90016-2)
- Gernsbacher, M. A. (1989). *The structure building framework*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Gordon, P. C., & Hendrick, R. (1997). Intuitive knowledge of linguistic co-reference. *Cognition* 62(3), 325–370. [https://doi.org/10.1016/S0010-0277\(96\)00788-3](https://doi.org/10.1016/S0010-0277(96)00788-3)
- Gordon, P. C., & Scarce, K. A. (1995). Pronominalization and discourse coherence, discourse structure and pronoun interpretation. *Memory & Cognition* 23(3), 313–323. <https://doi.org/10.3758/BF03197233>
- Hyltenstam, K. (1984). The use of typological markedness conditions as predictors in second language acquisition: The case of pronominal copies in relative clauses. In R. Andersen (Ed.), *Second languages: A crosslinguistic perspective* (pp. 39–60). Rowley, MA: Newbury House.
- Ioup, G. (1983). Acquiring complex sentences in English. In K. Bailey, M. Long, & S. Peck (Eds.), *Second language acquisition studies*, (pp. 25–40). Rowley, MA: Newbury House.
- Keenan, E., & Comrie, B. (1977). Noun phrase accessibility and universal grammar. *Linguistic Inquiry* 8(1), 63–99.
- Keenan, E., & Comrie, B. (1979). Data on the noun phrase accessibility hierarchy. *Language* 55(2), 333–351. <https://doi.org/10.2307/412588>
- Kroeger, P. R. (2004). *Analyzing syntax: A lexical-functional approach*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511801693>
- Kuno, S. (1974). The position of relative clauses and conjunctions. *Linguistic Inquiry* 5(1), 117–136.
- Lenzing, A. (2013). *The development of the grammatical system in early second language acquisition. The Multiple Constraints Hypothesis*. Amsterdam: John Benjamins.

- Levelt, W. J. M. (1989). *Speaking. From intention to articulation*. Cambridge, MA: The MIT Press.
- Lutz, L. (1981). *Zum Thema "Thema". Einführung in die Thema-Rhema-Theorie*. Hamburg: Hamburger Buchagentur.
- Paltridge, B. (2006). *Discourse analysis. An introduction*. Bodwin, Cornwall: MPG Books.
- Pienemann, M. (1985). Learnability and syllabus construction. In K. Hyltenstam & M. Pienemann (Eds.), *Modelling and assessing second language acquisition*, (pp. 23–76). Clevedon: Multilingual Matters.
- Pienemann, M. (1998). *Language processing and second language development. Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M. (2005). An introduction to Processability Theory. In M. Pienemann (Ed.), *Crosslinguistic aspects of Processability Theory* (pp. 1–60). Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30.03pie>
- Pienemann, M. (2011). The psycholinguistic basis of PT. In M. Pienemann & J. Keßler (Eds.), *Studying Processability Theory*, (pp. 27–49). Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.1.03the>
- Romaine, S. (1984). Relative clauses in child language, pidgins and Creoles. *Australian Journal of Linguistics* 4(2), 257–281. <https://doi.org/10.1080/07268608408599327>
- Schumann, J. (1980). The acquisition of English relative clause by second language learners. In R. Scarcella & S. Krashen (Eds.), *Research in second language acquisition: Selected papers from the Los Angeles Second Language Research Forum*, (pp. 118–131). Rowley, MA: Newbury House.
- Sheldon, A. (1974). The role of parallel function in the acquisition of relative clauses in English. In C. Ferguson & D. Slobin (Eds.), *Studies of child language development* (pp. 272–281). New York, NY: Holt, Rhinehart & Winston.
- Traxler, M. (2012). *Introduction to psycholinguistics*. Malden, MA: Blackwell.

Early development and relative clause constructions in English as a second language

A longitudinal study

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This study examines the development of relative clause (RC) constructions in a child learning English as a second language in a naturalistic environment. Processability Theory (PT) (Pienemann, 1998, 2005; Pienemann & Kessler, 2011) does not treat RCs, hence the present study looks at four major approaches to RC development and attempts to find points of convergence with PT's developmental stages. In order to trace RCs' development empirically, we audio-recorded at regular intervals the spontaneous and elicited speech production of a Japanese child learning English from age 5;08 to age 7;08. Our study found that infinitival and participial RC constructions, such as those considered by Diessel (2004) as building blocks for RC development in FLA, also emerge early in child ESL.

1. Introduction

The development of relative clause (RC) constructions has been a focus of much language acquisition research and debate in both first language (L1) and second language (L2) contexts (see for example Shirai & Ozeki, 2007). Processability Theory (PT) (Pienemann, 1998; Pienemann et al., 2005) has not examined RCs except through a preliminary study by Yamaguchi and Kawaguchi (2016) where they hypothesised that RCs are acquired relatively late because they involve non-default (or non-linear) mapping as specified in the Lexical Mapping Hypothesis due to long-distance dependencies in their constructions (Dalrymple, 2001). Nottbeck (this volume) elaborates a theoretical framework for English RC constructions in the PT hierarchy using, in part, Lexical Functional Grammar (LFG) formalisation. Our study provides empirical, longitudinal evidence of the development of RC constructions. More specifically, we investigate the development of RC constructions in a school-aged child acquiring English L2 in a naturalistic environment, and in

particular the relationship between the emergence of specific RC constructions and the general development of morphology according to PT (Pienemann, 1998).

In this chapter, we consider four major theoretical approaches to the acquisition of RC constructions. Each of these approaches looks at RC constructions from a different theoretical view point. Our study offers an invaluable opportunity to show how these different approaches contribute to understanding the early acquisition of RCs. We also show how they might relate to PT. The first is the Emergentist and Usage-based approaches, which has been used extensively in L1 acquisition studies (e.g., Diessel & Tomasello, 2005). In discussing the emergence of English RCs in L1, these scholars consider intermediate (developmental) constructions rather than just target-like RCs. Intermediate constructions are crucial in acquisitional studies as they reveal how language acquirers move from fixed or partially fixed patterns to productive, and potentially target-like use (Tomasello, 2000). In recent years the Emergentist and Usage-based approaches have been extended to L2 (e.g., N. Ellis 2008; Eskildsen 2008). For example, Eskildsen (2015) analysed a developmental sequence of English L2 interrogative structures using the longitudinal data of two Spanish-speaking students from Mexico. He found that both Yes/no and WH questions emerged as “lexically specific, exemplar-based patterns” (Eskildsen, 2015: 33) rather than being based on the deployment of syntactic rules such as inversion. The other three approaches, namely the Noun Phrase Accessibility Hierarchy (NPAH) (Keenan & Comrie, 1977), the Perceptual Difficulty Hypothesis (PDH) (Kuno, 1974) and Hamilton’s (1994) Subject-Object Hierarchy Hypothesis (SOHH) are based on views of RCs as used by monolinguals. Our analysis, in addition, considered a wide range of RC constructions including non-finite and finite RC constructions, as well as single and two proposition RCs. The description of the development of these constructions is integrated into the sequence of emergence of other English morphological structures according to the PT developmental schedule.

The development of RCs has been analysed for both L1 (e.g., Diessel & Tomasello, 2005; Kidd & Bavin, 2002; Sheldon, 1974) and L2 (e.g., Doughty, 1991; Eckman et al., 1988; Gass, 1979; Izumi, 2003; Pavesi, 1986) contexts. In L1 acquisition, children learning English start to produce sentence-like structures after nouns (e.g., *Look at that noise...you’re making again*) around the age of two and a half (O’Grady 2005: 112). Their development has been extensively examined in both experimental (e.g., Clark, 2003; Diessel & Tomasello, 2005; Kidd & Bavin, 2002; Sheldon, 1974) and longitudinal (e.g., Bloom, 1991; Bowerman, 1979; Diessel, 2004; Diessel & Tomasello, 2000, 2001; Limber, 1973) studies. Most L1 research has focused on comprehension rather than production and has found that centre-embedded RCs are difficult for children to process (Kuno 1974). Diessel and Tomasello (2000) is one of the few studies on L1 production. They analysed the

spontaneous speech of four children longitudinally ranging from 1;09 to 5;02 using data from the CHILDES corpus. They identified that the majority of RC constructions produced by these children described a single situation using a structure in which the RC is typically attached to the predicate nominal of the copular clause.

In L2 acquisition research, the majority of studies on the acquisition of English RCs are cross-sectional (e.g., Eckman et al., 1988; Gass, 1979) and focus on learning/teaching efficacy. A classic study by Schachter (1974) found that ESL learners of Japanese and Chinese avoid producing RC constructions because they 'know' that RCs are problematic for them. The L2 acquisition of RC constructions has also been investigated extensively using the NPAH (Keenan & Comrie, 1977). Hyltenstam (1984) found that ESL learners of different L1 backgrounds, including Finnish and Greek, developed RCs in a sequence aligned with the NPAH. Pavesi's (1986) study, involving two groups, one in an instructional setting (high school students in Italy) and the other in a naturalistic setting (migrant workers who had resided in Edinburgh for periods ranging from 3 months to 25 years), also confirmed that both groups develop RC constructions in a sequence consistent with the NPAH. Pavesi also investigated the effectiveness of instruction and found that the learners in instructional settings used object relative clauses more frequently and more successfully than the learners in naturalistic settings. The effect of type of instruction in relation to the markedness hierarchy of the RCs was further investigated by Eckman et al. (1988). These researchers found that instruction on more marked RC constructions in the NPAH (i.e., prepositional OBJ and direct OBJ relativisation) had a more positive effect than instruction on a less marked RC construction (i.e., SUBJ relativisation). Doughty (1991) confirmed Eckman's finding. More recently Izumi's (2003) cross-sectional study found that L1 Japanese learners of English did not master RCs strictly in accordance with the NPAH. The order of difficulty of RC constructions was found to be (from least to more difficult) SUB < DO < OBJ of preposition as measured by mean accuracy scores on a sentence combination test using RCs, but this order did not prove to be statistically significant. Since these previous studies have been cross-sectional and mainly used relative accuracy rather than emergence as the criterion, it is important to test the NPAH using longitudinal data and the emergence criterion of acquisition.

Such longitudinal studies of the production of RC constructions in L2 are very limited. Schumann's (1980) 10-month longitudinal study looked at the RCs produced by five L1 Spanish learners of L2 English, focusing on the position of RCs in the matrix clause and the grammatical function of the head noun inside the RC. He found that the acquisition order of production was OS > OO > SS > SO. Mellow (2006) conducted a 7-month observation of an L1 Spanish 12-year-old child learning English. He examined the teenager's written narratives within the

Emergentist approach, and found that the child started using individual items in limited patterns and gradually developed the abilities to create a range of RC constructions. Since longitudinal data, especially on speech production, is very limited, more focused studies are required to examine how RC constructions develop in L2 acquisition. Further, since RCs do not develop by themselves in a linguistic vacuum, it is important to interpret their development in conjunction with general linguistic development using transitional SLA paradigms such as Pienemann's (1998) Processability Theory.

2. Major theoretical approaches to relative clause acquisition

The acquisition of RC constructions in both L1 and L2 has been traditionally investigated from the following two points of view. The first is the grammatical function of the head noun in the RC. Keenan and Comrie's (1977) Noun Phrase Accessibility Hypothesis (NPAH) is the most extensively used theoretical framework for this perspective. The second is the grammatical function (GF) of the head noun in the matrix clause. This issue is directly connected to the position of RCs, and Kuno's (1974) Perceptual Difficulty Hypothesis (PDH) is widely used to broach this issue. A combination of these two approaches (i.e., examining head noun types in both the matrix clauses and RCs) is proposed as the SO Hierarchy Hypothesis (SOHH, Hamilton 1994). In L1 research, emergentism, especially in Usage-based approaches (Diessel, 2004; Diessel & Tomasello, 2000, 2001, 2005) has been widely used to explore the interaction of input and the linguistic environment available to L1 acquirers. Because these four approaches provide the background for the examination of our longitudinal data in relation to PT, they are briefly summarised below.

2.1 Emergentism and Usage-based approaches

In L1 acquisition, "the linguistic structure is an emergent property of language use, i.e., the child is not innately equipped with specifically linguistic representations" (Behrens, 2009: 387). This view assumes that language acquisition starts with items, often with lexically-specific features, and gradually becomes more productive. Interaction with language input and its frequencies are claimed to be important driving forces. Consequently, it may take time for the child to develop structures, including RC constructions from the varied features of each item. Thus, Emergentist views of language acquisition contrast with Innatist views of language acquisition according to which parameter setting enables the child to acquire the structure instantly in the appropriate environment. Chomsky's Principles and Parameter

approach originally involved a finite set of fundamental principles (Chomsky, 1981; Chomsky & Lasnik, 1993) but in his later Minimalist Program, the concept was modified to an economic (minimal) system of innate syntactic knowledge to explain universal and more constrained principles such as Merge, Move and Agree in language acquisition (e.g., Chomsky, 1995). Tomasello (e.g., 2003, 2004) as many other scholars (e.g., Evans & Levinson, 2009) rejects the idea of Universal Grammar or principles with +/- variables from the standpoint of developmental psychology and states “all of the empirical phenomena typically cited in favor of an innate UG are also consistent with the existence of biological adaptations for more general skills of human cognition and communication” (Tomasello, 2004: 643).

L1 studies within Emergentist and Usage-based approaches show that children develop RC constructions from single, non-embedded sentences (Diessel 2004). According to Diessel (2007: 312), “[r]elative clauses are grammatical constructions that children acquire based on their prior knowledge of simple sentences”. Thus, initially children use preliminary, compressed forms of clause modification referred to as “presentational amalgam constructions” (Lambrecht, 1988: 335). These are made up of syntactic blends in which a presentational copular clause and a verb phrase are conflated into a single syntactic unit. One might analyse these as RCs in which the relative pronoun or complementiser is absent (Lambrecht, 1988). An example of this construction would be *that’s doggy turn around*. These amalgam constructions occur several months before presentational RC constructions emerge in their speech (Diessel & Tomasello, 2000). In terms of proposition(s), RC constructions containing a single proposition (e.g., *this is the hat that my mum likes*) appear first and then children gradually learn to use complex RC constructions containing two propositions (e.g., *I played with the girl who likes reading*). Diessel (2004) considers infinitive and participial relative constructions such as (1a–b) and (2 a–b) as typical of early L1 acquisition.

- (1) participial relative constructions (Diessel, 2004: 139)
 - a. That’s the horse sleeping in a cradle, their bed. (Peter 2;8)
 - b. Who is that standing on the bed? (Nina 3;3)
- (2) infinitive relative constructions (Diessel, 2004: 141)
 - a. I want *something* to drink. (Nina 2;10)
 - b. I’m the right *person* to do that. (Peter 3;1)

L1 studies (e.g., Diessel & Tomasello, 2000; Diessel, 2004) also show that centre-embedded RCs rarely appear in children’s spontaneous speech.

2.2 The Noun Phrase Accessibility Hierarchy (NPAH)

Based on a typological investigation of more than 50 languages, Keenan and Comrie (1977) proposed the NPAH, suggesting that there is a markedness order to the different relative clause types that applies to all languages in the world. According to the NPAH, there are six types of relativisation in English distinguished by the grammatical function of the head noun inside the RC (see Table 1).

Table 1. English relativisation types (after Ellis, 1994: 102)

Type	Example
Subject (SU)	The man who lives next door ...
Direct object (DO)	The man whom I saw ...
Indirect object (IO)	The man to whom I gave a present ...
Oblique (OBL)	The man about whom we spoke ...
Genitive (GEN)	The man whose wife had an accident ...
Object of comparative (OCOMP)	The man that I am richer than ...

According to the NPAH, the accessibility hierarchy of RCs is described as SU > DO > IO > OBL > GEN > OCOMP. This indicates that positions at the left end of the scale are easier to relativise than those further to the right. If a language can form RCs in relation to a given position on the hierarchy, it can also form RCs for all positions higher (to the left) on the hierarchy. For instance, a language that can relativise indirect objects will also be able to relativise subject and object NPs, but possibly not genitive NPs. The relativisation types located to the left are considered to be less marked, and those to the right are regarded as more marked. Keenan and Comrie (1977) implied that the NPAH is relevant to L1 acquisition. The NPAH has been used to explain the general empirical finding that subject RCs have been shown to be easier to process in comparison to object RCs.

2.3 Perceptual Difficulty Hypothesis (PDH)

The NPAH reviewed above is concerned only with the functions of relative pronouns within the RCs and not with the functions of the NP that contains the RC in the matrix clauses. The Perceptual Difficulty Hypothesis (PDH), on the other hand, concerns the position of RCs in the matrix clauses, regardless of the grammatical function of RCs. Reflecting constraints of the human memory system, Kuno (1974) predicted that constructions involving centre-embedded RCs are perceptually more difficult to process than those involving right- and left-embedded, because the processing of the matrix sentence is interrupted by the centre-embedded RC, creating

greater demand on working memory resources during the interpretation of the whole sentence. Thus the PDH predicts that (3) is more difficult to process than (4) and is consequently acquired later.

- (3) the boy [who I met yesterday] likes Mary (*centre-embedded*)
 (4) the boy likes Mary [who is a sister of Tom] (*right-embedded*)

The NPAH looks only at RCs, and the PDH only at matrix clauses. The discontinuity created by the location of RCs in relation to the matrix clauses is considered by the SOHH, described next.

2.4 SO Hierarchy Hypothesis (SOHH)

Regarding the matrix clauses, discontinuity is created by a centre-embedded RC. Regarding the RC itself, discontinuity is created by the phrase boundaries between the relative pronoun and what Hamilton calls ‘the trace’ created by relativisation. Based on this concept, Hamilton (1994) predicts the hierarchy of difficulty of the four types of RC constructions as OS (object-subject) > OO (object-object) > SS (subject-subject) > SO (subject-object), where the first letter is the grammatical function in the matrix clause and the second letter is the function of the relative pronoun within the RC as illustrated in example 5. According to Hamilton’s prediction OS is the easiest to process since there is only one discontinuity within the RC. In contrast, SO is the most difficult to process since there are three discontinuities, two within the RC and one within the centre-embedded matrix clause created by relativisation. This hypothesis is similar to O’Grady’s (1987, 1999) processing discontinuity. The examples of each type of construction, below, are from Izumi (2003: 290) with added traces (i.e., () = phrase boundary, *t* = wh-trace, *i* = co-index, S = sentence node) to illustrate the discontinuities.

- (5) a. OS: They saw the boy who_i [_S t_i entered the room]
 b. OO: A man bought the clock that_i [_S the woman [_{VP} wanted t_i]]
 c. SS: The man [who_i [_S t_i needed a job]] helped the woman
 d. SO: The dog [that_i [_S the woman [_{VP} owns t_i]]] bit the cat

In PT, all (5 a–d) are placed at inter-clausal stage. The processing mechanism of RC constructions are explained in PT using the LFG notion of long-distance dependencies (see Section 3) rather than the notion of ‘trace’.

3. Morpho-syntactic development in Processability Theory

In this current study, PT (Pienemann, 1998 and later) is used for analysing the child's general morphological development. PT predicts a universal hierarchy of processing procedures. The key to predicting which grammatical structures are processable – and in which sequence – is to identify which pieces of grammatical information can be exchanged between which constituents given the availability of the different procedures and their storage capacity. The developmental hierarchy defined by PT is related to the requirements of the specific procedural skills needed for the target language (any L2). According to PT, learners, at any stage of development, are able to produce only those linguistic structures which the current stage of their language processors can handle (Pienemann, 1998). As learners gain control over the language-specific procedures needed to handle the target language, they progress through the acquisitional stages. According to PT, L2 morphology develops as the learners acquire the following procedures (in this order): lexical procedure > category procedure > phrasal procedure > S-procedure > inter-clausal procedure (if applicable). Structural outcomes at each stage and their examples are summarised in Table 2.

In the original version of PT (Pienemann, 1998), subordinate clauses are placed at the inter-clausal procedure stage because feature unification takes place between the matrix and the embedded clause. Finite RC constructions involve information processing across clauses because one of the arguments in the RC needs to link to a referent within the main clause. One conclusion from this would be that PT predicts that finite RC constructions emerge after the S-procedure stage is achieved by the learner. However, this position oversimplifies the learning that is involved in gaining control of RCs. As Nottbeck's chapter (this volume) indicates, the acquisition of RCs is multi-faceted. Except for an early attempt by Yamaguchi and Kawaguchi (2016), until recently the acquisition of infinitival and participial RC constructions has not been treated within PT.

In LFG, RCs in English and many other languages are considered to involve long-distance dependencies. According to Dalrymple (2001), two long-distance dependencies are involved in RC constructions. The first holds between the fronted phrase and the within-clause grammatical function it fills. Bresnan and Mchombo (1987) claim that a fronted relative pronoun in an RC bears the syntacticised TOPIC (TOP) function. TOP functions must be linked to a grammatical function within the clause. The second dependency involves the relative pronoun and its position, possibly embedded, within the fronted phrase. Figure 1 shows the c(onstituent)-structure and f(unctional)-structure for the phrase *a man who Chris saw*. It shows that the relative pronoun *who* appears in initial position in the RC's c-structure, and its f-structure is both the TOP and the relative pronoun (REL PRO) of the RC.

Table 2. Developmental stages for English morphology (after Di Biase et al., 2015)

Processing procedure	Structure	Example
INTER-CLAUSAL PROCEDURE ¹	e.g., subjunctive marking in subordination	<i>I suggest he left</i> <i>It's time he were here</i>
SENTENCE PROCEDURE	SV agreement: 3rd person sg -s	<i>Peter loves rice</i>
PHRASAL PROCEDURE	NP PROCEDURE	phrasal plural marking <i>these girls</i> <i>many dogs</i> <i>three cats</i>
	VP PROCEDURE ²	AUX + V: have + V- <i>ed</i> <i>they have walked</i>
		MODAL + V <i>you can go</i>
		be + V- <i>ing</i> <i>I am going</i>
CATEGORY PROCEDURE	past - <i>ed</i> <i>Mary jumped</i>	
	plural -s <i>I miss my friends</i>	
	Possessive 's <i>Mary's car</i>	
	Possessive determiners <i>My car</i>	
	verb - <i>ing</i> (without AUX) <i>he eating</i>	
LEMMA ACCESS	Invariant forms <i>apple, dog</i>	

Therefore, the production of the RC requires, at least, the “XP + Unmarked Alignment” procedure (see Di Biase et al., 2015; Yamaguchi & Kawaguchi, 2016). Further, all RC constructions (i.e., not only the RC itself but both matrix clause and RC) are predicted to be acquired after the S-procedure stage because they all involve a range of long distance dependencies between subordinate and matrix clauses. If this view is adopted, it means that all of those different kinds of RC constructions are acquired within one single stage. This would mean that PT has little to predict about sequences of RC acquisition by comparison, for instance, to Keenan and Comrie’s NPAH (subj > DO etc.). Even though different RC constructions involve different degrees of non-canonicity, it can be assumed that all RC constructions involve non-canonical alignment. However, additional non-canonicity with

1. We use the term inter-clausal rather than S'(S bar) procedure at the highest stage because S' is also used for nodes above S, i.e., for XP in questions or topicalisation that do not involve more than one clause (cf., Van Valin, 2001: 192). Inter-clausal refers unambiguously to relationships between different clauses.

2. We thank the anonymous reviewer who suggests that Aux + VP does not form a syntactic c-structural constituent in English and thus VP can only unify in the S-procedure. This is evident in the LFG analysis of a sentence, where V and Aux are co-heads of the same f-structure. The suggestion is certainly worth pursuing, while taking into account the developmental requirements of the learner in fully acquiring the English Aux system. However, this involves some updating of PT stages for English, such as the VP stage and above, which would require more space than we can afford in this chapter.

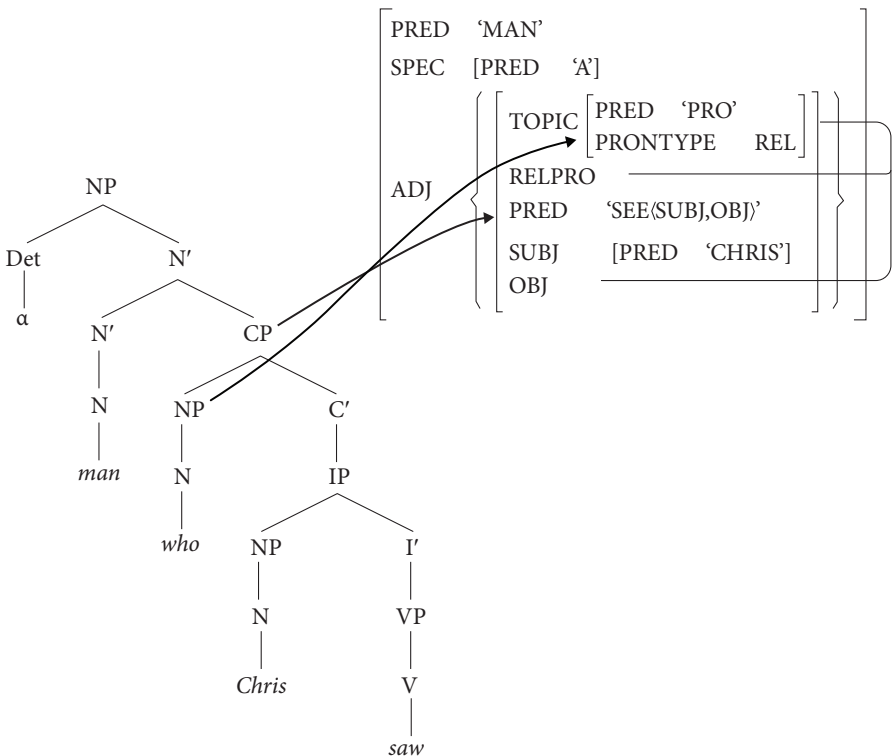


Figure 1. Two long-distance dependencies in RC construction (after Dalrymple, 2001: 401)

centre-embedded RC constructions can happen in c-structure. The Perceptual Difficulty Hypothesis (PDH) (Kuno, 1974) also states that centre-embedded RCs are perceptually more difficult to process than sentence-final RC constructions. Nottbeck (this volume) offers some discussion of different types of RC constructions in conjunction with PT. A research gap within the PT paradigm is a long-term lack of empirical studies which investigate acquisition of RC constructions. Also, we still do not know whether the early acquisition of RC constructions in L2 is similar to that of L1 as reported by the Emergentist approaches. If that is the case the acquisition of verbal morphology would be strongly connected to the acquisition of amalgams, participial and infinitival emerging RC constructions. This would suggest that the acquisition of early RC constructions is related to PT morphological stages. Further, as our literature review suggests, longitudinal studies on the acquisition of RC constructions in speech production are rare. On the other hand, the numerous studies which tested the acquisition of RC constructions against the NPAH, Perceptual Difficulty Hypothesis and SO Hierarchy Hypothesis are either

cross-sectional or experimental studies. This highlights the importance of the present study which examines longitudinal data in order to identify a developmental path of RC constructions.

4. The study

4.1 Research question

In order to fill the research gap identified through the literature review above, three research questions are formulated:

1. Is the developmental sequence in child L2 similar to that in L1 as reported by Emergentist approaches?
2. Does the acquisition of RC constructions follow the hierarchy predicted by any of the three major hypotheses: Noun Phrase Accessibility Hierarchy, Perceptual Difficulty Hypothesis, and SO Hierarchy Hypothesis?
3. When do infinitival and participial relative constructions and finite RC constructions emerge in the child's speech production in relation to PT morphological stages for L2 English?

4.2 The informant and the data

Kumi (code name) was raised as a Japanese monolingual until she was five years seven months (5;07) when she moved to Australia with her family. In Japan, she participated in an English program for two hours/week for 32 weeks from 4;10 to 5;06, that is, for two years and two months. In the English program she enjoyed various activities, such as singing songs and playing games with a native speaker of English and other Japanese children. However, she never received grammar instruction and had few opportunities to speak English in Japan. Thus, when she started attending a local primary school in Australia at the age of 5;07, her English was limited to basic words and formulaic expressions.

The child's spontaneous speech in English was audio-recorded regularly during the period when she was 5;08 to 7;08 using several tasks, such as semi-structured interviews, scaffolded storytelling, and communication games. In the semi-structured interviews, she was asked to talk about various topics (e.g., what happened at school). For the scaffolded storytelling a wordless picture book (Mayer, 1969) and cartoon strips were used. In one of the communication games, she was asked to preview a sheet with 16 pictures of common things, then to provide some hints

about one picture until her interlocutor could work out which picture she was describing. In another communication game, Kumi and her peer were asked to take turns to ask and answer questions to find out the differences between two pictures. The data collection started four weeks after Kumi arrived in Australia. Each session lasted for 20 to 40 minutes. All the audio-recorded sessions were transcribed. The extent of Kumi's data, calculated with the linguistic computer software KWIC, is summarized in Table 3. The first column indicates the different points in time (t1, t2...) in the corpus with her post-arrival in Australia exposure to English in weeks. The second column lists her age in the format 'year, month, day', and the third column records the total number of turns produced by the child. The fourth and fifth columns show the number of words (i.e., tokens) and the number of different words (i.e., types) she produced for each time.

Table 3. Overview of Kumi's longitudinal data

Time and exposure to English in week	Age	Total number of turns	Total number of words (tokens)	Total number of words (types)
t1 (4)	5;8,15	25	176	52
t2 (6)	5;9,0	322	1,307	321
t3 (8)	5;9,15	123	289	112
t4 (10)	5;10,0	191	682	221
t5 (12)	5;10,14	129	500	167
t6 (20)	6;0,15	190	957	268
t7 (28)	6;2,13	153	654	221
t8 (36)	6;4,15	100	482	177
t9 (44)	6;6,15	156	1,108	322
t10 (52)	6;8,13	124	1,060	345
t11 (64)	6;11,15	112	957	300
t12 (76)	7;2,12	122	793	256
t13 (88)	7;5,13	214	1,203	359
t14 (100)	7;8,15	190	1,783	504
(Total)	-	2,151	11,951	3,625

4.3 Analysis

Distributional analyses of relevant features of Kumi's data for each of the L2 developmental stages for morphology proposed in PT (Di Biase et al., 2015) were conducted first. Pienemann (1998) adopts 'emergence' as a criterion to establish when a feature is in principle acquired. The different points of emergence are used to establish a developmental sequence. Pienemann (1988: 138) states "(f)rom a

speech processing point of view, emergence can be understood as the point in time at which certain skills have, in principle, been attained or at which certain operations can, in principle, be carried out. From a descriptive viewpoint one can say that this is *the beginning of an acquisition process*” (emphasis added). ‘Emergence’ is a valid and reliable indicator of interlanguage development, as “emergence of a structure seems to be a more constant and less arbitrary landmark with respect to accuracy levels” (Pallotti, 2007: 362). For this reason, the emergence criterion was applied to determine the acquisition of specific morphological structures in Kumi’s data. That is, a specific morphological form was considered to have been acquired when lexical and structural variations were observed in the learner data (Di Biase & Kawaguchi, 2002). For example, if the learner produces both *eating* and *playing* (lexical variation) and *eating* and *eat* (structural variation), ‘verb-*ing* marking’ is considered to have been acquired.

Next, Kumi’s RC constructions were coded. As in previous L1 studies, infinitival and participial modifications were included in the data analysis. However, Wh-complements (e.g., *I’m gonna tell you what I did today*) were not included because they are not part of RC constructions. An overview of all the RC constructions analysed in this study, accompanied by examples from Kumi’s database, is provided in Table 4.

Table 4. RC constructions included in the data analysis

Type	Examples from Kumi’s data
Amalgam	t2 <i>do you have a man coat is blue?</i>
Non-finite RCs	t3 <i>we have a book to read</i> (infinitive-single proposition)
– Infinitival RCs	t4 <i>I like fish to eat</i> (infinitive-single propositions)
– Participial RCs	t4 <i>I have dog eating the doughnut</i> (participial-single proposition) t9 <i>he say it’s a bird chasing at his cat</i> (participial-single proposition)
Finite RCs	t8 <i>...there was a mother who was not scared of anything</i> (presentational RC-single proposition with head noun)
– with head nouns	
– Headless RCs	t10 <i>he saw big big bunch of the bees who was chasing the dog</i> (RC-two propositions with head noun) t8 <i>this is what you put in the thing</i> (headless RC)

In our data analysis, after identifying the RC constructions, we compare them against the four theoretical approaches as well as PT. Then we discuss our results against each theory. Connections between these theories and PT are also discussed. Figure 2 shows the grammatical structures relevant to each theory.

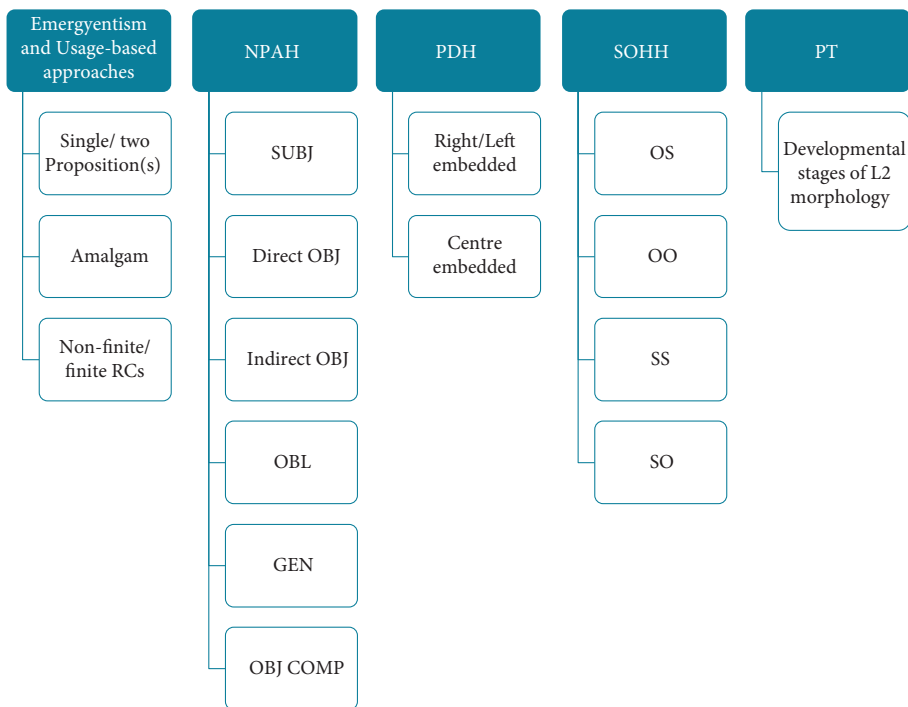


Figure 2. Kumi's data analysis according to different approaches

5. Results

5.1 Morphological development

Table 5 exhibits Kumi's development of morphology based on PT. The first stage, single words/formulaic expressions, is not included since many instances belonging to this stage were produced from t1. Kumi reached the category procedure stage in t2, when she was able to produce *V-ing* and possessive -'s. Then she moved to the phrasal procedure stage at t4, when she became able to produce VP combinations, such as *be + V-ing*. She attained S-procedure stage at t9, when she showed evidence of SV agreement. For further details, see Di Biase et al. (2015).

Table 5. Kumi's morphological development (after Di Biase et al., 2015)

Stage	Structure	T1 (4)	T2 (6)	T3 (8)	T4 (10)	T5 (12)	T6 (20)	T7 (28)	T8 (36)	T9 (44)	T10 (52)	T11 (64)	T12 (76)	T13 (88)	T14 (100)
S-PROCEDURE	3rd pers sg -s	>2	-2	/	-1	-1	+1-1	+1-1	-2	+8-1>1	+3	+2-1	+2	+4-1	+35-7
NP PROCEDURE	quantifier + pl -s	/	-4	-5	/	+1-1	/	+2-2	+1-2	+4-5	+10-8	+4-1	+7-1	+6-3	+13
VP PROCEDURE	<i>can't/can/will/couldn't</i>														
	V		+1-1	+1-1	+2	/	/	+1-1	/	+4	+7	+7	+6	+4	+13
	<i>be V-ing</i>	-2	+1-1	+1-1	+2-4	+8-2	+5	+11	+10	+7	+5	+4	+6	+6	+7
	past -ed	/	+1-7	-2	-5	-3	-2	+1-3	-2	+5-4>3	+4-1>1	+20>2	+5-2	+19-1>1	+21
	plural -s	-4	-5>1	+1-6>1	+2-3	+2-4	+6-2>7	+2-4	+2-2	+8-6	+9-2	+5-2	+9-1	+9-6	+29-3
CATEGORY	possessive pronouns	/	/	/	1	/	1	1	/	2	/	1	1	1	2
PROCEDURE	possessive 's	/	+7	/	/	+1>1	+1>1	+3	/	/	+5	+2	/	+3>1	+5>1
	possessive determiners	0	14	4	11	0	9	3	13	26	21	15	11	22	41
	<i>V-ing</i>	1	5	5	5	0	2	7	0	5	1	3	1	1	5

+ = supplied in obligatory context; - = not supplied in obligatory context; > = oversupplied in wrong context; / = no context

5.2 Development of relative clause constructions

Table 6 shows the overall distribution of Kumi's RC constructions and lists the number of occurrence of their different types.

Table 6. Distribution of Kumi's RC constructions

Structure / time	t1	t2	t3	t4	t5	t6	t7	t8	t9	t10	t11	t12	t13	t14	total
RC with head noun								1	4	4	4	7	2	2	24
Headless RC								3	1		1				5
Participial RC				2		7	5		4				8	2	28
Infinitival RC			2	1							3			1	7
Amalgam		8	1			1		1	1						12
TOTAL		8	3	3		8	5	5	10	4	8	7	10	5	76

Kumi produced a total of 76 RCs, 24 with head nouns; 5 headless; 28 participial; 7 infinitival; and 12 amalgam constructions. Her first instance of a right-branching NP modification was found at t2, and is a presentational amalgam, as in (6), which can be considered as a transition from simple sentences to RC constructions.

(6) t2 *do you have a flower is pink?*

Kumi's earliest RC was an infinitival construction at t3, followed by a participial in t4 as in (7) and (8) respectively. Finite RCs, including headless RCs, started to appear much later, at t8, as in (9) and (10). The fact that infinitival and participial RCs appeared prior to RC constructions supports the claim that they constitute a transition towards finite RC constructions (Diessel, 2004).

(7) t3 *we have a books to read*

(8) t4 *I have dog eating the doughnut*

(9) t8 *this is what. you work on*

(10) t9 *one day there was a daddy who lives in the house with his daughter and this son and his wife*

Tables 7 (a & b) are divided according to whether Kumi's RCs involved a single proposition or two propositions. RC constructions with a single proposition were dominant in Kumi's production. She produced 72 instances with single proposition in total, and only a total of four with two propositions. Finite RCs with single or two propositions emerged at t8 and t10 respectively. It should be noted that an amalgam construction and a participial RC with two propositions appeared at t9 and t13 respectively, as in (11) and (12).

Table 7. Distribution of RC constructions with a single proposition or two propositions

a. Single proposition															
Structure/time	t1	t2	t3	t4	t5	t6	t7	t8	t9	t10	t11	t12	t13	t14	total
Finite RC with head NP								1	4	2	4	6	2	2	21
Headless (finite) RC								3	1		1				5
Participial				2		7	5		4				7	2	27
Infinitival			2	1							3			1	7
Amalgam		8	1			1		1							11
TOTAL		8	3	3		8	5	5	9	2	8	6	9	5	71

b. Two propositions															
Structure/time	t1	t2	t3	t4	t5	t6	t7	t8	t9	t10	t11	t12	t13	t14	total
Finite RC with head NP										2		1			3
Participial													1		1
Amalgam									1						1
TOTAL									1	2		1	1		5

(11) t9 *they have something looks like stick*

(12) t13 *he saw the man bringing it*

6. Discussion

In this section, our results in relation to the major theories of RCs mentioned above as well as to the sequence of morphological development defined by PT are discussed.

6.1 Emergentism and Usage-based approaches

Figure 3 presents single and two-preposition RCs in Kumi's longitudinal data. Figure 3 clearly shows that amalgam constructions ($n = 11$) are precursors to RC constructions. They appeared eight times at t2 where seven out of these instances involved the prefabricated structure 'do you have plus NP' followed by a separate clause (as in *do you have a man wear the sunglasses?*) and were then used once each at t3, t6, t8, and t9. The number of amalgam constructions decreased after t2 while single-proposition RCs started to appear from the same time. Then, two-proposition RCs emerged at t10 when amalgam constructions had completely ceased. However, two-proposition RCs were produced less frequently (i.e., twice

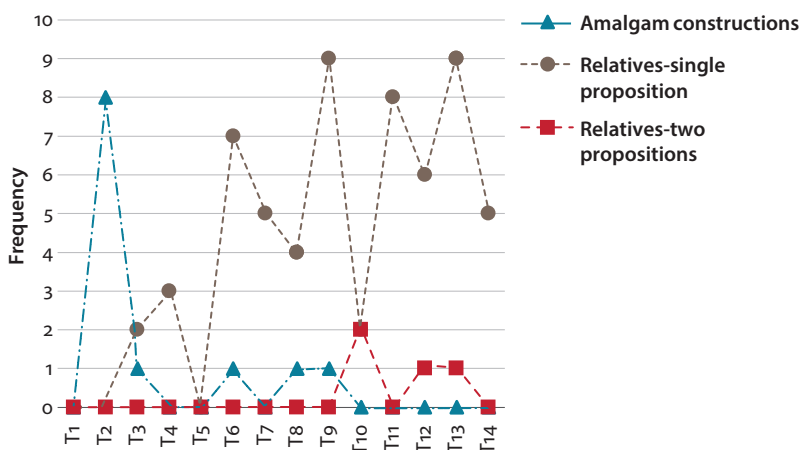


Figure 3. Single- and two-proposition RCs in Kumi's longitudinal study (n = 76)

at t10, once at t12, and once at t13). Single proposition RCs therefore represent the bulk of Kumi's RC data (60 constructions out of 76, excluding 11 amalgam constructions).

Figure 4 displays the frequency counts of finite and non-finite RC constructions for each of the recording times. Non-finite RC constructions represent Kumi's early stage of RC modification (n = 35), as all her RCs were non-finite up to t7. Unlike amalgams (n = 12), which were abandoned, these structures were produced after t9 together with finite constructions. Thus, after infinitival and participial RC constructions were established, Kumi produced finite RC constructions (n = 29). Initially, these were constructions with copular or presentational matrix clauses (see Table 4 for examples). This finding is compatible with the results in Diessel (2004) on RC development in L1, where earliest RCs are lexically specific amalgam constructions involving prefabricated presentational or copular sentences and RCs modify the predicate nominal of these clauses. The developmental path of RCs in Kumi appears to track along clause expansion from amalgam RCs involving single propositions to more complex RCs expressing two propositions using two full clauses including long distance dependent marking. Our results support the Emergentist claims in that production of amalgam, infinitival and participial relative clauses constitute important intermediate RCs from simple sentence to target-like RC constructions. Thus, our data suggests that child L2 and L1 acquisition in this area follow similar paths.

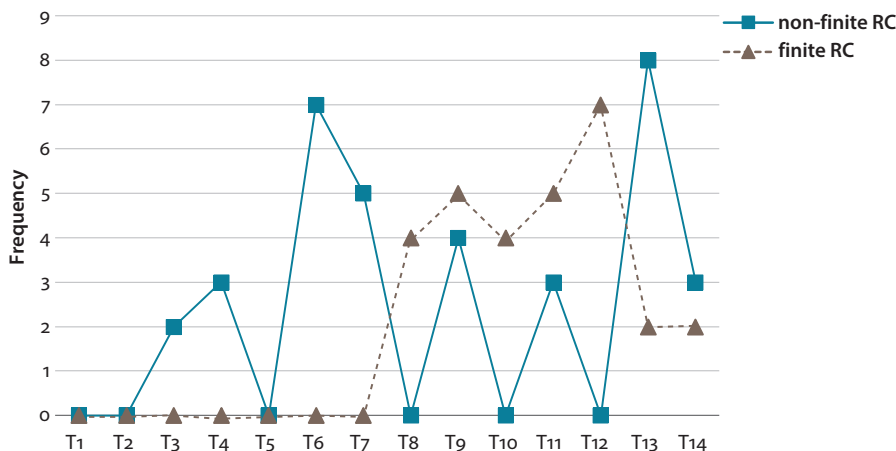


Figure 4. Finite and non-finite RC constructions in Kumi's longitudinal data (n=65)

6.2 Testing the Noun Phrase Accessibility Hierarchy (NPAH)

Here we consider the 29 cases (out of 76) of RC constructions produced by Kumi, excluding the 47 cases of amalgam, infinitival and participial RCs. Relativisation of adjuncts, which creates relative adverbs but not relative noun phrases, is also included in our analysis although not part of the NPAH.³ There were two such cases, shown in (13a and b), in which the relative pronoun *that* is used. Given that Kumi at t12 used the relative pronoun *that* instead of the required relative adverbs *when* or *where*, she might not have acquired the difference between relative NPs and relative adverbs at that point.

- (13) a. t12 *today was the day that mother and fathers come to look*
 b. t12 *this is the place that you you can have a look at lovely stories*

Out of the 29 instances of RCs, 24 are with head NPs and five are headless. Table 8 shows the results of the analysis of RC types. Headless RCs are listed separately because the sentence pattern for all five of them seems to be a formulaic expression, as in *this is what you work on* (t8), rather than the productive use of relativisation. These five cases of headless RCs are excluded from further analysis.

3. One of the reviewers, a native speaker of Australian English, pointed out that the general use of 'that' as in (13a–b) does occur in certain nonstandard varieties of adult speech in current Australian English. We thus do not analyse (13a–b) as ungrammatical but instead we considered them as instances of 'adjunct RC'. We thank the reviewer for pointing this out to us.

Table 8. Relative Clause Type

a. RCs with head NP															
RC Type	t1	t2	t3	t4	t5	t6	t7	t8	t9	t10	t11	t12	t13	t14	total
ADJ												2			2
OBL loc												2	1		3
OBJ (DO)									2	3	3	1	1	2	12
SUBJ								1	2	1	1	2			7
Total								1	4	4	4	7	2	2	24

b. Headless RCs															
RC Type	t1	t2	t3	t4	t5	t6	t7	t8	t9	t10	t11	t12	t13	t14	total
ADJ															
OBJ (DO)															
OBL								3	1						4
SUBJ											1				1
Total								3	1		1				5

The first headed RC type Kumi produced was SUBJ at t8, as in (14a). From t9, she produced the RC type of direct OBJ, as in (14b). Then at t12, 28 weeks after t9, she first produced the RC with the head NP functions as OBL_{loc}, as in (14c). However, this sentence was not well-formed because the preposition *in* is missing. She also produced an RC-type ADJ twice at t12, as in (14d). It is interesting that OBL_{loc} and ADJ appeared at the same time. Notice that the child relativised forms in (14c) and (14d) both of which denote 'place'. However, in (14c) *something* is a locative Argument, which can form a relative NP, but *the place* in (14d) is an Adjunct which has no long distance relationship between the matrix clause and the relativised clause. The child however is generalizing the relativising mechanism for Argument noun phrases. Further, it is interesting to note that Kumi seems to differentiate animates and inanimates/locations in the use of (or absence of) a relative pronoun. She tended to use specific, but not general, relative pronouns with animates. In both (14c) and (14d), both inanimates, the mature relativised constituent in the RC would be a PP_{Loc} (*in something/in this place*). She, however, used the general relative pronoun *that* whereas in (14a), animate, she used *who*, and in (14b), inanimate, she did not employ a complementiser or relative pronoun. In any case, Kumi did not differentiate between relative noun phrases and relative adverbials at this stage. It would be interesting to trace her subsequent development towards relative adverbs.

- (14) a. t8 *one day there was a mother who was not scared of anything*
 b. t9 *this is something you eat when it is was snack time*
 c. t12 *this is something that you put lovely writing for friend to sent*
 d. t12 *this is the place that you you can have a look at lovely stories*

In summary, our analysis indicates that Kumi developed her RC types in the following order: SUBJ > Direct OBJ > OBL_{loc} & ADJ, which mostly supports the three types of RCs in the NPAH: SUBJ > Direct OBJ > OBL as well as being consistent with Nottbeck's proposal (this volume). According to Keenan and Comrie (1977), Indirect OBJ RCs should be acquired before OBL RCs (see Table 1). However, they never appeared in our 2-year longitudinal study. Also, GEN and OCOMP RCs, located lower in the NPAH, were not produced, indicating that these might be acquired later. Further, the NPAH does not predict the emergence of (developmental) ADJ RCs, which highlights an important transition towards RCs. This leads to the conclusion that, indeed, the NPAH is an influential typological paradigm and hence a majority of the RC studies in SLA examine, mainly experimentally, the RC constructions listed in the NPAH. Our analysis suggests, instead, that target frameworks and purely experimental methods may miss important developmental facts.

6.3 Testing the Perceptual Difficulty Hypothesis (PDH)

Table 9 presents an analysis of the matrix position of RCs in Kumi's data. Out of 76 cases, 12 amalgam constructions were excluded from the analysis, so 64 cases remained to be analysed. All but one were either objects of the verb *have* (30 instances) or complements of presentational or copula sentences (33 instances) involving sentence final embedded RCs, as in (15). The one instance involving the SUBJ matrix position exhibits a centre-embedded RC, as in (16). Regarding the emergence order of RC constructions in relation to their matrix position, sentence-final embedded RC appeared first at t3 and centre-embedded RC at t4. Thus in terms of both the emergence order as well as frequency, this result strongly supports Kuno's (1974) PDH stating that centre-embedded RC constructions are more difficult to acquire than sentence-final embedded RC constructions. That is, the centre-embedded RCs interrupt the processing of the matrix sentences and thus they are more difficult to process than right-branching RCs. This view is quite compatible with Levelt's (1989) and Pienemann's (1998) views of the role of the syntactic buffer in processing language. Nottbeck (this volume) also believes that RCs modifying an NP_{head} in the OBJ position are easier to process and thus they are acquired before those in the SUBJ position. Our data suggest that this perceptual difficulty in processing is also reflected in the late acquisition of centre-embedded RCs. Thus, our study provides further support for Kuno (1974) by using naturalistic developmental data. Our results are also consistent with Izumi (2003) although his data elicitation methods and data types, such as sentence combination using relative clauses, RC comprehension/interpretation tasks and grammatical judgement, are different from ours.

Table 9. Matrix position of RC (n=64)

	Structure/time	t1	t2	t3	t4	t5	t6	t7	t8	t9	t10	t11	t12	t13	t14	total
S-centre embedded	SUBJ				1											1
S-final embedded	Complement						1	1	4	6	2	7	6	2	4	33
	OBJ			2	2		6	4		3	2	1	1	8	1	30

(15) t13 *this is a animal that my mum and my grandma hates*

(16) t4 *picture hanging the wall is the yacht picture.*

6.4 Testing the SO Hierarchy Hypothesis (SOHH)

As outlined earlier, this hypothesis relates to when the predicates of both matrix and RC involve lexical verbs, predicting that RC constructions develop in the order: OS > OO > SS > SO (Hamilton 1994). Out of the 76 RC constructions produced by Kumi, only two cases are of this type and both of them were produced at t10. However, a detailed analysis identified, in t9, an amalgam RC involving lexical verbs in both the clauses produced as (17). This case exhibited OS which was predicted by Hamilton to be the easiest to process and it can be proposed as a precursor of RC constructions. The other two cases were OO and OS produced in t10, shown in (18) and (19). Because the frequency is very low, our evidence does not contradict but is insufficient to support the OS > OO order. Further, the SS and SO constructions are absent in Kumi's data, which is not inconsistent with but does not demonstrate that these two types may be acquired later. Therefore, the results in relation to this hypothesis are inconclusive. Given the very low frequency of RC constructions involving lexical verbs in both matrix clause and RC, the SOHH may not be useful for early development. It is clear that the four types of RC constructions predicted in the SOHH do not tell the whole story about the acquisition of RC constructions. Kumi produced many RC constructions involving copula and presentational verbs in the matrix clauses before she produced the first of these types, OS, in t9. These findings highlight, again, the importance of longitudinal studies.

(17) t9 *they have something looks like stick* (OS)

(18) t10 *he got up and look at his frog that he he caught yesterday* (OO)

(19) t10 *he saw big big bunch of the bees w who was chasing the dog* (OS)

6.5 Acquisition of RC constructions and PT stages

Figure 5 shows the relationship between finite/non-finite RC constructions and PT stages. Comparing the development of RC constructions with the emergence of morphological structures, we found interesting correspondences. First, Kumi started producing infinitival and participial RCs at about the same time as verb complexes involving auxiliaries and lexical verbs emerged (i.e., phrasal procedure). She first produced ‘*be + V-ing*’ and ‘*modal + V*’ in t2 and then consolidated them in t4. This may indicate that the beginning of differentiation of finiteness from non-finiteness opens the way to more complex structures involving early RC constructions. Our findings on the acquisition of RC constructions are compatible with PT. Finite RC constructions themselves first emerged at t8. PT predicts finite RC constructions can be produced after the S-procedure is achieved because the processing of matrix clauses and RCs requires an inter-clausal procedure. Kumi started producing finite RC constructions at t8, which is just before she showed productive and more correct use of the S-procedure at t9. This finding does not contradict PT which predicts RC is acquired after S-procedure is in place. Although Kumi was not qualified to be placed at the stage of S-procedure at t8 when she produced first finite RC constructions, she previously produced morphological marking involving S-procedure (i.e., 3rd person singular *-s*) once at t6 and t7 respectively. Therefore, we could say that her use of 3rd person singular *-s* was less frequent and less accurate but her PT stage was moving towards S-procedure stages at t8. Our

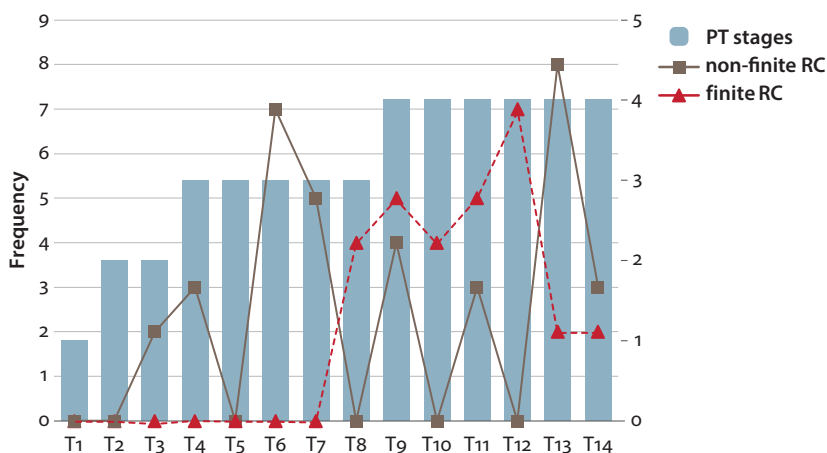


Figure 5. Finite/non-finite RC constructions and PT stages (Stage 1 = Lemma, Stage 2 = Category Procedure, Stage 3 = Phrasal Procedure, Stage 4 = S-procedure)

findings indicate that the acquisition of RCs is closely related to the emergence of finiteness and, consequently, morphological development, especially the acquisition of features of the verb lexical entry including *-ing* and *-s* (3rd person *-s*). These features are required to mark finiteness in English and thus the acquisition of RCs is not only a syntactic but also a morphological phenomenon. Therefore, our data indicates that PT morphological stages play an important role in predicting the acquisition of RCs.

7. Conclusion

This study has investigated the development of RC constructions in a 2-year longitudinal study of a school-aged Japanese child acquiring L2-English in a naturalistic environment. The RC constructions were analysed in view of major theoretical approaches to RC constructions produced by the child, which were then mapped onto stages of general morphological development using PT. Three of these approaches were found to be useful only in terms of the final stage to be reached by the developing learner, but their target orientation prevents them to be useful for describing developmental trajectories. On the other hand, the Emergentist approach can be used to trace development and may be linked to PT's morphological developmental schedule. Three research questions were posited in this study. We first addressed the issue of whether development of RC constructions in L1 and child L2 are similar. Similar to Diessel's (2004) L1 study, our child L2 study shows that infinitival and participial RC constructions represent the early stage of RC modification. In fact, non-finite RC constructions ($n = 35$) appear just after the emergence of PT's verb phrase procedure, that is, when the child starts producing verb complexes involving auxiliaries and lexical verbs. This means that the differentiation of finiteness may be a necessary resource for building complex structures involving RC constructions in English. After infinitival and participial RC constructions are established, the child starts producing finite RC constructions ($n = 29$). Initially, these involve single-propositions with copular or presentational matrix clauses. This type of construction represents the bulk of our RC data. The emergence of PT's S-procedure coincides with the few remaining two-proposition RC constructions with lexical verbs. We also found intermediate (developmental) infinitival and participial RC constructions as well as adverbial relative constructions which demonstrate a close resemblance between L1 and child L2 development of RC constructions.

The second question asked was whether the acquisition of (finite) RCs followed the hierarchies predicted by, respectively, Keenan and Comrie's (1977) NPAH, Kuno's (1974) PDH, and Hamilton's (1994) SOHH. Only three types of RCs were

produced by Kumi during the 2-year longitudinal study in the emergence order: SUBJ > Direct OBJ > OBL. Kumi did not produce the other RC types identified in the NPAH, IO, GEN, and OCOMP. On the other hand, she produced ADJ RCs, developmental structures which are not included in the NPAH. The findings in this study strongly support Kuno's PDH, because, with the exception of one centre-embedded RC, Kumi did produce sentence final RCs. We had insufficient evidence to test the SOHH because Kumi produced only three relevant RC constructions including lexical verbs in both matrix clauses and RCs over two years.

The third question asked when RC constructions emerged in the child's speech in relation to general developmental PT morphological stages of English L2. We found that non-finite RCs appeared around the same time as the verb phrase procedure and that finite RCs emerged after the S-procedure was acquired. In other words, the finite RC production from the point of view of the three hypotheses only relates to the final morphological stage of PT (Di Biase et al., 2015), leaving little room for development in terms of the PT framework. On the other hand, our study found that infinitival and participial RC constructions, such as those considered by Diessel (2004) as building blocks for RC development in FLA, also emerged early in child ESL acquisition. Given the paucity of the data at the higher developmental end of RCs, further longitudinal studies are required in order to identify possible steps within the two-proposition RCs.

It was beyond our scope to evaluate the Emergentist claim that language learning is exemplar-based and type/token frequencies determine the language acquisition of structure (N. Ellis, 2002). In terms of PT, our data provide evidence that the acquisition of RC constructions, including precursors of full, target-like RC constructions, that is, amalgam, infinitival and participial RCs, goes hand in hand with PT stages of morphological acquisition. Finally, longitudinal studies such as our own and that of Zhang (this volume) are indispensable if we want to look at language learners' detailed developmental trajectory rather than viewing L2 acquisition only in relation to distance from target-like use.

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References

- Behrens, H. (2009). Usage-based and emergentist approaches to language acquisition. *Linguistics* 47(2), 383–411. <https://doi.org/10.1515/LING.2009.014>
- Bloom, L. (1991). *Language development from two to three*. Cambridge: Cambridge University Press.
- Bowerman, M. (1979). The acquisition of complex sentences. In P. Fletcher & M. Garman (Eds.), *Language acquisition: Studies in first language development* (pp. 285–305). Cambridge: Cambridge University Press.
- Bresnan, J., & Mchombo, S. (1987). Topic, pronoun, and agreement in Chiche`a. *Language* 63(4), 741–782. <https://doi.org/10.2307/415717>
- Chomsky, N. (1981). *Lectures on government and binding*. Dordrecht: Foris.
- Chomsky, N. (1995). *The minimalist program*. Cambridge, MA: The MIT press.
- Chomsky, N., & Lasnik, H. (1993). The theory of principles and parameters. In J. von Stechow, J. A. W. Sternefeld & T. Vennemann (Eds.), *Syntax: an international handbook of contemporary research* (pp. 13–127). Cambridge MA: MIT Press.
- Clark, E. (2003). Language change during language acquisition. In M. Lamb & A. Brown (Eds.), *Advances in child development* (Vol. 2, pp. 173–197). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Dalrymple, M. (2001). *Syntax and semantics: Lexical Functional Grammar*. San Diego, CA: Academic Press. <https://doi.org/10.1163/9781849500104>
- Di Biase, B., & Kawaguchi, S. (2002). Exploring the typological plausibility of Processability Theory: Language development in Italian second language and Japanese second language. *Second language research* 18(3), 274–302. <https://doi.org/10.1191/0267658302sr2040a>
- Di Biase, B., Kawaguchi, S., & Yamaguchi, Y. (2015). The development of English as a second language. In C. Bettoni & B. Di Biase (Eds.), *Grammatical development in second languages: Exploring the boundaries of Processability Theory* (pp. 85–115). Paris: The European Second Language Association.
- Diessel, H. (2004). *The acquisition of complex sentences*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511486531>
- Diessel, H. (2007). A construction-based analysis of the acquisition of East Asian relative clauses. *Studies in Second Language Acquisition* 29(2), 311–320. <https://doi.org/10.1017/S0272263107070167>
- Diessel, H., & Tomasello, M. (2000). The development of relative clauses in spontaneous child speech. *Cognitive Linguistics* 11(1-2), 131–151.
- Diessel, H., & Tomasello, M. (2001). The acquisition of finite complement clauses in English: a corpus-based analysis. *Cognitive Linguistics* 12(2), 97–141. <https://doi.org/10.1515/cogl.12.2.97>
- Diessel, H., & Tomasello, M. (2005). A new look at the acquisition of relative clauses. *Languages* 81(4), 882–906.
- Doughty, C. J. (1991). Second language instruction does make a difference: Evidence from an empirical study of SL relativization. *Studies in Second Language Acquisition* 13(4), 431–469. <https://doi.org/10.1017/S0272263100010287>
- Eckman, F. R. (1977). Markedness and the contrastive analysis hypothesis. *Language Learning* 27(2), 315–330. <https://doi.org/10.1111/j.1467-1770.1977.tb00124.x>
- Eckman, F. R. (1984). Universals, typologies and interlanguage. In W. E. Rutherford (Ed.), *Language universals and second language acquisition* (pp. 79–105). Amsterdam: John Benjamins. <https://doi.org/10.1075/tsl.5.08eck>

- Eckman, F. R. (1996). A functional-typological approach to second language acquisition theory. In W. C. Ritchie & T. K. Bhatia (Eds.), *Handbook of second language acquisition* (pp. 33–68). San Diego, CA: Academic Press.
- Eckman, F. R., Bell, L., & Nelson, D. (1988). On the generalization of relative clauses instruction on the acquisition of English as a second language. *Applied Linguistics* 9(1), 1–20. <https://doi.org/10.1093/applin/9.1.1>
- Ellis, N. C. (2008). Usage-based and form-focused language acquisition: The associative learning of constructions, learned-attention, and the limited L2 endstate. In P. Robinson & N. C. Ellis (Eds.), *Handbook of cognitive linguistics and second language acquisition* (pp. 372–405). London: Routledge.
- Ellis, R. (1994). *The study of second language acquisition*. Oxford: Oxford University Press.
- Eskildsen, S. W. (2008). Constructing another language – Usage-based linguistics in second language acquisition. *Applied Linguistics* 30(3), 335–357. <https://doi.org/10.1093/applin/amn037>
- Eskildsen, S. W. (2015). What counts as developmental sequence? Exemplar-based L2 learning of English questions. *Language Learning* 65(1), 33–62. <https://doi.org/10.1111/lang.12090>
- Evans, N., & Levinson, S. C. (2009). The myth of language universals: Language diversity and its importance for cognitive science. *Behavioral and Brain Sciences* 32(5), 429–448. <https://doi.org/10.1017/S0140525X0999094X>
- Gass, S. (1979). Language transfer and universal grammatical relations. *Language Learning* 29(2), 327–344. <https://doi.org/10.1111/j.1467-1770.1979.tb01073.x>
- Hamilton, R. (1994). Is implicational generalization unidirectional and maximal? Evidence from relativization instruction in a second language. *Language Learning* 44(1), 123–157. <https://doi.org/10.1111/j.1467-1770.1994.tb01451.x>
- Hawkins, J. A. (1987). Implicational universals as predictions of language acquisition. *Linguistics* 25(3), 453–473. <https://doi.org/10.1515/ling.1987.25.3.453>
- Hyltenstam, K. (1984). The use of typological markedness conditions as predictors in second language acquisition: the case of pronominal copies in relative clauses. In R. Andersen (Ed.), *Second language: A crosslinguistic perspective* (pp. 39–58). Rowley, MA: Newbury House.
- Izumi, S. (2003). Processing difficulty in comprehension and production of relative clauses by learners of English as a second language. *Language Learning* 53(2), 285–323. <https://doi.org/10.1111/1467-9922.00218>
- Kaplan, R. M., & Bresnan, J. (1982). Lexical-Functional Grammar: A formal system for grammatical representation. In J. Bresnan (Ed.), *The mental representation of grammatical relations* (pp. 173–281). Cambridge, MA: The MIT Press.
- Keenan, E., & Comrie, B. (1977). Noun phrase accessibility and Universal Grammar. *Linguistic Inquiry* 8(1), 63–99.
- Kidd, E., & Bavin, E. L. (2002). English-speaking children’s comprehension of relative clauses: Evidence for general-cognitive and language-specific constraints on development. *Journal of Psycholinguistic Research* 31(6), 599–617. <https://doi.org/10.1023/A:1021265021141>
- Kuno, S. (1974). The position of relative clauses and conjunctions. *Linguistic Inquiry* 5(1), 117–136.
- Lambrech, K. (1988). There was a farmer had a dog: Syntactic amalgams revisited. *Berkeley Linguistics Society* 14, 319–339. <https://doi.org/10.3765/bls.v14i0.1796>
- Levelt, W. J. M. (1989). *Speaking: From intention to articulation*. Cambridge, MA: The MIT Press.
- Limber, J. (1973). The genesis of complex sentences. In T. E. Moore (Ed.), *Cognitive development and the acquisition of language* (pp. 169–185). New York, NY: Academic Press. <https://doi.org/10.1016/B978-0-12-505850-6.50013-X>

- MacWhinney, B., & Pleh, C. (1988). The processing of restrictive relative clauses in Hungarian. *Cognition* 29(2), 95–141. [https://doi.org/10.1016/0010-0277\(88\)90034-0](https://doi.org/10.1016/0010-0277(88)90034-0)
- Mellow, D. (2006). The emergence of second language syntax: A case study of the acquisition of relative clauses. *Applied Linguistics* 27(4), 620–644. <https://doi.org/10.1093/applin/aml031>
- Mayer, M. (1969). *Frog, where are you?* New York, NY: Dial Press.
- O'Grady, W. (1987). *Principles of grammar and learning*. Chicago, IL: The University of Chicago Press.
- O'Grady, W. (1999). Toward a new nativism. *Studies in Second Language Acquisition* 21(4), 621–633.
- O'Grady, W. (2005). *How children learn language*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511791192>
- Pallotti, G. (2007). An operational definition of the emergence criterion. *Applied Linguistics* 28(1), 361–382. <https://doi.org/10.1093/applin/amm018>
- Pavesi, M. (1986). Markedness, discoursal models, and relative clause formation in a formal and informal context. *Studies in Second Language Acquisition* 8(1), 38–55. <https://doi.org/10.1017/S0272263100005829>
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M. (Ed.). (2005). *Cross-linguistic aspects of Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30>
- Pienemann, M., Di Biase, B., & Kawaguchi, S. (2005). Extending Processability Theory. In M. Pienemann (Ed.), *Cross-linguistic aspects of Processability Theory* (pp. 199–251). Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30.09pie>
- Pienemann, M., Keßler, J.-U., & Itani-Adams, Y. (2011). Comparing levels of processability across languages. *International Journal of Bilingualism* 15(2), 128–146. <https://doi.org/10.1177/1367006910380037>
- Schachter, J. (1974). An error in error analysis. *Language learning* 24(2), 205–214. <https://doi.org/10.1111/j.1467-1770.1974.tb00502.x>
- Schumann, J. H. (1980). The acquisition of English relative clauses by second language learners. In R. C. Scarcella & S. Krashen (Eds.), *Research in second language acquisition: Selected papers of the Lost Angeles Second Language Acquisition Research Forum* (pp. 118–131). Rowley, MA: Newbury House.
- Sheldon, A. (1974). On the role of parallel function in the acquisition of relative clauses in English. *Journal of Verbal Learning and Verbal Behavior* 13(3), 272–281. [https://doi.org/10.1016/S0022-5371\(74\)80064-2](https://doi.org/10.1016/S0022-5371(74)80064-2)
- Tomasello, M. (2000). First steps toward a usage-based theory of language acquisition. *Cognitive Linguistics* 11(1-2), 61–82.
- Tomasello, M. (2003). *Constructing a language: A usage-based theory of language acquisition*. Cambridge, MA: Harvard University Press.
- Tomasello, M. (2004). What kind of evidence could refute the UG hypothesis? Commentary on Wunderlich. *Studies in Language* 28(3), 642–645. <https://doi.org/10.1075/sl.28.3.13tom>
- Van Valin, R. D. (2001). *An introduction to syntax*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9781139164320>
- Yamaguchi, Y. (2013). *Child second language learning: A study of English as a second language acquisition*. Saarbrücken, Germany: LAP Lambert Academic Publishing.
- Yamaguchi, Y., & Kawaguchi, S. (2016). Development of relative clause constructions in English L2. *International Journal of Applied Linguistics & English Literature* 5(1), 83–93.

Language learning and teaching issues in relation to classroom and assessment contexts

The Teachability Hypothesis is a construct that preceded the development of PT. It makes specific claims about how SLA research can contribute to specific teaching issues, particularly the issue of the sequencing of instruction. The authors in this section consider the Teachability Hypothesis as one among a number of perspectives on learning-teaching relationships. They make diverse connections between different teaching issues and features of PT and also relate to teachability in different ways. The relationship to teachability can exist at four levels.

- The first level is to do with the date of the references and whether the view reflects the Teachability Hypothesis prior to PT or as it has been interpreted after the elaboration of PT. This difference is significant because PT offers a specific explanation of how developmental sequences in SLA are to be accounted for whereas the Teachability Hypothesis was not based on such an explicit theory.
- The second level is the positioning of the authors' work in relation to PT as a theoretical framework. Some chapters are situated within PT; others engage with PT from 'outside'.
- The third level engages with varied possible criteria for acquisition and how they are used in studies of teaching and learning. Some chapters use developmental 'readiness' as it has been used in traditional Teachability Hypothesis work and apply the emergence criterion to determine the point at which a learner is ready to move to the next developmental stage; others engage critically with this definition or propose alternative ways of understanding what readiness is.
- The fourth level focuses on the framing of learner outcomes and the effects of instruction on the particular features that are the focus of the study. Chapters engaging with this level offer alternative theorisations of relationships between 'emergence', 'accuracy' or 'mastery', 'development' and 'change', and frequently offer alternative ways of recognising outcomes.

As a result of these four levels of relationship, the five chapters in this section widen traditional PT-based perspectives on change in learner language in instructional contexts. The widenings that are presented in the chapters include:

- an increased interest in trajectories from emergence to mastery
- a renewed consideration of the advantages and disadvantages of differences in the use of ‘readiness’ (development and accuracy)
- a more differentiated view of feedback that opens up consideration of (1) whether different kinds of feedback contribute to accuracy change in different ways as well as (2) how the benefits of feedback relate to learners’ literacy
- consideration of how development as defined in more traditional PT ways might relate to communicative features of language learning and assessment.

Jana Roos investigates the potential of an approach combining task-based and developmentally-motivated, form-focused language teaching. She argues that engaging learners in the active use of a grammatical feature for which they are developmentally ready can promote the acquisition of that feature.

Kristof Baten explores two different operationalisations of developmental readiness, namely emergence and relative accuracy and analyses how the different criteria relate to changes in the learners’ interlanguage systems in instructional contexts. He argues that developmental readiness defined in accordance with an emergence criterion allows predictions to be made about development, whereas development cannot be predicted by accuracy.

Huifang (Lydia) Li and Noriko Iwashita look at the effects of different types of feedback on the development of English question formation when the dominant instructional focus is on form(s). Measuring the effect of the feedback by an increase in frequency of the use of target forms they demonstrate that recasts are more frequently associated with improvements in accuracy than negotiated prompts. However, they also demonstrate that neither type of feedback achieved change in the learners’ stage assignment.

Carly Steele and Rhonda Oliver explore the question of how Aboriginal Australian learners’ written literacy level influences the effect of feedback on the way that different learners process features of question formation in Standard Australian English and thereby on their acquisition of English as a second dialect. They show that the learners’ literacy level does not influence the extent of noticing, but does influence the reproduction of modelled forms.

Maria Eklund Heinonen focuses on the relationship between grammatical development and communicative competence. She explores the question of whether learners’ levels of acquisition influence their performance in a language proficiency test and discusses the applicability of PT as a complementary tool to assess communicative language proficiency.

Exploiting the potential of tasks for targeted language learning in the EFL classroom

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This chapter reports on a classroom study showing how communicative tasks that include a focus on the developmental readiness of the learners promote the acquisition process. The study explores the effects of the use of such tasks with young German learners of English. It is based on the idea that a positive effect on language development is possible using an approach that engages learners in the active use of grammatical features for which they are developmentally ready. The study focuses on the acquisition of ‘third person singular -s’. In a pretest, a number of the learners involved had shown that they were developmentally ready for this feature. After an instruction period that included work with communicative tasks focussing on this feature, oral speech production data were obtained through task-based interaction in a posttest and a delayed posttest. The data indicate that providing learners with these kinds of opportunities to use a ‘learnable’ feature repeatedly and flexibly promotes the acquisition of that feature.

1. Introduction¹

A common finding in SLA research is that learners go through the same developmental sequences in the course of acquisition. A key assumption of Processability Theory (PT) (Pienemann, 1998, 2005) is that the developmental sequences that can be observed in SLA are determined by the architecture of the human language processor. What learners can acquire, that is, have the capacity to produce at a certain stage in the L2 acquisition process is constrained by the availability of specific processing mechanisms. These constraints on acquisition also impose restrictions on the effects of instruction and the teachability of certain grammatical structures in the foreign language classroom. The claim that is used to explain this finding

1. I would like to thank Lea Hartung and Johanna Bußwinkel for their assistance with data collection, transcription and analysis.

is that language learners need to be developmentally ready in order to be able to acquire particular target language structures in instructional activities. However, the idea that learners need to be at a particular point in their acquisition process in order to be able to acquire specific target language features, has been associated with more than constraints on language teaching and learning. One of these extensions is that ‘developmental readiness’, i.e., the point at which a learner can acquire a target language structure, has come to be seen as an advantageous starting point for instructional design, because it makes it possible to articulate a psycholinguistic perspective to answer the question of what can be taught when. What remains to be answered, however, is the question of how this idea can be transferred to the foreign language classroom and integrated into classroom practice.

This chapter focuses on an approach to promote second language acquisition in the EFL classroom that takes the concept of developmental readiness into account. In the first part, I discuss task-based language teaching in combination with a focus on form as a methodological approach that provides options for integrating opportunities to use specific linguistic features in communicative language experiences (Ellis, 2003; Long & Robinson, 1998; Long, 2011). I discuss this approach in connection with the importance of interaction and output in the acquisition process and argue that using ‘tasks with a developmentally moderated focus on form’, “which focus on aspects of form that are learnable” (Roos, 2016: 122), can engage learners in the active use of selected language features and support the acquisition of those features.

The classroom study conducted with young German learners of English as a foreign language in the early secondary years that is presented in the second part of the chapter explores the potential of using communicative tasks with a developmentally moderated focus on form in the EFL classroom to promote the use and the acquisition of a targeted linguistic feature, namely third person -s. The specific aim of the study is to investigate the outcomes of an approach combining task-based and form-focused aspects of language teaching, where the underlying idea is that the acquisition process can be promoted if developmental readiness is taken into account in the selection of the grammatical features for instructional focus.

2. A developmentally moderated approach to language teaching

Developmental readiness defines the margin within which instruction may have an effect on the acquisition of specific target language structures (Pienemann, 2015: 133), as it is assumed that learners follow predictable developmental stages in the acquisition process for these structures (see also Li & Iwashita (this volume); the concept of ‘readiness’ is further explored in Baten (this volume)).

The assumption that “[t]he effect of teaching is constrained by processability” (Pienemann & Lenzen, 2015: 176f.) is at the core of the Teachability Hypothesis (Pienemann, 1984). The main claims of this hypothesis are (1) that stages of acquisition cannot be skipped through instruction but (2) that instruction focusing on structures from the ‘next’ developmental stage (i.e. the stage for which the learners are ‘ready’) can facilitate the acquisition process (Pienemann, 1989). These claims have been examined in numerous studies that have shown that formal instruction cannot alter the course of language development (Bonilla, 2015; Ellis, 1989; Mansouri & Duffy, 2005; Pienemann, 1984) and that instruction building on a learner’s current stage of interlanguage development may enable the learner to progress to the targeted ‘next’ stage (Dyson, 1996; Di Biase, 2008; Pienemann, 1984). Even though the Teachability Hypothesis has important implications for language teaching, Pienemann states that it “does not contain any built-in ‘recipes’ for teaching methodology.” (Pienemann, 1989: 76) The studies mentioned above have applied different teaching approaches such as explicit (e.g. Bonilla, 2015; Mansouri & Duffy, 2005) or implicit (Spada & Lightbown, 1999; see also Doman, 2015) instruction of targeted features, or corrective feedback with a focus on form (Di Biase, 2008).

As regards the question of how developmental readiness can be taken into account in the teaching and learning process in the classroom, I consider task-based language teaching (see e.g., Ellis, 2003, 2018) in combination with a focus on form (see e.g., Long & Robinson, 1998; Long, 2000) a promising methodological approach. The possibilities a task-based approach offers for the teaching of foreign languages, and its potential to support processes of second language acquisition have been discussed from many different theoretical and practical perspectives. It has been shown that learners can benefit from the interaction that results from task-based work, because they are exposed to meaningful input and receive feedback on the language they produce as well as opportunities for producing modified output (García Mayo & Lázaro-Ibarrola, 2015; Long, 1996; Mackey, 1999; Swain, 1993). While task-based teaching promotes the development of communicative competence as an overall goal, it can also support the acquisition of grammar, as Ellis (2009: 238) points out, because it “aims to create a context in which grammar can be acquired gradually and dynamically while at the same time fostering the ability to use this grammar in communication.” In discussing task-based language teaching as an approach that is compatible with a developmentally moderated approach to language teaching, Kessler and Plessner (2011: 162) argue in favour of the use of communicative tasks in the classroom, because they enable learners to make recourse to their own linguistic repertoire and use “L2 structures according to their individual state of interlanguage development.”

The advantages of task-based language teaching have often been discussed in connection with the concept of ‘focus on form’ (Long, 1991) that Long (2000: 188) sees as a “methodological principle in TBLT.” As he outlines in a recent definition, the key idea is

to draw learners’ attention to linguistic problems in context, as they arise during communication in TBLT, typically as students work on problem-solving tasks, thereby increasing the likelihood that attention to code features will be synchronized with the learner’s internal syllabus, developmental stage and processing ability. (Long, 2015: 317)

This definition indicates a relationship of focus on form with issues of language development and learnability that are also key elements of the Teachability Hypothesis, because the support that the learner receives is geared to the developing interlanguage system. Central to focus on form is the idea of drawing learners’ attention to form, either implicitly or explicitly, in the context of meaning-oriented communication (Ellis, 2016). It can also provide a context that allows learners to notice features of the target language in the input and the interaction they are engaged in, which relates to Schmidt’s (1990) ‘noticing hypothesis’ and the idea that getting learners to attend to forms in the input contributes to acquisition.

Whereas the focus-on-form approach outlined by Long is responsive and incidental in nature, however, others have expanded his definition to include the possibility of providing a focus on form in predetermined ways (cf. Loewen, 2005: 362). For example, Doughty and Williams (1998b) differentiate between a proactive and a reactive approach to focus on form, and Ellis (2016) distinguishes between a pre-planned focus, addressing pre-determined linguistic features and incidental focus on form. In a similar way, Spada and Lightbown’s (2008) term ‘integrated form-focused instruction’ (FFI) includes the possibility of determining a form focus in advance. Judicious selection of tasks makes it possible to integrate a focus on specific target language structures, and research in this area has explored various possibilities of using ‘focused tasks’ (Ellis, 2003, 2009) with learners in different settings (see e.g., Doughty & Williams, 1998a; Ellis, 2003; Long, 2011). By creating tasks which focus on particular language structures, opportunities for the active use of specific linguistic features in a communicative context can be provided.

The use of tasks that include a focus on language features that are learnable in the sense of the Teachability Hypothesis, has only recently begun to be explored. For instance, Kessler et al. (2011) discuss possibilities of integrating a developmentally moderated focus on form into second language learning programs and mention the idea of using tasks not only in order to determine if a learner has acquired a structure, as is commonly done in SLA research, but also to provide opportunities for learners to use structures that SLA research indicates they should be in a position

to acquire next (see also Keßler & Plesser, 2011). In Roos (2016), I have suggested the use of communicative ‘tasks with a developmentally moderated focus on form’ in the EFL classroom.² The idea behind this approach is that the grammatical forms in focus are selected in accordance with learners’ developmental readiness to acquire particular structures. When using such tasks, learners have the opportunity to negotiate meaning through interaction, while being provided with many natural contexts for the spontaneous productive use of the targeted features. In this way, PT can provide a psycholinguistically-motivated framework for the appropriate selection of form-focused tasks (see Roos, 2016: 126) that can be used for additional language learning.

3. A classroom study

To address the issues identified above, a classroom study was carried out to explore the effects of an approach linking learners’ developmental readiness as conceptualised in PT with form-focused aspects of instruction and principles of task-based language teaching. The aim was to find out whether incorporating tasks with a developmentally moderated focus on form into English lessons can (1) help to engage learners in the active use of a targeted linguistic feature and (2) promote the acquisition of the targeted feature.

The structure that was selected as the feature in focus is third person singular *-s*. This morphological feature is usually introduced in EFL classrooms at an early point in the instructional process. As Lenzing (2008) reports in her analysis of textbooks for primary school learners of EFL in Germany, third person *-s* occurs as a learning objective as early as grade 3. The grammatical rule is usually introduced in German EFL textbooks in grade 5 (see Keßler & Plesser, 2011). While this suggests that the structure is ‘easy’ to learn, third person *-s* is a feature that is considered “persistently problematic particularly in spontaneous production” (Basterrechea & García Mayo, 2014: 80; see also Sarandi, 2017) and it is not uncommon that teachers “complain about the salient absence of the third person singular *-s*” (Rohde, 2010: 122) in the EFL classroom. VanPatten and Williams (2015: 26) point out that the feature is acquired late in the developmental process and state that “although the third person singular *-s* ending in English is relatively straightforward, it appears to be challenging for L2 learners, even those of fairly advanced proficiency”. The acquisition of third person *-s* at a relatively late stage is also mirrored in its position in the processability hierarchy outlined in PT, where it is located at stage 5. This is because

2. A part of the data set that was elicited in the context of the study presented here was used in Roos (2016) to exemplify the potential of such tasks.

third person -s requires the unification of subject and verb and thus a grammatical information exchange across phrase boundaries (see, e.g., Pienemann, 2013). A key feature of the tasks with a focus on third person -s that were used in this study was that the learners would have multiple opportunities to use the targeted form in task-based interaction.

3.1 Research design

The study was carried out with twelve young German learners of English as a foreign language in the early secondary years. The students came from two intact classes that were selected because the English teacher, who had been familiarised with the aim and the approach followed in the study had volunteered to use communicative tasks with a focus on third person -s in her English lessons in these classes. Six students were in grade 6 (11–12 years old), and six students were in grade 7 (12–13 years old). All twelve learners had voluntarily chosen to take part in the study. They had been learning English for 3.5 years, 2 years at primary and 1.5 years at secondary level. The learners in grade 7 had begun to learn French as a foreign language in their first year at secondary school, which is why they were one year older, but had the same amount of instruction in English as the learners in grade 6. As mentioned above, third person -s is commonly formally introduced in year 5, which is when the grammatical rule is presented in the textbook. This means that it can be assumed that explicit instruction in relation to third person -s first took place about a year before the study.

The study followed a pretest, posttest, delayed posttest design in order to be able to compare the individual learner data before and after the intervention and to see whether acquisition occurred. In all three tests, informal interviews based on oral production tasks were used. Through their design, the tasks provided multiple contexts for the use of third person singular -s and thus for an implicit focus on form. They were carried out with the six learners from each of the two classes in order to elicit individual speech samples, which were transcribed and analysed. In the data elicitation the learners worked in pairs that were created with other members of the same class. Each pair completed three tasks that were thematically linked to topics that are typically dealt with in English textbooks for the age group concerned, namely *daily routines*, *free time activities* and *stars and celebrities*.

After the pretest, over a period of two weeks involving four 90-minute lessons (double periods), about 20 minutes of the English classroom time was devoted to work with communicative tasks with a focus on third person -s. All students in the two classes were involved in these activities. In the lessons, the teacher used tasks that were specifically developed for the study and that resembled in both

design and content the tasks that were part of the data elicitation before and after the intervention. The learners were not made aware that they were working with form-focused tasks, but showed through comments that they made in both classes that they had noticed that third person singular *-s* played a role. They also brought up the rule in the classroom: “He, she, it, *das ‘S’ muss mit!*” (He, she, it, the ‘s’ must fit!) is a mnemonic rhyme that is commonly used in EFL classrooms in Germany to help students memorise the rule and that most students can readily recite. Thus, even though the focus on form was conceived as implicit, it occasionally became explicit, e.g. when the students negotiated the correct use of third person *-s* during the task-based interaction. The posttest was carried out immediately after the instruction period and the delayed posttest four weeks later, to see if there was a longer-term effect.

In the following sections, the focus is first on the results of analysis of the data that were collected in the two groups of learners in relation to their use of 3rd person *-s*. Then, examples of the learners’ interaction as they were completing the tasks with the developmentally moderated focus on form will be presented and discussed with regard to task-effectiveness.

3.2 The use of third person singular *-s*

The learner data elicited in the pretest, posttest and delayed posttest were analysed to find out whether any changes took place with regard to the learners’ use of the targeted form. After the pretest, the learners’ developmental stages in the acquisition of English according to the processability hierarchy were determined by means of a distributional analysis of the relevant syntactic and morphological features contained in the individual speech samples. To determine whether a feature had been acquired, the emergence criterion was applied and operationalised as follows: A syntactic feature was regarded as acquired if it occurred with variation at least three times in a learner’s speech sample. Regarding the acquisition of morphemes, Pienemann (2015: 133) points out that it is important “to ensure that formulaic chunks are not counted as instances of morpheme insertion.” Therefore, a morpheme needs to occur with lexical and morphological variation in order to be considered as acquired.

The analysis shows that by the time of the pretest, eight of the twelve learners had reached stage 5 of the processability hierarchy. It can be considered that they had acquired third person *-s* at that point, as all learners were using the structure with different verbs. It needs to be mentioned though that not all of them also used the verbs with morphological variation. This can most likely be interpreted as an effect of the tasks that were used because the focus on individual people’s regular

activities both created contexts for the use of third-person verb forms and restricted the range of other verb forms that could be used. However, despite the somewhat restricted range of verb forms that were used, the learners in the study used third person *-s* in only some of the obligatory contexts rather than in all of them, which speaks against a formulaic use of the targeted feature.

The analysis also shows that not all of the learners appeared to have acquired stage 5 features. Four of the learners, C5, C7, C9 and C10 had only reached stage 4 and had only just begun to produce third person *-s* when the treatment started (see Table 1). At this point, the limited number of occurrences of the targeted structure does not permit any definitive conclusion that this stage 5 feature had been acquired by the four learners. As a result, they were classified as developmentally ready to acquire third person *-s*.

Table 1. Use of third person singular *-s* in obligatory contexts

Grade 7	C1	C2	C3	C4	C5	C6
Pretest	26/34	28/29	20/27	10/14	1/22	8/23
	0.76	0.97	0.74	0.71	0.05	0.35
Posttest	35/36	31/31	33/36	36/43	32/34	31/33
	0.97	1.0	0.92	0.84	0.94	0.94
Delayed posttest	5/6	7/7	12/12	8/8	5/7	10/10
	0.83	1.0	1.0	1.0	0.71	1.0
Grade 6	C7	C8	C9	C10	C11	C12
Pretest	2/25	18/22	3/26	2/23	14/30	13/35
	0.08	0.82	0.12	0.09	0.47	0.37
Posttest	29/36	24/28	39/43	36/39	27/37	21/35
	0.81	0.83	0.91	0.92	0.73	0.60
Delayed posttest	23/24	21/21	–	–	12/15	10/19
	0.96	1.0	–	–	0.80	0.53

Table 1 provides an overview of the learners' use of third person *-s*. It shows the total number of obligatory contexts and the number of the actually produced target forms in the pretest, the posttest and the delayed posttest. In the row below, the corresponding relative frequencies are displayed. What can be seen is that for all learners, there is an increase in the production of third person singular *-s* from pretest to posttest. This is especially true in the case of the four learners who had been shown to be 'ready' to acquire it. Their use of the structure in obligatory contexts increases by about 70 percentage points or more in the posttest. For these learners, the data show that the classroom intervention lead to acquisition of the targeted structure.

The delayed posttest shows that the use of third person *-s* continued to increase or remained constant for all learners, except C1, C5 and C12, whose delayed posttest results are slightly below those in the posttest, but still higher than in the pretest. Unfortunately, no delayed posttest could be carried out for learners C9 and C10, as they were ill for an extended period of time. However, they used third person singular *-s* with a wide variety of verbs and also began to use other stage 5 structures (Aux-2nd-?; see Examples (1) and (2) below). Together, these patterns indicate that these two learners had moved to stage 5 of the PT hierarchy.

In the case of learners C9, C10 and C11, in addition to the development regarding the acquisition and use of third person *-s*, the data also show a parallel development at the level of syntax: In the pretest, these learners did not produce ‘Aux-2nd-?’-structures – also located at stage 5 of the PT hierarchy – to ask questions, but began to do so after the period of instruction and C11 continued to do so in the delayed posttest. Examples (1) and (2) exemplify the development in these learners’ capacity to produce question forms and show that the learners used, for instance, the structure ‘Wh-SVO-?’, from stage 3 in the pretest before they began to use to ‘Aux-2nd-?’ in the posttest in a very similar context.

- (1) C10 Pretest: When Terry stand up?
 Posttest: When does Tom go to the underground?
 What does Tom do at the weekend afternoon?
- (2) C11 Pretest: What she do on Tuesday afternoon?
 Posttest: What does Tom do on Tuesday morning?
 When does Sam try on his clothes?

As the tasks used in the tests also required the learners to use question forms, it probably supported development here as well. Thus, the data also reflect “the learners’ developing knowledge of the way questions are formed” (Lightbown, 2003: 5; see also Example (6)).

It should be pointed out here that, with regard to acquisition, the focus is not on accuracy but on emergence, which means that “progress will not necessarily show up as greater accuracy.” (Lightbown, 2003: 5) Even though all learners can be said to have acquired third person singular *-s*, by the time of the posttest, some of them did not always use the structure in obligatory contexts. Thus, although the form had emerged and the learners could process it, there might still be a long road ahead until the targeted structure is fully mastered in all contexts. What is interesting to see in this regard, however, is that not only the four learners who had not acquired third person *-s* by the time of the pretest, but also the eight other learners, who had already acquired it, seem to benefit from the instructional intervention because their use of third person singular *-s* increases. During the instruction period, all learners had the opportunity to work with a number of communicative tasks with

a focus on third person -s and to use the targeted form productively in meaningful interaction. Therefore, the tasks may have supported the learners in gaining control of a feature that had already emerged in their interlanguage.

In the last section of the chapter, selected examples of the learners' task-based interaction will be presented in order to illustrate the potential of using tasks with a focus on forms that are 'learnable'.

3.3 Illustrating the task-based interaction of learners

The tasks that were used in the study were designed with the aim of drawing learners' attention to third person -s and to create many contexts for its productive use. Figure 1 shows an example of a task that was used in the study. It is an information-gap task where the students had to work in pairs and to communicate in order to complete a timetable. The children talked about habitual actions or, more precisely, they had to find out about an imaginary child's regular activities on different days of the week.

The examples of learner data presented below are mostly based on this task (Examples (3), (5) and (6)). They are taken from the posttest and illustrate the task-based interaction of learners who did not provide evidence that they had acquired third person -s before the instruction. The language that the learners produced shows that the task is effective and provided numerous contexts for the production of the targeted structure. The examples also reveal that the learners had different ways of dealing with the challenges imposed on them by the task and its focus on third person -s.







In Example (3), learner C7 is still insecure about which form to use in the posttest. He seems to reflect on and try different options before he finally produces a correct form, even though its phonetic realisation is not yet target-like.

- (3) C8 What does Tom do Monday afternoon?
 C7 Monday. He looks TV? He watch TV? Nee. He watch TV. He watches TV.
 No.

In Example (4), learner C7 describes the activities of a girl and a boy and does not use third person -s at first, but adds it after a brief hesitation, as required by the context.

- (4) C7 Lucy bake ... bakes cakes.
 Tom listen to the ... listens to the music.

The fact that he manages to correct himself could indicate that he seems to recognise that third person singular -s is a distinct morpheme that can be attached to a verb.

Monday	Tuesday	Wednesday	Thursday	Friday	Weekend	
						morning
						afternoon







Monday	Tuesday	Wednesday	Thursday	Friday	Weekend	
						morning
						afternoon

Figure 1. Information-gap task “A timetable” © Oliver Sasse, Celle

Example (5) illustrates the interaction between two learners who deliberated on how to use the word ‘jogging’. It shows that this kind of task-based work also leads to negotiated interaction, more precisely, to negotiation of form and ultimately, in this case, to the use of a correct form (see also Roos, 2016: 130).

- (5) C9 What does John do at Tuesday in the afternoon?
 C10 He ... joggings.
 C9 He is jogging.
 C10 He is jogging? Joggings? He is jogging. Joggings.
 C9 He goes jogging.
 C10 Oh ja, Pech halt!
 Oh yes, that's bad luck!

Example (6) illustrates another situation in the posttest in which learners C9 and C10 engage in negotiation of form, this time showing that they can also draw on grammatical knowledge, not only about the use of third person -s but also about the inflection in questions with the auxiliary in second position. As mentioned above, the two learners had begun to use this structure in the posttest. When learner C10

asks an 'AUX-2nd'-question, C9 provides corrective feedback suggesting that an -s should be attached to the main verb. C10 disagrees and indicates in a metalinguistic comment that inflection is not required in this case, because it is the auxiliary 'does' that is marked for third person. Then, he completes his question accordingly.

- (6) C9 When does Tom play football?
 C10 He play football ... he plays oder? ... football at three o'clock.
 Right?
 When does Tom play ...
 C9 Plays!
 C10 Nein, doch nicht bei 'does'!
 No, not in the case of 'does'!
 C9 Ach so.
 I see.
 C10 ...play ... play computer games?

The examples above illustrate that the task is effective at creating a focus on form, because "the learner's attention is drawn precisely to a linguistic feature as necessitated by a communicative demand" (Doughty & Williams, 1998b: 3). Examples (5) and (6) show how this can lead to an active engagement with the feature itself and to reflections on its correct use, that also lead to learner feedback. Loewen (2005: 364f.) highlights the value of student-initiated focus on form, as it allows learners "to recognize and raise linguistic items that are problematic for them". Overall, the data clearly show that tasks with a developmentally moderated focus on form can help to engage the learners in the active use of a targeted linguistic feature. Such a task design also permits learners to develop the ability to use third person -s if they are developmentally ready to do so.

After the delayed posttest, the learners were asked to give spontaneous feedback on the use of the tasks in their English lessons. Interestingly, even though the focus of the task had not been explicitly mentioned by the teacher, the learners' perceptions of what they thought they had learned mirror the acquisition processes that the data analysis has revealed. The learners directly referred to the morphological feature targeted in the study when they said that they felt that they used third person -s more often than before. Also, they felt that their use of question words had improved, which is in line with the development of stage 5 questions that was observed for some learners in the study.

Overall, the young learners said that they enjoyed working with the tasks and that they preferred interacting with a partner to the teacher-led, whole-class interaction they were used to because the pair-based interaction gave them more time to speak and more possibilities to learn from each other.

4. Conclusion

In this chapter, I have addressed the question of whether and how the selection and use of communicative tasks that include a focus on developmental readiness can help to engage learners in the active use of a targeted linguistic feature and promote the acquisition process. I presented a classroom study investigating the effects of the use of such tasks with junior secondary learners. The findings suggest that there are benefits in using an approach that creates multiple opportunities for learners to productively use a targeted grammatical feature repeatedly and flexibly in meaning-focused communication if that feature has not yet been acquired but is within their reach in terms of developmental readiness. These findings reveal that this approach has the potential to promote acquisition of the feature. The data show a clear development towards the productive use of third person *-s* and thus confirm the idea that “formal instruction may be beneficial if timed correctly in developmental terms” (Pienemann, 2015: 133). The results also indicate that opportunities to use features that have already emerged can support learners on their way to gaining control of them. In this way, the approach used in the study could also contribute to successful language learning in the long term:

When practice is defined as experience in using language for meaningful interaction, including opportunities for thoughtful retrieval of language features that have emerged in learners’ interlanguage but have not become automatic, then practice is likely to be more predictive of long-term success. (Lightbown, 2003: 6)

The conclusions that can be drawn from the study must be treated with caution. This is a small-scale study, the results are based on data for only twelve learners, six students from each of the two classes involved, and the focus was on one developmental feature only. Also, the trial was for a limited period only. Nevertheless, the results can be regarded as an indicator of the possibilities that the developmentally moderated approach to language teaching applied here has to offer. Future research with larger groups of learners at different stages of acquisition could therefore explore if work with tasks with a developmentally moderated focus on other linguistic forms leads to similar effects.

All in all, the findings confirm that using tasks with a developmentally moderated focus on form can promote the acquisition of targeted linguistic features and support second language development in an institutional context. These tasks can thus play a key role in a developmentally moderated approach to foreign language teaching.

References

- Basterrechea, M., & García Mayo, M. P. (2014). Dictogloss and the production of the English third person -s by CLIL and mainstream EFL learners: A comparative study. *International Journal of English Studies* 14(2), 77–98. <https://doi.org/10.6018/j.177321>
- Bonilla, C. L. (2015). Instructing stages of Processability Theory in L2 Spanish: Next or next + 1? In K. Baten, A. Buyl, K. Lochtmann, & M. Van Herreweghe (Eds.), *Theoretical and methodological developments in Processability Theory* (pp. 205–238). Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.4.10bon>
- Di Biase, B. (2008). Focus-on-form and development in L2 learning. In J.-U. Kefler (Ed.), *Processability approaches to second language acquisition* (pp. 197–220). Newcastle upon Tyne: Cambridge Scholars.
- Doman, E. (2015). Implications of the developmental stages of language acquisition for classroom teaching. In K. Baten, A. Buyl, K. Lochtmann, & M. Van Herreweghe (Eds.), *Theoretical and methodological developments in Processability Theory* (pp. 239–262). Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.4.11dom>
- Doughty, C., & Williams, J. (Eds.) (1998a). *Focus on form in second language acquisition*. Cambridge: Cambridge University Press.
- Doughty, C., & Williams, J. (1998b). Issues and terminology. In C. Doughty & J. Williams (Eds.), *Focus on form in classroom second language acquisition* (pp. 1–11). Cambridge: Cambridge University Press.
- Dyson, B. (1996). The debate on form-focused instruction: A teacher's perspective. *Australian Review of Applied Linguistics* 19(2), 59–78. <https://doi.org/10.1075/aryl.19.2.04dys>
- Ellis, R. (1989). Are classroom and naturalistic acquisition the same? A study of the classroom acquisition of German word order rules. *Studies in Second Language Acquisition* 11(3), 305–328. <https://doi.org/10.1017/S0272263100008159>
- Ellis, R. (2003). *Task-based language teaching and learning*. Oxford: Oxford University Press.
- Ellis, R. (2009). Task-based language teaching: Sorting out the misunderstandings. *International Journal of Applied Linguistics* 19(3), 221–246. <https://doi.org/10.1111/j.1473-4192.2009.00231.x>
- Ellis, R. (2016). Focus on form: A critical review. *Language Teaching Research* 20(3), 405–428. <https://doi.org/10.1177/1362168816628627>
- Ellis, R. (2018). *Reflections on task-based language Teaching*. Bristol: Multilingual Matters. <https://doi.org/10.21832/ELLIS0131>
- García Mayo, M. P., & Lázaro-Ibarrola, A. (2015). Do children negotiate for meaning in task-based interaction? Evidence from CLIL and EFL settings. *System* 54, 40–54. <https://doi.org/10.1016/j.system.2014.12.001>
- Kefler, J.-U., Liebner, M., & Mansouri, F. (2011). Teaching. In M. Pienemann & J.-U. Kefler (Eds.), *Studying Processability Theory* (pp. 150–156). Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.1.12tea>
- Kefler, J.-U., & Plessner, A. (2011). *Teaching English grammar*. Standard Wissen Lehramt Englisch. Paderborn: Schöningh/UTB.
- Lenzing, A. (2008). Teachability and learnability: An analysis of primary school textbooks. In J.-U. Kefler (Ed.), *Processability approaches to second language development and second language learning* (pp. 221–241). Newcastle upon Tyne: Cambridge Scholars.
- Lightbown, P. M. (2003). SLA research in the classroom / SLA research for the classroom. *Language Learning Journal* 28(1), 4–13. <https://doi.org/10.1080/09571730385200151>

- Loewen, S. (2005). Incidental focus on form and second language learning. *Studies in Second Language Acquisition* 27(3), 361–386. <https://doi.org/10.1017/S0272263105050163>
- Long, M. H. (1991). Focus on form: A design feature in language teaching methodology. In K. de Bot, R. Ginsberg, & C. Kramsch (Eds.), *Foreign language research in cross-cultural perspective* (pp. 39–52). Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.2.07lon>
- Long, M. H. (1996). The role of the linguistic environment in second language acquisition. In W. C. Ritchie & T. K. Bhatia (Eds.), *Handbook of second language acquisition* (pp. 413–468). New York, NY: Academic Press.
- Long, M. H. & Robinson, P. (1998). Focus on form: Theory, research and practice. In C. Doughty & J. Williams (Eds.), *Focus on form in classroom second language acquisition* (pp. 15–41). Cambridge: Cambridge University Press.
- Long, M. H. (2000). Focus on form in task-based language teaching. In R. D. Lambert & E. Shohamy (Eds.), *Language policy and pedagogy: Essays in honor of A. Ronald Walton* (pp. 179–192). Amsterdam: Benjamins. <https://doi.org/10.1075/z.96.11lon>
- Long, M. H. (2011). Methodological principles for language teaching. In C. Doughty & M. H. Long (Eds.), *Handbook of language teaching* (pp. 373–394). Oxford: Wiley-Blackwell.
- Long, M. H. (2015). *Second language acquisition and task-based language teaching*. Malden, MA: Wiley Blackwell.
- Mackey, A. (1999). Input, interaction and language development. *Studies in Second Language Acquisition* 21(4), 557–587. <https://doi.org/10.1017/S0272263199004027>
- Mansouri, F., & Duffy, L. (2005). The pedagogic effectiveness of developmental readiness in ESL grammar instruction. *Australian Review of Applied Linguistics* 28(1), 81–99. <https://doi.org/10.1075/ara.28.1.o6man>
- Pienemann, M. (1984). Psychological constraints on the teachability of language. *Studies in Second Language Acquisition* 6(2), 186–214. <https://doi.org/10.1017/S0272263100005015>
- Pienemann, M. (1989). Is language teachable? Psycholinguistic experiments and hypotheses. *Applied Linguistics* 10(1), 52–79. <https://doi.org/10.1093/applin/10.1.52>
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M. (Ed.) (2005). *Cross-linguistic aspects of Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30>
- Pienemann, M. (2013). Processability Theory and teachability. In C. A. Chapelle (Ed.), *The encyclopedia of applied linguistics* (pp. 1–6). Oxford: Blackwell.
- Pienemann, M., & Lenzing, A. (2015). Processability Theory. In B. VanPatten & J. Williams (Eds.), *Theories in second language acquisition*. An introduction (2nd ed., pp. 159–179). New York, NY: Routledge.
- Pienemann, M. (2015). An outline of Processability Theory and its relationship to other approaches to SLA. *Language Learning* 65(1), 123–151. <https://doi.org/10.1111/lang.12095>
- Rohde, A. (2010). Introduction to second language acquisition. In K. Kersten, A. Rohde, C. Schelletter, & A. K. Steinlen (Eds.), *Bilingual preschools, Volume II: Best practices* (pp. 119–130). Trier: WVT.
- Roos, J. (2016). Acquisition as a gradual process: Second language development in the EFL classroom. In J.-U. Keßler, A. Lenzing, & M. Liebner (Eds.), *Developing, modelling and assessing second languages* (pp. 121–134). Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.5.06roo>
- Sarandi, H. (2017). Mixed corrective feedback and the acquisition of third person ‘-s’. *The Language Learning Journal*, 1–12. <https://doi.org/10.1080/09571736.2017.1400579>

- Schmidt, R. (1990). The role of consciousness in second language learning. *Applied Linguistics* 11(2), 129–158.
- Spada, N., & Lightbown, P. M. (1999). Instruction, L1 influence and developmental readiness in second language acquisition. *Modern Language Journal* 83, 1–22.
<https://doi.org/10.1111/0026-7902.00002>
- Spada, N., & Lightbown, P. M. (2008). Form-focused instruction: Isolated or integrated? *Tesol Quarterly* 42(2), 181–207. <https://doi.org/10.1002/j.1545-7249.2008.tb00115.x>
- Swain, M. (1993). The output hypothesis: Just speaking and writing aren't enough. *The Canadian Modern Languages Review* 50(1), 33–39.
- VanPatten, B., & Williams, J. (2015). Early theories in SLA. In B. VanPatten & J. Williams (Eds.), *Theories in second language acquisition: An introduction* (2nd ed., pp. 17–33). London: Routledge.

Teaching the German case system

A comparison of two approaches to the study of learner readiness

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This chapter compares two different approaches to the construct ‘readiness’: namely, processing constraints as defined by Processability Theory and the Teachability Hypothesis (Pienemann, 1998) and partial mastery as defined in the research on Focus on Form (Williams & Evans, 1998). The former operationalises readiness through the emergence criterion, the latter employs an accuracy criterion. The chapter applies both definitions and operationalisations in the context of a study investigating the effectiveness of instruction on the acquisition of the German case system by Dutch-speaking foreign language learners. The study included 18 freshman university students of German and adopted a quasi-experimental pretest/posttest design. The instructional treatment involved a meaning-focussed activity which eventually led to explicit rule presentation. Oral language production data was collected by means of a picture description task and an elicited imitation task. The results show that the (non-)emergence of the developmental stages of the German case marking system stayed within the predictive boundaries of the Teachability Hypothesis, whereas the development of the accuracy scores did not reveal any observable sequence. However, the results reveal that the two (emergence and accuracy) are related to the extent that increases in accuracy scores are only possible if a stage is reached or reachable. The findings suggest that the systematic, implicational emergence of stages and the subsequent, variable increases in accuracy scores represent two different, but complementing, aspects of L2 development.

1. Introduction

In the field of SLA it has been suggested that instruction can only be effective if it is provided at that particular point in time when learners are ready to receive it (see, e.g., Ellis, 1997; Lightbown, 1998; Mackey & Philp, 1998; Pienemann, 1988, 1998; Spada & Lightbown, 1999). This idea was formalised in the Teachability

Hypothesis (Pienemann, 1984), which was later re-formalised within the architecture of Processability Theory (PT) (Pienemann, 1998). In addition, the principle of learner readiness has also made its way outside the PT framework; for example, in classroom research within the research tradition of Focus on Form (FonF) (Doughty & Williams, 1998). However, definitions as well as operationalisations of the construct ‘readiness’ differ between frameworks and research traditions. Whereas the Teachability Hypothesis associates readiness with the nature of developmental sequences and their underlying processing constraints, FonF-studies (e.g., Williams & Evans, 1998) relate readiness to the learner’s ability of expanding control of a language feature. The aim of this chapter is to compare these different approaches to readiness in order to deepen our understanding of the construct of ‘readiness’, which appears to involve different sub-constructs. The present chapter aims to explore these sub-constructs as well as possible relationships between them.

To investigate the concept of readiness this chapter will discuss the results of a study investigating the effectiveness of explicit instruction on the acquisition of the German case system by foreign language learners. The chapter is organised as follows: Section 2 begins with a brief theoretical background on learner readiness in SLA, which is followed by a description of the developmental stages for German case acquisition (Section 3). The design and methodology of the study will be presented in Section 4. This section includes the definition, the operationalisation and the method of analysis of the two approaches of readiness that will be compared in this chapter. In Sections 5 and 6, respectively, the results of the study and the discussion of these results will be presented.

2. Individual learner readiness in SLA

In SLA, a number of studies have reported that instruction will promote acquisition if it occurs at a time when a learner is ‘ready’ for the forms instructed (e.g., Doughty & Williams, 1998; Ellis, 1997; Mackey & Philp, 1998; Pienemann, 1988, 1998; Spada & Lightbown, 1999). One formalisation of this idea of learner readiness includes Pienemann’s (1984) Teachability Hypothesis, which states that instruction is constrained by development. The Teachability Hypothesis makes two claims (Pienemann, 1998: 250): (i) Stages of acquisition cannot be skipped through formal instruction, and (ii) instruction will only be beneficial if it focuses on structures from the next stage. Empirical evidence for these claims came from a quasi-experimental study on the L2 German word order of ten L1 Italian children, aged 7-9. The children were all below stage 4 (inversion) and received instruction on exactly this stage. The experiment resulted in a boost of formulaic use of inversion

by all subjects, but only those learners who were close to stage 4 during the phase of instruction (i.e., stage 3 verb separation) actually acquired inversion. They were the 'ready' learners. The 'unready' learners, who were at stage 2 (adverb preposing), made no progress.

Several studies have found supporting evidence for the Teachability Hypothesis (e.g., Bonilla, 2015; Boss, 1996; Doman, 2015; Dyson, 1996; Ellis, 1989; Spada & Ligthbown, 1999;). However, in relation to the first claim, a recent study by Zhang and Lantolf (2015) on the L2 acquisition of Chinese topicalisation demonstrated that unready learners were actually able to skip a stage after a formal intervention that focussed on the next + 1 stage. In the study, four learners received instruction on Chinese object topicalisation (stage 4, TOP_{obj}-SV), even though these learners only produced stage 2 SVO sentences on the pretest prior to instruction. On the posttest these learners were capable of producing stage 4 sentences, but unable to produce stage 3 ADJ+SVO sentences. Pienemann (2015) questioned, however, whether the non-use of stage 3 sentences really provides evidence that the learners are not able to process such structures, because the use of adjunct topicalisation is non-obligatory in Chinese. This means that obligatory contexts cannot really be provided, and as a result, the non-use can only be classified as 'no evidence' (for non-application of the rule). In a personal communication with the authors (see Lantolf & Zhang, 2015; Zhang & Lantolf, 2015), Lenzing adds that the alleged unready learners may very well be capable of producing morphological features from stage 3, basically making them ready learners. Lantolf and Zhang (2015) responded to these comments, arguing that a sufficient number of contexts for topicalisation was available to yield evidence for either application or non-application of the rule. In addition, they found it hard to imagine why learners, who are at stage 3 for morphology and stage 4 for syntax, would find it difficult to produce a syntactic structure from stage 3.

In a number of respects, the response fails to convince. First, a native speaker benchmark should have been added to substantiate that a sufficient number of contexts was indeed provided. The argument would only hold if it could be shown that native speakers produce stage 3 sentences on the posttest task. Recall that the structure under investigation is not obligatory, so both native speakers and learners may choose not to produce it. Keeping in mind this non-obligatory nature, it is perfectly possible that learners produce a syntactic structure from stage 4, and at the same time do not produce the syntactic structure from stage 3. This gap does not necessarily reflect a stage gap. As Keßler (2007) demonstrated, some stage 3 structures can sometimes be difficult to elicit if the learners have already progressed to stage 4. This means that the gap may not be developmental, but rather diagnostic. Lenzing's suggestion (personal communication in Lantolf & Zhang, 2015; Zhang & Lantolf, 2015) of establishing a fuller learner profile that includes a range of possible

structures accounts for this issue. A fuller learner profile would allow for a more reliable determination of a learner's developmental stage.

In addition to these arguments, it should be pointed out that Zhang and Lantolf (2015) automatically considered the production of object topicalisation as stage 4, inter-phrasal feature unification. However, research on L2 German (Baten, 2013), L2 Italian (Magnani, 2016) and L2 Russian (Artoni, 2015; Magnani, 2016) has put forward that additional linguistic information is needed to assume that TOPic (as a discourse function) really is assigned to OBJECT (as a grammatical function). If there is no other linguistic information present (such as case markers or clitics), the TOP discourse function remains underspecified, and it cannot be taken for granted that the learners make a connection with a grammatical function. In Chinese there are no syntactic consequences of the object topicalisation, seeing that the SV-string remains in the same order. In other words, it is hard to tell whether the object topicalisation in Chinese really implies inter-phrasal feature unification. An alternative testing ground would be to include Chinese *ba*-object constructions, because this construction involves word order deviations (Y. Zhang, 2015). In absence of these constructions, the counter-evidence to the first claim of the Teachability Hypothesis presented in Zhang and Lantolf (2015) remains inconclusive.

Turning now to the second claim, a number of other studies have found that unready learners do benefit from instruction, even when this instruction was targeted at stages beyond the next stage (Bonilla, 2015; Doughty, 1991; Mackey, 1999; Spada & Lightbown, 1999). However, in these studies, the benefits did not involve the skipping of stages but instead looked at the extension of use of features that had already emerged in the learner's interlanguage. These studies are, in other words, not in contradiction to the Teachability Hypothesis, seeing that the Teachability Hypothesis does not rule out that learners become more proficient (in terms of higher production frequencies or accuracy rates) in the use of structures of already acquired stages. In fact, Roos (2015: 267) argues that as long as the rise in accuracy rates "concerns structures which have already been acquired or belong to the 'next' stage", no counter-evidence is given to predictions made by the Teachability Hypothesis. She points out that the apparently contradictory findings are the result of a different interpretation of the concept of readiness. Indeed, other studies have made use of a variety of language proficiency measures to define and operationalise 'readiness'. Mackey (1999), for example, defined learners as ready or unready according to their proficiency placement in a language programme. Williams and Evans (1998: 151), on the other hand, used accuracy rates to define and operationalise 'readiness': The ready learners are those who already have partial mastery of the form; these learners are expected to experience the greatest accuracy gains.

Williams and Evans (1998) examined the differential effect of two types of FonF-instruction (Explicit Focus on Form vs. Input Flood) on two forms, i.e.,

participial adjectives and passives. FonF is a pedagogical approach that involves attention to meaning, but also includes some attention to form, with varying degrees of explicitness (Nassaji & Fotos, 2011). Input flooding is one of the more implicit types of FonF. It provides the learners with a flood of examples of the target structures, thereby increasing the normal frequency of the target structure in the input. For example, in Williams and Evans (1998), the texts given to the students were modified to such an extent that they contained three times the initial number of participial adjectives. Also, the active verbs were changed to passives in the materials that focussed on the passive. In the explicit type of FonF, the same flooded texts were given, in addition to corrective feedback and a brief presentation of the rules.

Williams and Evans (1998) found that “the individuals who made the greatest gains with either type of focus on form [...] were those who already had partial mastery of the form. [...] Those who had extremely low scores to begin with generally made little progress [...]” (ibid., 151). Furthermore, they argued, that this finding interacted with the complexity of the form taught, seeing that the greatest gains in the first place relate to the relatively easy form, i.e., the participial adjectives. With regard to the considerably more complex passives, Williams and Evans (1998) stated that many learners appeared not to be ready, which is why the accurate use of the passive remains low, after both explicit and flood treatment. It is speculated that the results would possibly be different if the treatments were given later in the learners’ development. The authors assume that if learners are ready the explicit treatment on passives would be more effective.

Clearly, the effectiveness of instruction depends on the interaction of instructional treatment, difficulty of language form and learner readiness. The exact nature of this interaction, e.g., *what type of instruction is more beneficial for which form (simple/complex)*, remains a debated and controversial issue in instructed SLA (for an overview of research, see Loewen, 2015). One of the problematic issues is, for example, the way in which simple and complex language features are defined. As a general rule, a linguistic perspective is taken, more specifically the form, the meaning and the form/meaning-mapping of a language feature is considered (see DeKeyser, 2005). However, this perspective does not always lead to a straightforward distinction between simple and complex – the English articles are a case in point – but more importantly in the context of this chapter: The relationship with learner readiness is unclear. One could argue, for instance, that linguistic forms that are considered complex from a purely linguistic perspective are actually no longer complex for ready learners, i.e., what does complex actually mean if learners are developmentally ready? In a meta-analysis of studies dealing with the effectiveness of instruction in relation to the complexity of the linguistic form, Spada and Tomita (2010: 289) argue that the use of psycholinguistic criteria, e.g., in terms of

developmental sequences, could avoid the kind of problematic categorisation that seems to occur with a purely linguistic perspective. The present chapter will deal with this type of readiness, i.e., the type of readiness that is related to developmental stages and their associated processing constraints, but also includes the type of readiness that is related to accuracy rates.

3. The acquisition of the German case system

The acquisition of German case marking is a well-researched topic, with regard to first (Eisenbeiß et al., 2005), second (Marx, 2014), and instructed second language acquisition (Baten & Lochtman, 2014), as well as speech therapy (Motsch & Riehemann, 2008). From this extensive body of research, two generally accepted research findings can be drawn that are relevant for the rest of this chapter, namely (1) the systematic use of accusative and dative is acquired sooner in prepositional phrases (PPs) than in nominal phrases (NPs), governed by the verb (i.e., the direct and indirect objects), and (2) case markings are easier to comprehend and to produce in canonical sentences (i.e., subject before object) than in non-canonical sentences (i.e., object before subject).

In a longitudinal study on German case marking that adopted the PT framework, Baten (2013) showed that case in PPs is indeed acquired sooner than case in NPs, at least when it comes to functional case use in the NPs. In addition, the study also found that learners proceed from marking the position to marking the function, which means, for example, that the correct marking of the accusative object in canonical positions (1) precedes its correct marking in non-canonical position (2) (Examples (1) and (2) are actual learner language taken from Baten (2013).)

- (1) er wirft auch seinen stick ins wasser
he throws also his-ACC stick into the water
- (2) den stick der anderen mann ja lasst uh er liegen
the-ACC stick of.the other man well leaves uh he lying

Only a few learners analysed in Baten (2013) reached the stage of functional case marking. This does not mean that learners were not able to produce non-canonical sentences. They were just not able to correctly mark the non-canonical arguments (3).

- (3) aber *der anderen stick lässt der hund liegen
but *the-NOM other stick leaves the dog lying (correct: *den*, 'the-ACC')

These findings were explained in the frame of PT (see Table 1).

Table 1. Developmental sequence for L2 German case acquisition (Baten, 2013: 121)

Stage	Procedure	C-to-F-mapping	Case
4	Sentence procedure	Non-linear (Topic = Object)	Functional marking
3	Phrasal procedure		Prepositional case marking
2	Category procedure	Linear (Topic = Subject)	No case marking or one-to-one positional marking

According to PT, language production involving grammatical processing within phrasal boundaries (i.e., phrasal procedure) emerges sooner than production involving processing beyond phrasal boundaries (i.e., sentence procedure). This explains why case in terms of an accusative-dative opposition emerges first in prepositional phrases, and only later in the verb arguments. It is important to note here, that the ‘verb arguments’ only involve arguments in non-canonical position, because only these kinds of arguments can reveal whether functional case marking is in place. To explain why case in the verb arguments first emerges in canonical sentences, and only later also in non-canonical sentences, PT relies on Lexical Mapping Theory (Bresnan, 2001), which involves the correspondences between functional and constituent structure (and argument structure, for that matter), as illustrated below.

geben ‘to give’ <x, y, z>

	<i>linear</i>	<i>non-linear</i>
f-structure	→ SUBJ OBJ θ OBJ	→ TOP _{OBJθ} SUBJ OBJ
c-structure	→ NP _{SUBJ} NP _{OBJθ} NP _{OBJ}	→ NP _{TOP.OBJθ} NP _{SUBJ} NP _{OBJ}
case:	<i>position marking</i>	<i>functional marking</i>

PT predicts that learners develop from linear (category procedure) to non-linear correspondences (sentence procedure). In stages enabled by linear processing, the arguments are directly mapped onto a functionally underspecified constituent structure (existing basically of a stringing together of lexical categories). This means that in these stages case markers only mark the direct positions, and not necessarily the grammatical functions. In stages with non-linear processing, inter-phrasal processing is needed to make possible these departures from the canonical word order, and as a consequence case marking (if present) can only be functional.

This development from marking the position to marking the function has also been uncovered in other PT studies, dealing with L2 Russian (Artoni & Magnani,

2013) and L2 Serbian (Di Biase et al., 2015). The study on L2 Russian also examined case marking in prepositional phrases and also found that case in PPs emerges before functional case marking (see Artoni, 2015). In actual PT work, studies on L2 Russian (Artoni, this volume), and L2 Italian (Magnani, this volume) further specify which aspects of case are acquired at which point of development, taking into account typological differences between languages. Nevertheless, despite cross-linguistic differences, the overall trajectory in relation to case seems to be as follows: Positional marking > prepositional marking > functional marking. This sequence is the basis for the experiment described below.

4. The study

The research question guiding the present chapter is as follows: What is the effectiveness of explicit instruction in relation to the learners' readiness, as defined by either processing constraints or partial mastery? Corresponding to the previous research findings in teachability studies and FonF-studies, it can be hypothesised that instruction will only be effective when the necessary processing procedures are available and/or when the learners already partially master the forms instructed. It should be noted here, that the study will not evaluate the benefits of explicit instruction as opposed to other types of instruction.

4.1 Design and participants

The study adopted a quasi-experimental pretest/posttest design with 18 university students of L2 German (5 male, 13 female, mean age = 19.8). The experiment consisted of four phases: Pretest, treatment, immediate posttest and delayed posttest. The participants were students at a Belgian university and were enrolled in a linguistics and literature programme, one of the chosen language being German. However, German is not the participants' first foreign language. All participants had formal instruction in French and English prior to learning German (two participants also had knowledge of Spanish, one of Moroccan, and one of Italian). On a self-rating questionnaire, these participants did not rate their own speaking skills very highly: On a scale from 1 (minimal) to 5 (near-native), the mean rate was 2.4, which according to the given scale is between basic and average. The participants also indicated that they hardly use German actively outside of the university context, except for the occasional tourist visits to German-speaking countries. Likewise, passive contact with the language (e.g., through television, music, newspapers, internet) was minimal: On a scale from 1 (never) to 5 (very often), the mean rate was 2.3.

None of the participants had lived in a German-speaking country for an extended period of time (except for one, who had lived in Austria for three years in his early childhood). In other words, the input and output of German among these students was, in general, restricted to the university courses.

4.2 Instruction

The instructional treatment of the experimental study was integrated in the normal language course which students are obliged to follow as part of their bachelor programme. The teacher was the regular teacher responsible for the course. She was however given a short special training in order to be able to give the experimental instructional treatment as intended.¹ The treatment involved a meaningful activity which eventually led to explicit rule presentation. The reason as to why explicit rule presentation was included is twofold: (1) Most of the teachability studies involve explicit instruction only (Roos 2015), and (2) there seems to be some consensus in the field of SLA that especially explicit types foster second language acquisition (De Graaff & Housen, 2009; Spada & Tomita, 2010). The meaningful activity concerned the speech acts ‘requests/offers’ and ‘accept/decline’, and was set up to practice a grammatical construction in German that does not exist in Dutch, i.e., the negation structure with *sondern*. In concrete terms, the lesson was about two hours long and was organised along the following phases.

A first phase dealt with German negation and followed a very traditional PPP-method.² Grammatical rules and sample sentences were provided, after which the students had to construct negative sentences during a group exercise session. The teacher gave a positive sentence, which the students, one after the other, had to negate. This oral language production exercise was quite easy, because the rules for negation in German are similar to the rules in Dutch. After that, the teacher shifted focus to the one aspect in German negation that is different from Dutch. When the negation involves a direct opposition with an initial negated element, as in ‘not x but y’, then the negation particle ‘sondern’ should be used, instead of ‘aber’. The

1. I would like to thank Lesley Penné for her contribution to the instructional treatment and her students for their participation.

2. The three Ps stand for Presentation, Practice, Production. In the Presentation section the forms and meanings are explained. In the Practice section the learners are asked to produce sentences or answer questions to demonstrate they understand how to use the new forms correctly. This practice takes place in a controlled manner. In the Production section the learners move to freer speech as they are asked to produce what they have been taught in real situation-like activities (in oral or written texts).

presentation of the rule was followed by an exercise session. This time, the students had to complete a cloze exercise individually, in which they had to choose between the use of either 'aber' or 'sondern'. When this was done, the teacher discussed the sentences one by one, together with the students.

In the next phase, the focus shifted to the meaning, and more particularly, to speech acts, such as offers, requests, and refusals. The students were asked to enact conversations, virtually taking place in three settings: In a restaurant, in a supermarket, at a party. The students had to respond to questions, like 'What would you like to eat/drink?', 'What would you like to buy?', 'What present would you give to whom?'. To be able to perform such conversations, the students were given cards, which always depicted two possible meals/drinks (e.g., *ein Rotwein oder ein Bier*, 'a red wine or a beer'), two possible objects/presents from the store (e.g., *eine Kaffeemaschine oder ein Wasserkocher*, 'a coffee machine or a water boiler'), and two possible people to give the presents to (e.g., *Mutter oder Vater*, 'mother or father'). These conversation exercises were in the first place intended to practice the negation structure, but they were of course also expected to provide valuable information on the students' use of case. The exercises were first done in pairs (while the teacher circulated in the classroom and gave them feedback), and then in group. The students were instructed to start with the negation element. As such, the exercises were thought to elicit sentences like, *Nein nicht die Kaffeemaschine, sondern den Wasserkocher möchte ich gerne kaufen*, 'not the coffee machine, but rather the kettle, I would like to buy', or *Nein nicht meiner Mutter, sondern meinem Vater werde ich den Wasserkocher geben*, 'not to my mom, but to my dad, I will give the kettle'.

The final phase explicitly dealt with the use of case markings. The total time of exposure to the explicit information was only about 15 minutes. The teacher informed the students that she had noticed several case errors, especially when in the negated sentences the direct object (which should be marked with accusative case) and the indirect object (which should be marked with dative case) were topicalised. The teacher explained that in canonical sentences the nominative subject comes before the accusative object, and that the dative object comes before the accusative object. She illustrated this canonical pattern by means of a schema. Then she made clear that in (the negated) non-canonical sentences, the case marking should of course also be in place. A schema, in which the canonical pattern was changed into a non-canonical pattern, illustrated this so-called functional case marking. To conclude the lesson, a number of conversation exercises were repeated in group, but now with an explicit focus on the case marking.

4.3 Data elicitation

A combination of two oral production tasks was administered by the researcher (i.e., the author): A picture description task to elicit canonical sentences and prepositional phrases and an elicited imitation task to elicit non-canonical sentences. The picture description task was quite straightforward. The participants were given twelve pictures, which depicted a simple event. These pictures elicited eight accusative objects and four dative objects in canonical positions as well as five prepositional phrases (three with dative use and two with accusative use). The elicited imitation task consisted of 16 pictures: Eight of them were distractors, the other eight were real items serving the purpose of eliciting functional case use.

The general procedure in an elicited imitation task is that the participant hears a spoken stimulus sentence and then has to attempt to repeat it as accurately as possible. In the present study, an assertion judgment was added to this stimulus-response pattern (see Akakura, 2012). The participants had to evaluate whether the presented stimulus sentence rendered a correct or an incorrect description of the picture: If the description was correct they simply had to repeat the sentence they had just heard (the eight distractor items); if the description was incorrect, they had to reconstruct the sentence by using the ‘nicht x, sondern’-construction (the eight real items). In concrete terms, the procedure was as follows:

- a. The participant looked at a picture, which depicted a simple event (such as a man reading a letter). The participant turned the picture over and put it aside;
- b. The stimulus, i.e., the assertion that had to be evaluated, was presented acoustically (e.g., *Der Mann liest eine Zeitung*, ‘the man is reading a newspaper’);
- c. Before either repeating or restructuring the stimulus, a time delay was set, in that the participant had to count from one to a random number between five and twelve. This number was shown to the participants immediately after hearing the stimulus sentence;
- d. The participant responded, according to expectation, with *Nein, nicht eine Zeitung, sondern einen Brief liest er*, ‘no not a newspaper, but a letter he is reading’).

The time delay in C fulfilled the purpose of assuring a real reconstruction with regard to the grammatical structure and the case marking.

4.4 Readiness

This section focusses on ‘processing constraints’ and ‘accuracy’ discussed above (placement criteria based on labels such as ‘intermediate’/‘advanced’, or ‘B2/C1’ will not be considered). First, taking PT’s processing logic, the learners in this study,

who show to have reached stage 3 (i.e., prepositional case marking) are the ready learners. Of these learners it is expected that they *can* benefit from the instruction that was targeted at stage 4 structures (i.e., functional case marking). The learners, who have not reached stage 3, are the unready learners, of whom it is assumed that they do not possess the prerequisites to acquire features of stage 4. It should be noted that this interpretation of the Teachability Hypothesis expresses the cautious view that the presence of the necessary processing procedures does not guarantee that the structure will emerge (hence: ‘can’ in italics). Looking ahead at Table 6, the results of the pretest reveal that nine learners have reached stage 3 and nine other learners have not.

The second perspective links readiness with accuracy. Here I follow Williams and Evans (1998) who related readiness to partial mastery. Learners who already partially master a linguistic form/structure are considered the ready learners, and they are expected to experience the greatest gains. Applied to German case acquisition, this means that the ready learners are the ones who already show some accurate uses of functional case markers, the unready learners have zero accuracy. Again, anticipating the results section, the pretest data reveal that seven learners show some accurate uses of functional case markers, ranging from 13% to 63%. The other eleven learners did not use a single accurate form.

Of course, an overlap exists between the two accounts of readiness: Eight learners are unready learners according to both accounts and six learners are ready learners according to both accounts. This leaves four learners, who are ready according to one account, but unready according to the other account (three are ready in the PT-account, but unready in terms of accuracy; one is unready in the PT-account, but ready in terms of accuracy).

4.5 Analysis and scoring

The data is analysed by means of both accuracy rates and by applying the emergence criterion. Scoring the data in terms of accuracy was a matter of determining whether the case use in the intended elicitation contexts was correct or not. Because of non-normally distributed data (Kolmogorov-Smirnov: $t_1 (D(54) = .24, p < 0.001)$, $t_2 (D(54) = .19, p < 0.001)$ and $t_3 (D(54) = .13, p < 0.05)$), the non-parametric Friedman test is used to detect differences. The Friedman test is based on ranked data, not on the actual scores. It examines whether the ranks were similar across conditions or not.

Different from the accuracy analysis, PT-studies use the emergence criterion to operationalise ‘acquisition’. Emergence can be defined as the “point in time corresponding to the first systematic and productive use of a structure” (Pallotti,

2007: 366). However, ‘first’ does not actually involve an isolated case but is embedded in a number of different contexts. The present study always elicited a minimum of four contexts for each case context. Also, because individual cases owe their existence to other cases (Hjelmslev, 1935/37; Jakobson 1971 [1936]), a case cannot be acquired independently, but only in opposition to one or more other cases. In concrete terms, this means that evidence of emergence of a stage can only be assumed when the proportion accusative: dative is 1:1 or higher.

5. Results

5.1 Accuracy analysis

To start with the general picture Table 2 presents the mean scores of the entire group as well as the standard deviations and the mean ranks.

Table 2. General accuracy scores on the oral production task (n = 18)

Time	Mean	StDev.	Mean rank
t1	.217	.285	1.50
t2	.432	.392	2.15
t3	.452	.339	2.35

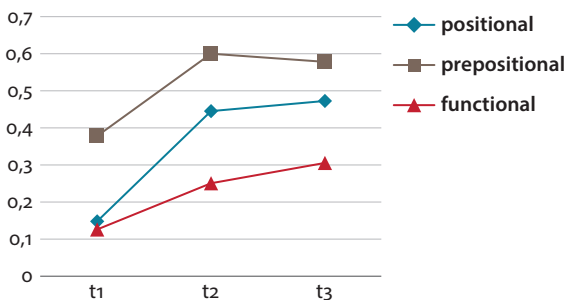
The mean scores reveal that the overall accuracy scores are very low before and after treatment. However, the correct uses of the case markers did change significantly over the three months of the experiment ($X^2(2) = 29.59, p < 0.001$). To what extent the (slight) increase of the accuracy scores interacts with the case context (positional, prepositional, functional) or the developmental readiness of the learners cannot be deduced from the general Friedman test, because it does not allow independent variables to be entered into the analysis. However, individual Friedman tests for each level of the independent variable can be calculated separately (see McDonough & Trofimovich, 2009: 172). In addition, post hoc tests can be calculated by using individual Wilcoxon signed rank tests (with a Bonferroni correction to account for the multiple comparisons³). We will first explore the results according to case context, and then according to readiness. Table 3 presents the mean scores for the different case contexts.

3. The Post Hoc Wilcoxon signed rank tests were always calculated with the following Bonferroni correction: alpha 0.05/3 comparisons = 0.0167.

Table 3. Accuracy scores according to case context (n = 18)

Time	Positional	Prepositional	Functional
t1	.148	.378	.125
t2	.444	.600	.250
t3	.472	.578	.306

A first look at this table reveals that the scores for the prepositional case use exceed the scores for the positional case use, which scores, in turn, exceed the scores for the functional case use. Figure 1 below gives a visual representation of these differences between case contexts.

**Figure 1.** General case development according to case context

The changes for the positional ($X^2 = 14.63, p < 0.001$), the prepositional ($X^2 = 7.61, p < 0.05$) and the functional level ($X^2 = 10.30, p < 0.01$) are significant. Post hoc Wilcoxon signed rank tests show that the change on the positional level manifests itself between t1 and t2 ($z = -2.86, p < 0.01$) and t1 and t3 ($z = -3.20, p < 0.001$), but not between t2 and t3 ($z = -0.81, p = 0.45$). On the prepositional level the change is significant between t1 and t2 ($z = -2.67, p < 0.01$), but not between t1 and t3 ($z = -2.06, p = 0.045$) and t2 and t3 ($z = -.49, p = 0.75$). On the functional level the change is only significant between t1 and t3 ($z = -2.99, p < 0.001$), but not between t1 and t2 ($z = -1.97, p = 0.031$) and t2 and t3 ($z = -.99, p = 0.17$). These results indicate that the experimental treatment has an effect on the use of positional and prepositional case markers (from t1 to t2), and even a lasting effect with positional case markers (from t1 to t3). The use of functional case markers, on the other hand, seems to be unaffected by the treatment. Instead of a direct effect of instruction, a gradual change over time appears to take place in this area.

The lack of effect in the area of functional case marking might be explained by the (un)readiness of the learners. It might be that some ready learners do develop in the domain of functional case marking, but that this development goes unnoticed

as it disappears in the group results. Let us therefore explore the data according to the readiness of the learners. Table 4 splits the data according to the two viewpoints on readiness considered in this chapter.

Table 4. Overall accuracy scores according to readiness

Time	Readiness based on partial mastery		Readiness based on processing constraints		
	n = 18	Yes (n = 7)	No (n = 11)	Yes (n = 9)	No (n = 9)
t1	.217	.412	.093	.383	.051
t2	.431	.598	.325	.661	.202
t3	.452	.578	.372	.608	.295

A first look at Table 4 reveals that the ready learners perform better than the unready learners. Figure 2 gives a visual representation of these differences between learners.

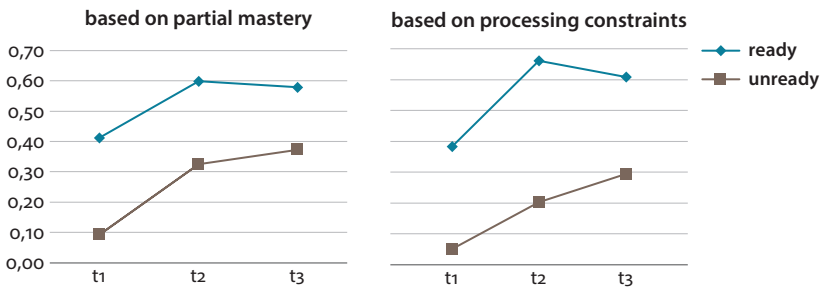


Figure 2. Case development according to status of developmental readiness

Considering first the readiness based on partial mastery, the Friedman test reveals a significant change for both ready ($X^2 = 6.78, p < 0.05$) and unready learners ($X^2 = 25.20, p < 0.001$). Post hoc Wilcoxon signed rank tests show that the change for the ready learners manifests itself between t1 and t2 ($z = -2.64, p < 0.01$) and t1 and t3 ($z = -2.42, p < 0.01$), but not between t2 and t3 ($z = -0.55, p = 0.60$). The same pattern applies to the unready learners: Significant between t1 and t2 ($z = -3.39, p < 0.001$), and between t1 and t3 ($z = -4.10, p < 0.001$), but not between t2 and t3 ($z = -1.19, p = 0.24$). These results indicate that the instruction has a lasting effect on both ready and unready learners. This finding does not mean that the two types of learners are actually the same. The ready learners clearly reach higher accuracy levels compared to the unready learners. Mann-Whitney U tests indeed reveal that the distribution of the case use was different across the ready

and unready learners (at all data points) (t1: $U = 606.00$, $p < 0.001$; t2: $U = 506.50$, $p = 0.01$; t3: $U = 456.50$, $p < 0.05$). These results indicate that the two types of learners were different from the start (which was the reason to differentiate between them in the first place), and that they remain so after instruction.

The same statistical findings occur when readiness is based on processing constraints: Both ready ($X^2 = 17.62$, $p < 0.001$) and unready ($X^2 = 18.76$, $p < 0.001$) learners undergo a significant change. Post hoc Wilcoxon Signed Rank tests show that the change manifests itself between t1 and t2 (ready: $z = -3.40$, $p < 0.001$; unready: $z = -2.52$, $p < 0.01$), and between t1 and t3 (ready: $z = -3.30$, $p < 0.001$; unready: $z = -3.53$, $p < 0.001$), but not between t2 and t3 (ready: $z = -1.14$, $p = 0.26$; unready: $z = -2.28$, $p = 0.02$). Also, the Mann-Whitney U tests reveal once more that the distribution of case use was different across the ready and unready learners at all times (t1: $U = 603.00$, $p < 0.001$; t2: $U = 610.00$, $p = 0.01$; t3: $U = 558.50$, $p < 0.001$).

The analyses show that all learners develop from pretest to posttest, albeit that the development of the ready learners is situated at higher accuracy levels. In addition, the general picture above (see Figure 1 and Table 3) suggests that the developments especially take place in the positional and the prepositional domain, and not so much in the functional domain. Unfortunately, the Friedman test does not allow for a calculation of the interactions between learner readiness and case context. Nevertheless, on the basis of the findings, one can speculate that only ready learners will develop in the area of functional case marking. So let us examine the accuracy scores for functional case marking only.

Table 5 shows that in both readiness accounts, the ready learners outperform the unready learners. However, considering the readiness based on partial mastery, the Friedman test reveals a significant change in the unready learners ($X^2 = 9.85$, $p < 0.01$), but not in the ready learners ($X^2 = 1.92$, $p = 0.43$). Taking into account the readiness based on processing constraints, the picture is reversed: While the accuracy scores of the ready learners increase significantly ($X^2 = 7.19$, $p < 0.05$), the scores of the unready learners do not ($X^2 = 3.90$, $p = 0.17$).

The picture of results in the readiness account based on partial mastery is confusing, because it was expected that ready learners would increase their accuracy

Table 5. Accuracy scores for *functional* case marking according to readiness

Time	<i>n</i> = 18	Readiness based on partial mastery		Readiness based on processing constraints	
		Yes (<i>n</i> = 7)	No (<i>n</i> = 11)	Yes (<i>n</i> = 9)	No (<i>n</i> = 9)
t1	.125	.32	.00	.22	.03
t2	.250	.43	.14	.40	.10
t3	.306	.48	.19	.46	.15

scores, whereas unready ones would not. However, the importance of the increase of accuracy scores among the unready learners should not be overestimated, because starting from zero accuracy, even the slightest increase would result in statistical significance. On the other hand, the reason as to why the ready learners did not increase significantly (even though, they could, in principle, have advanced to a score close to 100%) remains unclear. Following this confusing and unclear pattern of results it can be assumed that other factors may have been involved, such as processing constraints.

Indeed, the picture of results in the readiness account based on processing constraints seems to reveal exactly this: The intervening influence of processing constraints. The ready learners possess the necessary processing prerequisites in order to make progress possible in the area of functional case marking; the unready learners, on the other hand, do not possess these necessary processing prerequisites and are therefore incapable of increasing their accuracy scores in the area of functional case marking. But, if processing prerequisites are not available, how then is it possible that the accuracy scores of the unready learners increase (from .03 to .10 and .15), even if this increase is non-significant? This can be explained because the accuracy scores only represent article correctness. As a result, increasing accuracy scores (even to a small extent) can arise from the increasing correct marking of just one case, and as such the increasing accuracy scores do not reveal whether or not the case *functions* are also acquired.⁴ The accuracy scores disregard the fact that case reflects a system of oppositions. PT's emergence criterion is consistent with the specific nature of case as an oppositional system, and it is to this emergence approach that we turn next.

5.2 Emergence analysis

In the emergence analysis the emergence of case forms is distributed in a system of oppositions. As a consequence, Table 6 does not present the acquisition of case forms, but the acquisition of case functions: '+' means that the case opposition has emerged, '-' means that it has not emerged. A special case is '(+)', which means that an opposition between accusative and dative is present, but the learner also uses a non-target-like strategy by additionally inserting a preposition (e.g., *der schüler gibt einen apfel *an dem lehrer*, 'the pupil gives an apple to the-_{DAT} teacher'). The actual numbers can be found in the Appendix.

4. In general, the increasing accuracy scores reported above are due to better scores on accusative case forms only, thereby not including an opposition with dative case forms, which means that case is not really acquired.

Table 6. The emergence of developmental stages for case

	t1			t2			t3		
	POS	PREP	FUNCT	POS	PREP	FUNCT	POS	PREP	FUNCT
AF	-	-	-	-	-	-	-	-	-
DDS	-	-	-	-	-	-	-	-	-
FC	-	-	-	-	-	-	-	-	-
JVDB	-	-	-	-	-	-	-	-	-
MP	-	-	-	-	-	-	-	-	-
HC	-	-	-	-	-	-	(+)	+	-
ML	-	-	-	-	+	-	+	+	-
YVG	-	-	-	(+)	+	-	(+)	+	-
SG	-	-	-	+	+	+	-	+	-
DB	(+)	+	-	-	+	-	(+)	+	-
WD	-	+	-	(+)	+	-	-	-	-
KH	-	+	-	+	+	-	+	+	-
MLD	-	+	-	(+)	+	-	(+)	+	-
IVDV	+	+	-	+	+	-	+	+	+
SL	-	+	-	+	+	+	+	+	+
IB	-	+	-	+	+	+	+	+	+
NVDL	-	+	-	+	+	+	+	+	+
EVH	(+)	+	+	+	+	+	+	+	+

In terms of readiness, the group can be divided into two. At t1, nine learners have reached the prepositional stage and nine have not. The learners who have reached the prepositional stage are the ready learners. After instruction, a stage gain can be expected among these ready learners.⁵ What is remarkable at t1 is that the awareness of case is largely restricted to the prepositional context. In the positional context only a few dative case forms appear. In fact, the acc-dat opposition is present in only one learner and in two other learners the acc-dat opposition co-occurs with a preposition (which is non-target-like). Among the other learners, the use of case forms is restricted to nominative and accusative. The lack of positional case marking of course does not mean that the learners have not reached the stage of the category procedure. In terms of c-to-f-mapping (see Table 1) they have actually all reached this stage. They all use canonical word order or prepositional phrases to indicate the grammatical function of the sentence arguments, which means that

5. Remark that one learner already reached the stage of functional case assignment at t1. She acts as a sort of control to the task used, because clearly, the task is suited to elicit functional case marking.

from the perspective of the learner there is no functional need to use (positional) case markers.

Let us now look at what happened after the instructional treatment. Four groups (in the table separated by blank lines) can be distinguished. Considering first the unready learners, one group does not develop at all. This is reminiscent of previous findings in Baten (2013) where, likewise, a group of learners is shown not to progress. These learners use the nominative case or a direct mapping of nominative vs. non-nominative throughout. Grammatical functions are indicated through canonical word order or prepositions. The other group of the unready learners does show development in the case marking system, since they are able to progress to the prepositional stage. Even though the instruction did not explicitly target case use in prepositional phrases, this kind of case use was of course available in the input too. In other words, although the instruction was targeted at the next + 1 stage, linguistic information of the next stage is available as well, which causes learners to develop. This result is comparable to earlier studies that also observed unready learners to benefit from instruction that was targeted at stages beyond the next stage (Bonilla, 2015; Doughty, 1991; Mackey, 1999; Spada & Lightbown, 1999). These findings should not be treated as counter-evidence to the Teachability Hypothesis, because, as predicted, the learners still do not skip stages. This reasoning also applies to the one unready learner (SG), who reaches the stage of functional case assignment at t₂, but then slides back to the prepositional stage again at t₃.

Analogous to the unready learners, two groups can be uncovered among the ready learners: Those who develop to the functional case marking stage and those who do not. The latter group of learners remains at the prepositional stage. Again, this finding should not be treated as counter-evidence to the Teachability Hypothesis. As PT contends, the availability of certain processing skills does not imply that the linguistic structures corresponding to these processing skills will necessarily emerge. Finally, a group of ready learners does develop to the next stage of functional case marking, which indicates a progress that aligns with the correlates of the Teachability Hypothesis.

To sum up, the results of the two groups at the ends are straightforward to interpret: The five unready learners at the top of the table do not develop, whereas the five ready learners at the bottom do. The ready and unready learners in the middle of the table might be more difficult to interpret at first sight, and indeed, such findings have often been used as counter-evidence to the Teachability Hypothesis. However, two of the misunderstandings concerning the Teachability Hypothesis are (1) that all ready learners will proceed to the next stage and (2) that the unready will not develop at all. This is not what the Teachability Hypothesis (in its re-formalisation within PT) says. On the contrary, the Teachability Hypothesis states that development is constrained and that stages cannot be skipped; it does

not state that developmental readiness guarantees acquisition, nor that unreadiness excludes development. If development takes place among unready learners, then the development only relates to stages already acquired or the next stage – as among the learners in this study. Furthermore, the possible non-development among the ready learners can be explained by the fact that so many factors other than processing susceptibility play a role.

This interpretation of the Teachability Hypothesis, of course, begs the question as to what can be considered as counter-evidence (given that a hypothesis must be falsifiable). In the present study on German case acquisition, counter-evidence would arise if an unready learner (i.e., with a case profile of ‘---’, ‘+--’ or ‘(+)--’) were to reach the functional stage after instruction, but without showing at the same time the emergence of the prepositional stage (i.e., with a case profile of ‘- - +’, ‘+ - +’ or ‘(+)- +’). Seeing that this is not the case, the Teachability Hypothesis still stands and further evidence is provided that stages cannot be skipped.

6. Discussion and conclusion

The aim of this chapter was to compare two different operationalisations of readiness, namely processing constraints and partial mastery. In terms of accuracy rates the present study on German case development found that all learners progressed from pretest to posttest. This progress included both ready and unready learners in both readiness accounts. However, the ready learners’ performance and progress is located at higher levels of accuracy compared to the unready learners (see Table 4 and Figure 2). In addition, the progress is mainly situated in the positional and prepositional context (see Table 3 and Figure 1). No significant development was observed in the functional context, which was attributed to the status of readiness. However, the two accounts on readiness gave different statistical results (Table 5).

In the partial mastery account, the development in functional case marking among the unready learners is significant, whereas among the ready learners it is not. This result clearly contradicts Williams and Evans (1998), who observed that ready learners made the greatest gains while unready learners made only little progress. The contradictory findings suggest that it may be difficult to inform timing decisions in (Focus on Form) instruction on the basis of accuracy scores alone. A problematic aspect of the accuracy account is its vagueness: What exactly does ‘partial mastery’ mean and what is meant by ‘the greatest gains’? In the absence of a clear operationalisation in Williams and Evans (1998), this study took ‘partial mastery’ to mean ‘some accurate uses’, which basically meant everything above zero accuracy. This resulted in seven ready learners, who ranged between 13% and 63% in accuracy. Maybe the cut-off point should have been higher (20%?, 30%? or

more?) for statistical significance to occur. But then again, this arbitrariness very much erodes the validity of the accuracy account. It should be noted, though, that the contradictions between Williams and Evans (1998) and the present study can also be the result of the different type of instruction used in the two studies and the different linguistic forms that were examined (participial adjectives and passives vs. case marking).

Nevertheless, a further drawback of the accuracy approach with regard to German case is that the partial mastery of the ready learners is only due to correct uses of accusative case forms (except for learner EVH, who shows accurate uses of dative case forms too). The limitation to accusative forms ignores that case as a category actually only exists by virtue of oppositions. Indeed, the accuracy approach only involves a purely formal analysis. As opposed to this exclusively formal analysis, the other approach adopted in this study does take into consideration functional oppositions. The processing constraints account prescribes that an opposition acc-dat must have emerged in prepositional phrases in order for learners to be ready. This account has the advantage that it includes a distributional analysis of case oppositions, but also that it employs a cut-off point that remains constant. When a case opposition exists, regardless of the actual numbers in the opposition, the form has emerged. In addition, the processing account has the advantage that it allowed for testing the Teachability Hypothesis.

The emergence analysis revealed four types of learners, all within the boundaries of the Teachability Hypothesis. There are two types of (PT-based) unready learners: The ones who progress in the already acquired stages and the ones who do not progress at all. None of the unready learners reach the functional stage. In other words, none of the unready learners skip a stage. The situation is reversed for the (PT-based) ready learners: One part of this group gains a stage and reaches the functional case marking stage; another part only progresses within the already acquired stages. As discussed above, this pattern of results is in line with the Teachability Hypothesis as it was re-formalised within PT (Pienemann, 1998).

As Håkansson (2013: 118) has reminded us, there is no direct relationship between the sequence of emergence and sequences of mastery. This study, however, yields two observations concerning the relationship between emergence and accuracy. First, accuracy increases are not possible if a stage is not reached. Indeed, the PT-based unready learners do not develop in their accuracy of functional case marking, which is demonstrated by the non-significant statistical result. Secondly, accuracy increases are possible if a stage is reached or reachable. The PT-based ready learners show a significant increase in the accuracy of functional case marking (i.e., the reachable stage). Furthermore, all learners were at stage 2 (positional case marking) or 3 (prepositional case marking), which explains that accuracy increases were also found in these case contexts (see Table 3 and Figure 1).

These findings are reminiscent of previous studies' findings that instruction related to structures belonging to stages beyond the next stage can also improve the correct use of structures from previous stages (Doughty, 1991; Mackey, 1999; Spada & Lightbown, 1999; Bonilla, 2015). In addition, these findings square well with the study by Roos (this volume), where it is shown that developmentally moderated instruction on features that have already been acquired (i.e., stage 5, third person -s) will support learners to increase their accuracy levels. Although the aspect of variation was not explicitly addressed in the present study, the increase of the accuracy scores in this study is linked with lexical variation. The oral production task used in the present study included a variety of different lexical items and, after the instruction, the number of different lexical items connected with target-like case markers was indeed shown to increase.

The issue of variation in accuracy scores is also particularly interesting with respect to the effectiveness of different types of corrective feedback. In the present study, this question was not addressed, because all learners received the same type of explicit instruction (there was no control group). However, Li and Iwashita (this volume) showed that recasts were more effective than negotiated prompts in improving the Chinese learners' accuracy of English question formation. Whatever the type of instruction or the type of feedback, Li and Iwashita (this volume) and the present study seem to agree that different instruction or feedback does not result in a differential effect on the emergence pattern of developmental stages. This finding is important in relation to the generally accepted observations in SLA research, as they are listed by VanPatten and Williams (2015: 9ff.). One of these observations includes that there are limits on the effects of instruction. Roos (this volume), Li and Iwashita (this volume), and the present study seem to suggest that these limits concern the emergence of developmental features, but not necessarily the path from emergence to mastery.

As a final point, it should be noted that the present study determined the learners' developmental stages as well as their readiness by case marking only. This means that the learners' syntactic development was not taken into account, nor other morphological features from stage 3 or 4 (as suggested by Lenzing in Zhang & Lantolf, 2015). The reason to refrain from doing this, is because other morphological features do not necessarily relate to case marking and because the precise nature of the 'morphology-syntax' interface in PT is still unclear. What we do know, however, is that PT does not predict morphology and syntax to develop in tandem. Instead, developmental trailers may develop which can be brought in line through instruction (Pienemann & Kefßler, 2012). Developmental trailers refer to the temporal gap between producing the linguistic context for a particular structure and its actual rule application. With regard to the present study, a developmental trailer

is the OVS structure, which represents stage 4.⁶ All learners but one (MP) were able to produce such structures from the start of data collection, yet their ability to produce these structures should not be equated with an ability to produce all potential structures from stage 4 (e.g., functional case marking). In the present study, such equation would actually mean that all learners but one were ready learners. However, the present study posits that developmental readiness should not be determined from the perspective of the trailers, but instead should only consider the particular linguistic rule under study. As a consequence, the present study did not include a full diagnostic profile of the learners, which is why the results need to be interpreted with some circumspection. Future research will have to deal with the possible implications for the Teachability Hypothesis. Is a full diagnostic profile always necessary, and if so, does this necessity not reduce the practicality and applicability of the Teachability Hypothesis, because it implies that every single structure of a particular stage should be elicited and examined? Also, how to deal with a situation (as is the case in the present study), where learners are considered unready for a particular language feature in a particular developmental sequence, but might actually be ready learners, when also including other, unrelated language features?

References

- Akakura, M. (2012). Evaluating the effectiveness of explicit instruction on implicit and explicit L2 knowledge. *Language Teaching Research* 16(1), 9–37. <https://doi.org/10.1177/1362168811423339>
- Artoni, D., & Magnani, M. (2013). The development of case in L2 Russian. In M. Butt, & T. Holloway King (Eds.), *Proceedings of the LFG13 Conference* (pp. 69–89). Stanford, CA: CSLI.
- Artoni, D. (2015). *The acquisition of case morphology in Russian as a second language* (Unpublished doctoral dissertation). University of Verona.
- Baten, K. (2013). *The acquisition of the German case system by foreign language learners*. Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.2>
- Baten, K., & Lochtman, K. (2014). Das deutsche Kasussystem im Fremdsprachenerwerb: Ein Forschungsüberblick. *Muttersprache* 124(1), 1–25.
- Bonilla, C. (2015). Instructing stages of Processability Theory in L2 Spanish: Next or next + 1? In K. Baten, A. Buyl, K. Lochtman & M. Van Herreweghe (Eds.), *Theoretical and methodological developments in Processability Theory* (pp. 209–242). Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.4.10bon>
- Boss, B. (1996). German grammars for beginners: the Teachability Hypothesis and its relevance to the classroom. *The University of Queensland Papers in Language and Linguistics* 1, 93–100.

6. It should be noted that in this study object topicalisation is a ‘real’ OVS structure because the topicalisation leads to a structural change in the word order, which means that the learners are inter-phrasally unifying grammatical information.

- Bresnan, J. (2001). *Lexical-functional syntax*. Malden, MA: Wiley-Blackwell.
- De Graaff, R., & Housen, A. (2009). Investigating the effects and effectiveness of L2 instruction. In M. Long & C. Doughty (Eds.), *The handbook of language teaching* (pp. 726–755). Malden, MA: Wiley-Blackwell. <https://doi.org/10.1002/9781444315783.ch38>
- DeKeyser, R. (2005). What makes second-language grammar difficult? A review of issues. *Language Learning* 55(1), 1–25. <https://doi.org/10.1111/j.0023-8333.2005.00294.x>
- Di Biase, B., Bettoni, C., & Medojevic, L. (2015). The development of case in a bilingual context: Serbian in Australia. In C. Bettoni & B. Di Biase (Eds.), *Grammatical development in second languages: Exploring the boundaries of Processability Theory* (pp. 195–212). Paris: Eurosla.
- Doman, E. (2015). Implications of the developmental stages of language acquisition for classroom teaching. In K. Baten, A. Buyl, K. Lochtman, & M. Van Herreweghe (Eds.), *Theoretical and methodological developments in Processability Theory* (pp. 243–264). Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.4.11dom>
- Doughty, C. (1991). Instruction does make a difference. *Studies in Second Language Acquisition* 13(4), 431–469. <https://doi.org/10.1017/S0272263100010287>
- Doughty, C., & Williams, J. (1998). *Focus on form in classroom second language acquisition*. Cambridge: Cambridge University Press.
- Dyson, B. (1996). The debate on form-focused instruction: A teacher's perspective. *Australian Review of Applied Linguistics* 19(2), 59–78. <https://doi.org/10.1075/ara1.19.2.04dys>
- Eisenbeiß, S., Bartke, S., & Clahsen, H. (2005). Structural and lexical case in child German: Evidence from language-impaired and typically developing children. *Language Acquisition: A Journal of Developmental Linguistics* 13(1), 3–32. https://doi.org/10.1207/s15327817la1301_2
- Ellis R. (1989). Are classroom and naturalistic acquisition the same? A study of the classroom acquisition of German word order rules. *Studies in Second Language Acquisition* 11(3), 305–328. <https://doi.org/10.1017/S0272263100008159>
- Ellis, R. (1997). *SLA research and language teaching*. Oxford: Oxford University Press.
- Håkansson, G. (2013). Processability Theory. Explaining developmental sequences. In M. del Pilar García Mayo, M. Junkal Gutierrez Mangado, & M. Martínez Adrián (Eds.), *Contemporary approaches to second language acquisition* (pp. 111–127). Amsterdam: John Benjamins. <https://doi.org/10.1075/aals.9.09ch6>
- Hjelmslev, L. (1935/37). *Catégorie des cas: Acta Jutlandica VII, IX*. Aarhus.
- Jakobson, R. (1971 [1936]). Beitrag zur allgemeinen Kasuslehre. In R. Jakobson (Ed.), *Selected Writings II* (pp. 23–71). The Hague: Mouton.
- Kefler, J.-U. (2007). Assessing EFL-development online: A feasibility study of Rapid Profile. In F. Mansouri (Ed.), *Second language acquisition research. Theory-construction and testing* (pp. 119–143). Newcastle upon Tyne: Cambridge Scholars.
- Lantolf, J., & Zhang, X. (2015). Response to Pienemann's critique of Zhang and Lantolf. *Language Learning* 65(3), 752–760. <https://doi.org/10.1111/lang.12122>
- Lightbown, P. (1998). The importance of timing in focus on form. In C. Doughty & J. Williams (Eds.), *Focus on form in classroom second language acquisition* (pp. 177–196). Cambridge: Cambridge University Press.
- Loewen, S. (2015). *Introduction to instructed second language acquisition*. New York, NY: Routledge.
- Mackey, A., & Philp, J. (1998). Conversational interaction and second language development: Recasts, responses, and red herrings? *Modern Language Journal* 82(3), 338–356. <https://doi.org/10.1111/j.1540-4781.1998.tb01211.x>
- Mackey, A. (1999). Input, Interaction, and second language development: An empirical study of question formation in ESL. *Studies in Second Language Acquisition* 21(4), 557–587. <https://doi.org/10.1017/S0272263199004027>

- Magnani, M. (2016). *A Processability Theory approach to the development of marked word orders in Russian and Italian as second languages* (Unpublished doctoral dissertation). University of Verona.
- Marx, N. (2014). Kasuzuweisung und Kasuslehre bei Schülern mit Migrationshintergrund: Eine differenzierte Betrachtung. In B. Ahrenholz & P. Grommes (Eds.), *Zweitspracherwerb im Jugendalter* (pp. 99–124). Berlin: De Gruyter.
- McDonough, K., & Trofimovich, P. (2009). *Using priming methods in second language research*. New York, NY: Taylor & Francis.
- Motsch, H.-J., & Riehemann, S. (2008). Grammatische Störungen mehrsprachiger Schüler. Interventionsstudie zum Therapieziel Kasus. *Die Sprachheilarbeit* 53(1), 15–25.
- Nassaji, H., & Fotos, S. (2011). *Teaching grammar in second language classrooms: integrating form-focused instruction in communicative contexts*. New York, NY: Routledge.
<https://doi.org/10.4324/9780203850961>
- Pallotti, G. (2007). An operational definition of the emergence criterion. *Applied Linguistics* 28(3), 361–382. <https://doi.org/10.1093/applin/amm018>
- Pienemann, M. (1984). Psychological constraints on the teachability of languages. *Studies in Second Language Acquisition* 6(2), 186–214. <https://doi.org/10.1017/S0272263100005015>
- Pienemann, M. (1988). Determining the influence of instruction on L2 speech processing. *AILA Review* 5, 40–72.
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M. (2015). An outline of Processability Theory and its relationship to other approaches to SLA. *Language Learning* 65(1), 123–151. <https://doi.org/10.1111/lang.12095>
- Pienemann, M. & Kefler, J.-U. (2012). Processability Theory. In S. Gass & A. Mackey (eds.), *The Routledge Handbook of Second Language Acquisition* (pp. 228–246). New York: Routledge.
- Roos, J. (2015). Response Paper: language teaching and learning from a PT perspective. In K. Baten, A. Buyl, K. Lochtman, & M. Van Herreweghe (Eds.), *Theoretical and methodological developments in Processability Theory* (pp. 265–272). Amsterdam: John Benjamins.
<https://doi.org/10.1075/palart.4.12roo>
- Spada, N., & Lightbown, P. (1999). Instruction, first language influence, and developmental readiness in second language acquisition. *The Modern Language Journal* 83(1), 1–22.
<https://doi.org/10.1111/0026-7902.00002>
- Spada, N., & Tomita, Y. (2010). Interactions between type of instruction and type of language feature: A meta-analysis. *Language Learning* 60(2), 263–308.
<https://doi.org/10.1111/j.1467-9922.2010.00562.x>
- VanPatten, B., & Williams, J. (2015). *Theories in second language acquisition: An introduction*. New York, NY: Routledge.
- Williams, J., & Evans J. (1998). What kind of focus and on which forms. In C. Doughty & J. Williams (Eds.), *Focus on form in classroom second language acquisition* (pp. 139–155). Cambridge: Cambridge University Press.
- Zhang, X., & Lantolf, J. (2015). Natural or artificial: Is the route to L2 development teachable? *Language Learning* 65(1), 152–180. <https://doi.org/10.1111/lang.12094>
- Zhang, Y. (2015). The emergence of sentence Topic in a Topicprominent language: A descriptive study of L2 Chinese. In K. Baten, A. Buyl, K. Lochtman, & M. Van Herreweghe (Eds.), *Theoretical and methodological developments in Processability Theory* (pp. 45–70). Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.4.03zha>

Appendix

The development of case according to opposition accusative-dative

	t1			t2			t3		
	POS	PREP	FUNCT	POS	PREP	FUNCT	POS	PREP	FUNCT
	8-4	2-3	4-4	8-4	2-3	4-4	8-4	2-3	4-4
AF	0-0	0-0	0-0	0-0	0-0	0-0	2-0	0-0	0-0
DDS	2-0	1-0	2-0	1-0	1-0	1-0	2-0	1-0	1-0
FC	0-0	0-1	0-0	3-0	2-0	0-0	6-0	1-0	3-0
JVDB	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	1-0
MP	0-0	1-0	0-0	0-0	0-0	0-0	5-0	1-0	3-0
HC	0-0	0-0	0-0	0-0	0-1	0-0	2-(1)	1-1	1-0
ML	1-0	0-0	0-0	2-0	1-1	0-0	4-1	1-3	0-0
YVG	1-0	1-0	0-0	5-(3)	2-2	0-0	6-(3)	2-2	0-0
SG	0-0	0-0	0-0	7-1	2-3	3-3	8-0	2-3	2-0
DB	4-(1)	2-1	3-0	1-0	2-2	1-0	4-(1)	2-2	4-0
WD	0-(2)	1-1	1-0	2-(4)	1-2	3-0	0-0	0-1	0-0
KH	0-0	1-1	0-0	7-4	2-3	1-0	4-1	1-3	2-0
MLD	6-0	2-3	0-0	8-(3)	2-3	0-0	6-(4)	2-2	1-0
IVDV	5-1	2-3	1-0	8-4	2-3	1-0	8-4	2-1	2-1
SL	0-0	1-2	0-0	8-1	1-2	3-2	4-3	2-2	3-1
IB	2-0	1-1	2-0	7-3	2-2	2-3	5-3	2-2	1-2
NVDL	4-0	2-3	4-0	8-4	2-3	4-2	8-4	2-3	4-4
EVH	6-(2)	2-2	3-2	8-4	2-3	3-4	8-4	2-3	4-4

Note. The numbers present the opposition for accusative-dative. The numbers between brackets refer to the (non-target-like) use of dative in prepositional phrases. Only unambiguous accusative or dative forms are considered; syncretic and ambiguous forms are not considered. The obligatory contexts are given on top (8-4, 2-3, 4-4). The grey shades correspond to the ‘+’ of the in-chapter table.

Development of English question formation in the EFL context of China

Recasts or prompts?

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This experimental classroom study investigates the effects of two feedback types on English question formation. Ninety Chinese learners were randomly assigned to either one of two experimental groups (recasts or prompts) or the control group. Between the pre- and posttests, the learners in the experimental groups received the assigned type of feedback that addressed their production of questions during task-based interaction. The effects of the feedback were measured by calculating whether there was an increase in production frequency of targeted question types. The results showed that (1) neither feedback type was effective in increasing the learners' production of Stage-5 questions, and (2) both feedback types were valuable in improving the learners' production of accurate questions, but recasts yielded a larger effect than prompts. These findings provide further evidence of feedback usefulness in L2 learning and shed light on English question formation via the pedagogical tool of corrective feedback.

1. Introduction

Over the past thirty years, there has been continued interest in investigating the role of corrective feedback (CF), such as recasts and prompts, within the Cognitive Interactionist Approach to Second Language Acquisition (SLA). In this field of research, English question formation has been explored in several laboratory studies (e.g., Loewen & Nabei, 2007; McDonough, 2005; McDonough & Mackey, 2006; Mackey & Philp, 1998; Philp, 2003). The examination of English question formation in those studies has followed the developmental sequence of English question formation outlined in Processability Theory (PT) (Pienemann, 1998, 2011, 2005; Pienemann & Johnston, 1987). More specifically, most of the studies investigated whether CF in dyadic interaction could help second language (L2) learners, who were developmentally ready, to proceed to a higher stage of question formation

according to the emergence criterion for acquisition (Meisel et al., 1981). The studies concluded that both recasts and prompts have a positive role in English question formation.

This study, however, investigated the role of recasts and prompts in L2 learners' acquisition of English question formation in the classroom setting. Much interaction research (e.g., Li, 2010; Lyster & Saito, 2010) reports that the positive role of CF observed in laboratory studies may not be applicable to classroom learning. In fact, previous classroom studies have reported mixed results for the efficacy of recasts and prompts (e.g., Ellis, 2007; Lyster & Mori, 2006; Lyster & Saito, 2010; Lyster et al., 2013; Mifka-Profozic, 2013; Sheen, 2004; van de Guchte et al., 2015). As a result, there have been calls for further research into the role of the two CF types in classroom settings (Goo & Mackey, 2013; Li, 2010; Lyster, 2015; Lyster & Ranta, 2013; Lyster et al., 2013). To meet this need, the present study used specific purpose classes to examine the effectiveness of recasts and three types of prompts in a context where English is taught as a foreign language (EFL) to university learners. Moreover, the present study conceptualised the development of English question formation as continued development of particular question forms when the learners had passed the onset of acquisition defined by the emergence criterion (Meisel et al., 1981). The following sections relate to English question formation and PT, the role of CF in SLA, CF and English question formation, and CF and L2 classroom learning, followed by the presentation of the method, results, discussion and conclusion.

2. English question formation and PT

It has been extensively reported that L2 learners have persistent difficulties in acquiring different kinds of English questions (e.g., Pozzan & Quirk, 2014; Spada & Lightbown, 1999; Zobl, 1980). PT (Pienemann, 1998, 2011, 2005) attributes the difficulties that L2 learners experience in acquiring English questions to processing constraints, such that, as a result of the processing constraints, a learner can produce only those structures that are processable by the learner. The explanation for this, according to PT, is that L2 learners, regardless of their mother tongue, undergo a six-stage developmental sequence of English question formation, each stage of which is contingent upon its predecessor.

The six stages are framed based on L2 learners' ability to produce a variety of question types with particular word order characteristics. Initially, L2 learners are able to form a question with single words or canonical word order (i.e., stages 1 and 2). When moving to stage 3, the learners are able to provide a *Wh*-question word, auxiliary, or interrogative phrase in sentence-initial position prior to other items in

canonical word order. At stage 4, the learners can produce a variety of interrogative questions with a copula, auxiliary, or modal in sentence-initial position. When they are able to produce Wh-questions that require inversion of subject and auxiliary/modal, the learners are at stage 5. When they are able to produce embedded questions with inversion cancelled, the learners have achieved the highest stage of development (i.e., stage 6).

Entwined with PT is the Teachability Hypothesis (TH) (Pienemann, 1984). This hypothesis claims that formal instruction cannot help a learner skip a stage of development and only becomes beneficial if it focuses on structures that are at the next stage for the learner. To examine the effectiveness of instruction on progress through the developmental sequence, the emergence criterion for acquisition is traditionally applied (Meisel et al., 1981). The emergence criterion sees the evidence of acquisition as a learner's production of at least two different instances of the question types at the relevant stage. Pienemann (2005: 2) argues, "The task of acquiring a language includes the acquisition of the procedural skills needed for the processing of the language". Baten (this volume) concurs with Pienemann that instruction may help learners to become more proficient in the use of structures they have already acquired with regard to higher production frequencies or accuracy rates.

3. The role of CF in SLA

Interaction studies on CF seek theoretical support to the Cognitive Interactionist Approach to SLA. Within this theoretical approach, Long's (1990, 1996, 2007) Interaction Hypothesis claims that CF provided during interaction constitutes a type of negative linguistic evidence to draw learners' attention to the form in question and such attention establishes a crucial condition for acquisition. Also with this theoretical approach, Swain's (1985, 1995, 1998, 2005) Output Hypothesis adds that while the Interaction Hypothesis mostly focuses on the role of negative input in SLA, the role of learner production following CF is also relevant. The Output Hypothesis argues that the output following CF serves three functions for SLA (i.e., noticing, hypothesis testing, and metalinguistic awareness).

Of the CF types, recasts and prompts are often compared within interaction studies due to their differing characteristics (Ellis, 2006). Recasts are feedback with full or partial reformulation of learners' non-target-like use (Long & Robinson, 1998). In contrast, prompts signal non-target-like use of learner utterances through clarification requests, repetitions, metalinguistic clues, and elicitations, and the speakers are required to reformulate the utterances (Lyster, 2004). Recasts contain the correct models of learner non-target-like utterances, whereas prompts do not, but they offer opportunities for learners to modify the utterances (see

Examples (1)-(4) in the Methodology section). For this reason, recasts are referred to as input-providing feedback, and prompts are referred to as output-promoting feedback (Ellis & Sheen, 2006). However, it is problematic to regard prompts purely as output-promoting feedback if metalinguistic clues are also provided. A metalinguistic clue usually constitutes a metalinguistic comment on the error in the learner's previous utterance, such as "No, you need past tense" for a learner's non-target-like use of a verb that is required in the past tense (Ammar & Spada, 2006; Ellis, 2007; van de Guchte et al., 2015; Yang & Lyster, 2010). This feedback indeed provides metalinguistic input in addition to the opportunity for modified output, which raises a concern about the claim that the effects of prompts are purely due to opportunities for output (Goo & Mackey, 2013).

Recasts and prompts are also different in terms of the level of cognitive processing that the learners are engaged in. Researchers tend to agree that recasts are unobtrusive to the conversation flow compared to prompts in general, and metalinguistic clues in particular (e.g., Ellis & Sheen, 2006; Long, 1996, 2007). This nature of recast feedback, along with its juxtaposition of a target-like model and the learner's non-target-like utterance, encourages a cognitive comparison of form in the meaning-focused conversation (Long, 2007). Processing of language form in a meaning-focused context is argued to help the learner gain implicit knowledge that is mostly involved for fluent production of the L2 (Ellis & Sheen, 2006). However, the provision of a prompt stops the conversation flow, and the learner needs to retrieve the correct model from memory to modify the initial utterance (Swain, 1985, 1995, 1998, 2005). This retrieval involves the learner in processing form at the conscious level, and thus generates explicit knowledge (Lyster, 2004; van de Guchte et al., 2015; Yang & Lyster, 2010). According to Acquisition of Cognitive Skill Theory (Anderson, 1993, 2000), explicit knowledge serves a monitoring role for fluent production but can be transferred into implicit knowledge through practice. As a result of the differing characteristics between recasts and prompts, interaction research has been interested in whether there is a difference in the influence of the two CF types in L2 learning.

4. CF and English question formation

A large number of studies have investigated the role of recasts and prompts in SLA in varied contexts (e.g., laboratory/classroom, second/foreign language setting, and immersion/communication-oriented contexts), targeting different structures in different languages (e.g., Ammar, 2008; Ammar & Spada, 2006; Ellis, 2007; Ellis et al., 2006; Loewen & Nabei, 2007; Loewen & Philp, 2006; Lyster, 2004; Lyster & Izquierdo, 2009; McDonough, 2007; van de Guchte et al., 2015; Yang & Lyster,

2010). The results of these studies suggest equal effectiveness of recasts vs. prompts in a laboratory setting with dyadic interaction, but mixed effectiveness of recasts vs. prompts in a classroom setting (e.g., Li, 2010; Lyster & Saito, 2013).

The studies that engaged with the six-stage developmental sequence of English question formation were mostly conducted in a laboratory setting (e.g., Loewen & Nabei, 2007; McDonough, 2005; McDonough & Mackey, 2006; Mackey & Philp, 1998; Philp, 2003). These studies were interested in whether interactional treatments either in the form of recasts or prompts accelerated learners' progress to a higher stage of question formation. For example, Mackey (1999) classified the learners as developmental 'readies' or 'unreadies' at the onset of the instruction, and found that, according to the emergence criterion, more 'readies' than 'unreadies' moved to the next stage as a result of recast treatment. McDonough (2005) found that prompts in the form of repetitions and clarification requests were facilitative for Thai L2 learners' production of higher stage questions when the learners were able to successfully modify their previous erroneous utterances following the feedback.

An exception in the laboratory research is the study by Loewen and Nabei (2007). Their study employed small group interaction (4 learners per group) and examined the effects of recasts vs. prompts on the learners' increased frequency of production of a higher stage question type after the relevant form had emerged. They found no apparent difference between the feedback types in increasing the learners' production of higher stage questions.

Researchers attribute the positive role of both recasts and prompts found in the laboratory studies to the intensive, consistent provision of the CF targeting a single structure in one-on-one interaction (Ellis & Sheen, 2006; Nicholas et al., 2001). Due to the lack of extensive individualised attention to a particular individual's use of a structure in L2 classes, the effectiveness of the two CF types becomes questionable in a classroom setting.

5. CF and L2 classroom learning

The observational classroom studies that have been conducted in varied pedagogical contexts (e.g., Ellis et al., 2001; Iwashita & Li, 2012; Loewen & Philp, 2006; Lyster & Ranta, 1997; Sheen, 2004) tend to point to a differential effect of recasts compared to prompts according to the communicative orientation of instruction. For example, Sheen (2004) found that the rate of uptake (i.e., various verbal reactions from learners) following recasts differed substantially across four classroom contexts, ranging from 34% in content-based immersion programs to over 82.5% in Korean EFL classes that were more oriented to language form. Further, Lyster and Mori (2006) found that a much higher proportion of successful uptake

was observed in form-oriented classes following the use of recasts, whereas in meaning-oriented classes, a much higher proportion of successful uptake followed the use of prompts. Accordingly, Lyster and Mori hypothesised that recasts may be more facilitative than prompts in the form-focused instructional setting, and that prompts may be more facilitative than recasts in the meaning-focused instructional setting. They explained their hypothesis with reference to the ambiguity of recasts in meaning-oriented L2 classes.

While the findings of the observational classroom studies are insightful, they need to be verified by experimental classroom research simply because learners' verbal reactions following CF are not equivalent to learning (Goo & Mackey, 2013; Lyster, 2015). Several experimental classroom studies have reported that prompts are more effective than recasts (e.g., Ammar & Spada, 2006; Ellis, 2007; Lyster, 2004; Yang & Lyster, 2010; van de Guchte et al., 2015). However, Mifka-Profozic (2013) found recasts to have a positive role in both written and oral tests for secondary learners' accurate use of *passé composé* and imperfect in French, but did not find significant improvement in the clarification request group.

The experimental classroom studies that researched the efficacy of recasts vs. prompts used a wide range of variables in their design, which makes comparison across studies difficult. One variable that makes the comparison difficult is target structure. In the existing literature, the target structures used are mainly morphological, for instance, French gender agreement (Lyster 2004), the third person possessive (his or her) (Ammar & Spada, 2006), comparative and past tense (Ellis, 2007), regular and irregular past tense (Yang & Lyster, 2010), the comparative and dative forms in German (van de Guchte et al., 2015), and *passé composé* and imperfect in French (Mifka-Profozic, 2013). Several scholars have pointed out that CF effectiveness is largely dependent on the structure, and even if it works well for one chosen structure in one condition, there is no guarantee that it will be effective for another structure (e.g., Ellis & Sheen, 2006; van de Guchte et al., 2015). Syntactic structures, such as English question formation outlined by PT, have rarely been investigated in this tradition of experimental classroom research.

Another variable that makes the comparison difficult is the operationalisation of CF. For example, prompt feedback is only provided as metalinguistic clues by Ellis (2007), only as clarification requests by Mifka-Profozic (2013), as a metalinguistic clue followed by an elicitation by van de Guchte et al. (2015), and as a combination of metalinguistic clues and two or three other prompts in other quasi-experimental classroom studies (e.g., Ammar & Spada, 2006; Lyster, 2004; Yang & Lyster, 2010). Furthermore, metalinguistic clues included in most of the classroom experimental studies – with the exception of Lyster (2004) – explicitly refer to grammar rules about the non-target-like part of the learner's utterance, in

addition to pushing for a second output. As noted earlier, this provision of metalinguistic input in metalinguistic clues confuses the role of prompts due to either including metalinguistic input or providing opportunities for output. Therefore, there is a need for additional experimental classroom research to disentangle the role of prompts in L2 learning.

6. The present study

This study took an experimental classroom design to further investigate the effects of recasts vs. prompts on the production of English questions in a form-focused L2 learning environment. Specifically, in English question formation, the study examined the effectiveness of recasts vs. prompts in two aspects of L2 learners' continued development; that is higher production frequencies of stage-5 questions of the PT hierarchy and higher accuracy rates of various yes/no and Wh-question types. It intended to test whether recasts and prompts would be effective and which CF type would be more effective in influencing these two aspects of development, a focus that is rarely taken in the existing experimental classroom studies. Moreover, the study removed metalinguistic clues from the prompt feedback category, thereby making the role of prompts only promoting output. Two research questions (RQ) were formulated:

1. Are recasts and prompts effective for increasing Chinese learners' production of stage-5 questions in a form-focused classroom context? If so, which CF type is more effective?
2. Are recasts and prompts effective for increasing Chinese learners' production of target-like questions in a form-focused classroom context? If so, which CF type is more effective?

By answering the two questions, the present study seeks to cast further light on the current issue surrounding the relative efficacy of recasts vs. prompts in L2 classroom learning. It also provides insight into how English question formation develops via the provision of CF in a form-focused classroom context, which will contribute to the understanding of the TH (Pienemann, 1998, 2011, 2005).

7. Methodology

7.1 Participants

The current study was conducted at a university in an inland province of the People's Republic of China. This research site was chosen because its students are mostly from rural areas of the province, and their past and current L2 learning experiences represent the mainstream of EFL teaching in China.

Ninety first-year learners (female = 72, male = 18) volunteered to participate in the study. They had been attending the university for nearly four months at the onset of the study. They were majoring in physics and were all enrolled in two English classes.

The learners had learned English for six years prior to entering the university. At secondary school, they had had a one-hour lesson every day of the week, whereas at university, they were provided with a two-hour lesson twice a week in their first two academic years. Through an informal group interview and observation of their usual English class at the university, it was noted that the instruction they received did not focus on communication but on language items, which is consistent with the findings about the EFL teaching in the inland provinces of China. Several studies have commented that English language classes in Mainland China are large in size and the prevalent pedagogical practice focuses on grammar, especially in the inland provinces (Chen, 2004; Hu, 2003, 2005). Most of the learners stated that outside their English classes, they spent a great deal of time reciting new words or completing grammar and reading exercises.

A native English-speaking teacher from New Zealand, who has a Master of Arts degree, taught the lessons during the treatment sessions. He was chosen because (1) he was familiar with the language profile of the students in the university due to several years' teaching experience, (2) his lessons were well-received by the students and (3) he volunteered to help.

7.2 Research design and procedures

The study employed an experimental research design with a pretest, three treatment lessons and two posttests. The whole experiment was completed within four weeks. The three groups (i.e., the recast, the prompt, and the control group) were formed through stratified random sampling. The Chinese learners at the same score level in the national entrance examination to university were randomly assigned to the three groups. On Day 1, all the learners were briefed about the test procedure, and they took the pretest on Day 2. Between Day 3 and Day 9, the experimental group

learners attended three treatment lessons, outside their usual English classes. The treatment lessons were video recorded. All the learners took the immediate posttest on Day 10 and the delayed posttest on Day 31.

7.3 Instruments for testing and treatment

The pre-/posttests consisted of three similar sets of tasks, which were counter-balanced in each test session to avoid task effects on the test performances. The tasks that were included in each set were warming-up, spot-the-difference and story-discovery. The warming-up task was five minutes long and the learners were asked to explain their recent activities. In the spot-the-difference task, they were instructed that there were 20 differences between the picture on their individual monitor and a hidden picture, and they had five minutes to ask as many questions as possible in order to find those differences. For the story-discovery task, four pictures were shown one-by-one on their individual monitor, and the learners were given one minute per picture to ask questions about the picture.

The three tasks for instructional treatment included an interview, spot-the-difference and guessing-the-object. Each task was carried out in a 40-minute lesson and with a format of interaction that allowed the teacher to join in and intervene at a convenient point, for example, by initiating interaction between the teacher and the whole class or interaction between a group of learners and the rest of the class.

The tasks used for testing and treatment purposes were designed based on previous studies (e.g., Mackey, 1999; Mackey & Philp, 1998; McDonough, 2005; Philp, 1998) and went through a pilot process. Those studies and the pilot demonstrated that the tasks could successfully elicit a variety of questions.

7.4 Training the teacher

The teacher was instructed to (1) correct the learners' non-target-like questions through provision of the assigned CF type; (2) correct the learners' non-target-like production of other linguistic forms in the assigned manner at his convenience, or simply ignore them; (3) ask another learner to help if a learner could not correct his/her errors after a number of prompts; and (4) negotiate for meaning when he could not discern what a learner intended to say during the provision of recasts. The teacher practised how to provide the two CF types. The practice lessons were recorded and viewed by the teacher and the first author together to ensure that he had a clear understanding of the tasks and the provision of feedback matching the treatment.

7.5 Operationalisation of recasts and prompts

As explained earlier, recasts are commonly defined as the full or partial reformulation of the learners' erroneous utterances without changing their meaning (Long & Robinson, 1998). With this definition, recasts can be provided in a variety of ways in a classroom environment (Loewen & Philp, 2006; Sheen, 2006), such as with or without extra conversational moves, or using stress on the erroneous part. The present study intended to keep the provision of feedback as natural and similar as possible to a regular classroom environment; therefore, recasts with varied characteristics were expected. However, observation established that a vast majority of the recast episodes provided by the teacher contained only a single feedback move and were delivered declaratively, non-segmentally, and without additional stress or uptake, as shown in Example (1) below. Please note that all the examples have been taken from the data collected in this study.

- (1) S: Is your first object *is* a famous person?
 T: Is your first object a famous person?

Prompts are the interactional moves that arise from negotiation and require the learners to modify their previous utterance by themselves. Specifically, the prompts in this study involved clarification requests, repetitions, and elicitations, which are defined and exemplified below:

Clarification Requests: Indicating to the learner that his/her message has been unclear or ill formed through phrases, such as "Sorry" and "I beg your pardon".

- (2) S: *What is it?*
 T: Sorry, what?
 S: What is it like?

Repetitions: Repeating the learner's erroneous utterance, usually with rising intonation.

- (3) S: How many glasses *are* there *are* on the bookshelf?
 T: How many glasses are there are on the bookshelf?

Elicitations: Repeating the learner's utterance up to the error and waiting for the learner to supply the correct form.

- (4) S: Where the cup in your picture?
 T: Where...?
 S: [the student is thinking]
 S: Where is the cup in your picture?

7.6 Data analysis

The 270 audio files for the 90 learners' performances on the three tests were transcribed. These transcriptions were completed by several research assistants and were re-checked by the first author.

Based on the emergence criterion that locates a learner's current developmental stage in terms of the learner's two different non-formulaic utterances of the form in the stage (Meisel et al., 1981), the examination of the pretest data showed that 84 of the learners were located at stage 5, five were at stage 4, and one was at stage 6.

Although a vast majority of the learners were at stage 5, there was a variation in their production of questions. A major characteristic in the variation was that for the same question type, the learners sometimes produced questions from a higher stage and sometimes did not. For example, for the Wh- question that requires inversion of subject and auxiliary/modal, the learners sometimes produced stage-3 questions, such as "what he is drinking?" and sometimes stage-5 questions, such as "what are other people doing?". The occurrence of stage-5 questions in all learners' production amounted to 21.6% of their total utterances, which was low compared to the frequent occurrence of the corresponding stage-3 questions (41.3%).

Another major characteristic in the variation concerned some non-target-like features in the learners' productions of various question types. The non-target-like features related to specific elements *when the questions were in the correct word order*. The elements included the Wh-question word, the copula/modal/auxiliary and the subject. One example of a wrong Wh-question word in a question was "why [what] are they talking about?" There was also both correct and incorrect use of the subject case in their performance, such as in the utterances "where is he in the picture?" and "how old is him?". The errors associated with the copula/modal/auxiliary included instances where (1) the copula/auxiliary did not agree with the subject of the sentence (for example, "does they want to steal the big box?", "how big are the door?" and "what does they do?"); and (2) the auxiliary/modal did not match the lexical verb of the sentence (for example, "where is he come from?").

Accordingly, the present study conducted two analyses. One analysis was to examine whether recasts and prompts would increase learners' production of stage-5 questions, and the other analysed their production of target-like questions of a variety of yes-no and Wh-question types (i.e., question types between stage 3 and stage 5). The following formulae were used for the analyses to calculate the percentage of stage-5 questions or target-like questions:

$$\frac{n \text{ questions at stage 5} / n \text{ target-like questions}}{n \text{ total question form utterances}} \times 100 = \text{Percentage}$$

7.7 Coding of the data

Prior to coding the learners' production data, certain utterances were excluded from the analysis. Single constituent utterances, such as "man or woman?" and "six birds?" were excluded because they rarely occurred. Formulaic questions were also not considered in the analysis, as they were not included in previous interaction research on English questions (e.g., 1993 Spada & Lightbown, 1999; Loewen & Nabei, 2007; McDonough, 2005; McDonough & Mackey, 2006; Mackey & Philp, 1998; Philp, 2003). The present study broadly followed the criteria proposed by Myles, Mitchell, and Hooper (1999), who acknowledged chunk identification as "an irreducible intuitive dimension" (p. 50). The questions that might be considered formulaic included such examples as "what's the weather like?", "what's wrong?" and "what's this?". When such questions were produced (unlike when other types of questions were generated), most of the Chinese learners were quite fluent.

In coding a learner's production data in each test, stage-5 questions were first identified. For a question to be classified as stage 5, the learner must use the correct word order in Wh-question types that require inversion of subject and auxiliary/modal. Second, all the questions were further coded according to whether they were target-like. For an utterance to be coded as target-like, all elements of question formation (i.e., lexis, word order and morphology) had to be correct. Third, the frequency of stage-5 questions and target-like questions observed in the learner's test performance was determined by recording the number of stage-5 questions, target-like questions, and total number of question utterances on a coding sheet and applying the formulae mentioned previously.

Finally, the first author undertook the coding analysis. Approximately 15% of the test data were double-checked by a trained research assistant, and the inter-rater reliability was found to be 97.7%.

8. Results

The preliminary analyses involved undertaking two one-way between-group ANOVAs to confirm the equivalence of the three groups' pretest results regarding the groups' stage-5 question and target-like question production. With the significance level set at $p \leq .05$, the non-significant values for stage-5 questions and target-like questions were $F(2, 87) = 2.07, p = .13$ and $F(2, 87) = 1.28, p = .28$, respectively.

The main analyses consisted of two two-way mixed ANOVAs, for which the within-subject factor was time of testing and the between-subject factor was the group condition (recast, prompt or control). Parametric statistics such

as ANOVAs were justified for the analyses based on the results of the normality test (Shapiro-Wilk's test) and the large sample size ($n = 30$ in each group). Partial eta-square ηp^2 was reported for the two-way mixed ANOVA, and Cohen's d was used for post-hoc analyses¹.

8.1 Stage-5 questions

Table 1 presents the descriptive statistics of the average percentage of stage-5 question utterances for the three groups in the pretest, the immediate posttest, and the delayed posttest. A two-way mixed ANOVA yielded no significant interaction between group type and time ($F(4,172) = .24, p = .91, \eta p^2 = .006$). The main effect that compared CF types (i.e., the group effect) was not significant ($F(2, 87) = 2.75, p = .07, \eta p^2 = .06$), but a significant main effect for time was observed ($F(2, 86) = 6.4, p = .002, \eta p^2 = .13$).

Table 1. Descriptive statistics of the three groups' mean percentages of stage-5 question production in the three tests

Group/ $n = 30$ each	Pretest		Immediate posttest		Delayed posttest	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Prompts	.20	.12	.23	.10	.25	.10
Recasts	.26	.13	.27	.13	.29	.11
Control	.20	.12	.21	.14	.22	.14

Post-hoc analyses for the main effect of time involved three repeated-measure one-way ANOVAs, with the p value corrected to $p \leq .017$ ($= .05/3$) in order to avoid Type I errors (Pallant, 2010). Accordingly, none of the differences over time for any of the groups reached significance, with $F(2, 28) = .79, p = .04, \eta p^2 = .21$ for the prompt group, $F(2, 28) = .87, p = .15, \eta p^2 = .06$ for the recast group, and $F(2, 28) = .92, p = .33, \eta p^2 = .08$ for the control group.

To conclude, the two-way mixed ANOVA for stage-5 questions did not show any significant differences for the within-/between-group comparisons. Therefore, to answer RQ1, neither recasts nor prompts were effective in increasing the Chinese learners' production of stage-5 questions.

1. Interpretations of effect sizes partial eta-square (ηp^2) ≥ 0.01 small, ≥ 0.06 medium, ≥ 0.13 large (Richardson, 2011); Cohen's $d \leq 0.20$ small effect size, medium $0.20 < d < 0.80$ medium, or large $d \geq 0.8$ (Cohen, 1977).

8.2 Target-like questions

Table 2 summarises the descriptive statistics for the three groups' mean percentages of target-like question utterances. In the two-way mixed ANOVA analysis, Mauchly's test indicated a violation in the assumption of sphericity ($\chi^2(2) = 5.78$, $p < .05$), and thus Greenhouse-Geisser estimates of sphericity ($\epsilon = 0.94$) were used to correct the degrees of freedom. The two-way mixed ANOVA revealed substantial main effects for time ($F(1.89, 163) = 27.63$, $p \leq .000$, $\eta p^2 = .24$) and groups ($F(2, 87) = 4.09$, $p = .02$, $\eta p^2 = .086$), with a large effect size for both effects; however, the interaction between group and time was not significant ($F(3.78, 163) = 1.95$, $p = .14$, $\eta p^2 = .10$).

Table 2. Descriptive statistics of the three groups' mean percentages of target-like question production in the three tests

Group/ $n = 30$ each	Pretest		Immediate posttest		Delayed posttest	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Prompts	.52	.18	.62	.19	.61	.19
Recasts	.54	.14	.64	.14	.66	.12
Control	.47	.16	.50	.19	.54	.19

Post-hoc analyses through three repeated-measure one-way ANOVAs, with $p \leq .017$ taken to avoid Type I errors, detected significant differences for the recast and prompt groups. The prompt group significantly improved from the pretest to the immediate posttest ($p = .003$, $d = .53$), and maintained this level in the delayed posttest ($p = .005$, $d = .48$). The recast group also significantly improved from the pretest to the immediate post-test ($p = .000$, $d = .74$), and from the pretest to the delayed posttest ($p = .000$, $d = .92$). However, the level of improvement of the recast group was larger than the prompt group, as shown by the effect sizes (Cohen's d values).

With regard to the comparison across the groups, two one-way ANOVAs were conducted to compare the immediate and delayed posttest results across the groups. Again, to avoid Type I errors, the value $p \leq .025$ was taken. Because the variance in each group for the delayed posttest was not homogeneous (immediate posttest $F(2, 56.2) = 1.757$, $p = .18$; delayed posttest $F(2, 56.2) = 4.16$, $p = .019$), the Games-Howell's test was employed instead of the Tukey test for the delayed posttest. The statistical analyses revealed that the recast group significantly outperformed the control group in each of the two posttests ($p = .008$, $d = .84$ in the immediate posttest; $p = .012$, $d = .77$ in the delayed posttest). The prompt group, however, approached a significant difference from the control group only in the immediate posttest ($p = .029$).

In summary, the analyses for target-like questions found a number of significant differences. The recast group achieved significant differences in four comparisons: Immediate posttest/delayed posttest vs. pretest in relation to the time effect and recast vs. control at the two posttests in relation to the group effect. In contrast, the prompt group revealed significant differences in two comparisons, but only in relation to the time effect: Immediate posttest vs. pretest and delayed posttest vs. pretest. Moreover, the recast group gained larger effect sizes than the prompt group for the significant improvement over time. Therefore, the answer to RQ2 is that both CF types presented a beneficial impact on the Chinese learners' increased production of target-like questions, but recasts were more effective than prompts.

9. Discussion

The results indicate two major findings. Firstly, neither recasts nor prompts increased the frequency of production of the more advanced stage questions (i.e., stage-5 questions). Secondly, both CF types were useful in supporting more target-like question production, and recasts were more beneficial than prompts in achieving these results.

The finding that recasts and prompts worked for the development of target-like questions but not for the development of stage-5 questions agrees with the findings in the interaction research on the role of CF and the research on developmental sequences. An example within the interaction research is Long, Inagaki, and Ortega's (1998) study, which found that CF was effective for the placement of adverbs in Spanish but not for the other three forms involved. Similarly, Iwashita (2003) identified that CF was beneficial for only one of the forms involved in her study. For the research on developmental sequences, Ellis and Barkhuizen (2005) discussed Alberto's learning in Schumann's (1978) and Berdan's (1996) studies, pointing out that Alberto's learning was not demonstrated by increased frequency of use of a higher-stage language feature, but by his interlanguage change in the target-like direction of the L2 within his current stage.

The non-effectiveness of recasts and prompts in the learners' development of stage-5 questions may be due to the inherent difficulty for Chinese speakers to use this kind of English question structure. This difficulty may be a combined result of the L1 influence and the complexity of stage-5 questions. Zobl (1980) found that Spanish-L1 learners of English remained longer in a lower negation stage due to the influence of a type of negation in their mother tongue, and Spada and Lightbown (1999) discovered that the lack of inversion with nouns in French questions made similar types of English questions come much later for most French-L1 learners of English. Similarly, the lack of inversion or morphological changes in forming

Chinese questions makes the production of English questions difficult. Also, according to the PT hierarchy, the higher stage a question is, the more complex are the movements it involves in word order. Stage-5 questions, which are located at the second highest stage of the PT hierarchy, should be particularly difficult for Chinese speakers of English compared to the question types at the lower stages (i.e., *do* fronting, *Wh*-question with no inversion and *yes/no* question types). Consequently, like Alberto's learning mentioned earlier, the effects of recasts and prompts on the learners' development of question formation were not shown in their greater use of stage-5 questions but in their increased production of target-like questions. However, it seems that the effect of Chinese is not to distort the sequence of acquisition or to prevent the structure being acquired, as it was reported in the Method section that 85 of the 90 learners were able to produce stage-5 questions. The effect of Chinese is rather to reduce the extent to which the structural capacity is exploited.

The more beneficial role for recasts over prompts found in this study challenges the results found in most of the experimental classroom research (e.g., Ammar & Spada, 2006; Ellis, 2007; Lyster, 2004; Yang & Lyster, 2010; van de Guchte et al., 2015). At the same time, it provides certain support to Lyster and Mori's (2006) claim that recasts can be more effective than prompts in form-focused instruction. In the learning context of the present study, the English class the learners had every week typically focused on linguistic items. Explicit instruction on language points, such as the part of speech of newly introduced words, frequent collocations and associated syntactic structures, took the majority of class time. This method of instruction may have played a significant role in shaping the learners' attention to what the recasts were intended to correct in the treatment lessons (Mifka-Profozic, 2013; Sheen, 2004), even though this CF was provided quite implicitly. According to Lyster and Mori, the provision of recasts in the form-focused instruction creates a balance of attention to form and meaning, which will make the remedy of problematic interlanguage features most effective. This claim for a stronger effectiveness of recasts in the form-focused instruction, however, only holds true for the learners' production of target-like questions in the present study.

10. Conclusion

The current study investigated the efficacy of two types of CF, recasts and prompts, in gaining control of question formation in an experimental design with a control group and two treatment groups. The features explored were increased use of stage-5 questions and target-like use of interrogative and *Wh*-questions. The results supply the answer to RQ1 that as groups, neither treatment nor control group

learners significantly increased the number of stage-5 questions. On the other hand, the results answer RQ2 that both CF types were effective for the increased number of target-like questions, and recasts were more effective than prompts. These findings provide further insights into the utility of recasts and prompts in classroom L2 learning. If CF is a feature of the instruction used to teach structures that have an identified location along the developmental sequences (Pienemann, 1998, 2011, 2005), such as the English questions that were used in the present study, these findings also provide insights into the TH and PT.

Nevertheless, the findings of the present study should be interpreted with caution, because, as stated earlier, a wide range of variables can influence the effects of recasts and prompts. For example, the findings of the present study may be limited due to how the two feedback types were operationalised. With metalinguistic clues excluded from the prompt category, recasts were more effective than prompts in an EFL learning environment that had a heavy emphasis on form. In the same learning context, it is unclear whether recasts would still work more effectively for English question formation in comparison to prompts if metalinguistic cues were included, as metalinguistic cues are a more explicit prompt than the three prompts that were included in this study, and the degree of explicitness of CF is a variable that could contribute to the efficacy of CF (Gass, 1997; Norris & Ortega, 2001). For the same reason, it is worthwhile for future research to investigate the effects of recasts vs. the three prompts used in this study in an L2 learning environment with an instructional focus on meaning. In contexts with an instructional focus on meaning, several quasi-experimental classroom studies have found prompts to be more effective than recasts (e.g., Ammar & Spada, 2006; Ellis, 2007; Lyster, 2004; Yang & Lyster, 2010; van de Guchte et al., 2015), but the prompts in their studies included metalinguistic clues. With metalinguistic clues removed, it is not guaranteed that the greater effectiveness of prompts over recasts can still hold true in those classroom conditions.

Along with the cautious interpretation of the findings in the present study, a limitation relates to the control group that took the pre-/posttests without any task-based lessons. Ideally, in addition to taking the three tests, the control group should have received the same task-based lessons, but without any provision of CF. This ideal involvement of the control group could make it clear whether any effects achieved in the experimental groups is due only to the provision of CF. It is possible that the positive outcomes gained by the two experimental groups in their production of target-like questions could be partly due to the provision of CF and partly due to the extra practice that the treatment lessons provided.

Another arguable limitation of the present study is the occasional provision of CF types other than the assigned method of correction to each of the experimental groups. The classroom setting of the study required the teacher to try to keep the

provision of CF as natural as possible. Therefore, the teacher's occasional negotiation for meaning with the learners in the recast group was allowed when he did not hear or understand the learner's utterance, whereas, in the prompt group, the teacher made contingent decisions when the learners were not able to self-correct after having been prompted several times. These considerations resulted in occasional instances of clarification requests in the recast group, and of recasts and explicit feedback within the prompt group. However, the two experimental groups were clearly distinguishable in the feedback treatment because the teacher mainly provided recasts to the recast group and the three prompts to the prompt group.

Despite these limitations, the current study provides further evidence of the role of CF in second language development, and especially contributes to the current debate over the efficacy of recasts vs. prompts in relation to both aspects of development and aspects of variation in learners' language use.

References

- Anderson, J. R. (1993). *Rules of the mind*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Anderson, J. R. (2000). *Learning and memory: An integrated approach*. New York, NY: John Wiley.
- Ammar, A. (2008). Prompts and recasts: Differential effects on second language morphosyntax. *Language Teaching Research* 12(2), 183–210. <https://doi.org/10.1177/1362168807086287>
- Ammar, A., & Spada, N. (2006). One size fits all? Recasts, prompts, and L2 learning. *Studies in Second Language Acquisition* 28(4), 543–574. <https://doi.org/10.1017/S0272263106060268>
- Berden, R. (1996). Disentangling language acquisition from language variation. In R. Bayley & R. Preston (Eds.), *Second language acquisition and linguistic variation* (pp. 203–244). Cambridge: Cambridge University Press. <https://doi.org/10.1075/sibil.10.09ber>
- Chen, Y. (2004). Investigation into secondary school EFL teaching in Henan Province. *Foreign Language Teaching Annals* 2(1), 36–39.
- Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*. New York, NY: Routledge.
- Ellis, R. (2006). Researching the effects of form-focused instruction on L2 acquisition. *AILA Review* 19(1), 18–41.
- Ellis, R. (2007). The differential effects of corrective feedback on two grammatical structures. In A. Mackey (Ed.), *Conversational interaction in second language acquisition: A collection of empirical studies* (pp. 339–360). Oxford: Oxford University Press.
- Ellis, R., & Barkhuizen, G. (2005). *Analysing learner language*. Oxford: Oxford University Press.
- Ellis, R., Basturkmen, H., & Loewen, S. (2001). Learner uptake in communicative ESL lessons. *Language Learning* 51(2), 281–318. <https://doi.org/10.1111/1467-9922.00156>
- Ellis, R., Loewen, S., & Erlam, R. (2006). Implicit and explicit corrective feedback and the acquisition of L2 grammar. *Studies in Second Language Acquisition* 28(2), 339–368. <https://doi.org/10.1017/S0272263106060141>
- Ellis, R., & Sheen, Y. (2006). Reexamining the role of recasts in second language acquisition. *Studies in Second Language Acquisition* 28(4), 575–600. <https://doi.org/10.1017/S027226310606027X>
- Gass, S. (1997). *Input, interaction and the second language learner*. Mahwah, NJ: Lawrence Erlbaum Associates.

- Goo, J., & Mackey, A. (2013). The case against the case against recasts. *Studies in Second Language Acquisition* 35(1), 127–165. <https://doi.org/10.1017/S0272263112000708>
- Li, S. (2010). The effectiveness of CF in SLA: A meta-analysis. *Language Learning* 60(2), 309–365. <https://doi.org/10.1111/j.1467-9922.2010.00561.x>
- Hu, G. (2003). English language teaching in China: Regional differences and contributing factors. *Journal of Multilingual and Multicultural Development* 24(4), 290–318. <https://doi.org/10.1080/01434630308666503>
- Hu, G. (2005). English language education in China: Policies, progress, and problems. *Language Policy* 4(1), 5–24. <https://doi.org/10.1007/s10993-004-6561-7>
- Iwashita, N. (2003). Negative feedback and positive evidence in task-based interaction: Differential effects on L2 development. *Studies in Second Language Acquisition* 25(1), 1–36. <https://doi.org/10.1017/S0272263103000019>
- Iwashita, N., & Li, H. (2012). Patterns of interaction in a TBLT-based adult oral English class in China. In A. Shehadeh & C. Coombe (Eds.), *Task-based language teaching in foreign language contexts: Research and implementation* (pp. 137–162). Amsterdam: John Benjamins. <https://doi.org/10.1075/tblt.4.11iwa>
- Loewen, S., & Nabei, T. (2007). The effect of oral corrective feedback on implicit and explicit L2 knowledge. In Mackey, A. (Ed.), *Conversational interaction and second language acquisition: A series of empirical studies* (pp. 361–378). Oxford: Oxford University Press.
- Loewen, S., & Philp, J. (2006). Recasts in the adult English L2 classroom: Characteristics, explicitness and effectiveness. *The Modern Language Journal* 90(4), 536–556. <https://doi.org/10.1111/j.1540-4781.2006.00465.x>
- Long, M. (1990). The least a second language acquisition theory needs to explain. *TESOL Quarterly* 24(4), 649–666. <https://doi.org/10.2307/3587113>
- Long, M. (1996). The role of the linguistic environment in second language acquisition. In W. Ritchie & T. Bhatia (Eds.), *Handbook of second language acquisition* (pp. 413–468). San Diego, CA: Academic Press.
- Long, M. (2007). *Problems in SLA*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Long, M., Inagaki, S., & Ortega, L. (1998). The role of implicit negative feedback in SLA: Models and recasts in Japanese and Spanish. *The Modern Language Journal* 82(3), 357–371. <https://doi.org/10.1111/j.1540-4781.1998.tb01213.x>
- Long, M., & Robinson, P. (1998). Focus on form: Theory, research, and practice. In C. Doughty & J. Williams (Eds.), *Focus on form in classroom second language acquisition* (pp. 15–41). Cambridge: Cambridge University Press.
- Lyster, R. (1998). Recasts, repetition, and ambiguity in L2 classroom discourse. *Studies in Second Language Acquisition* 20(1), 55–85. <https://doi.org/10.1017/S027226319800103X>
- Lyster, R. (2004). Differential effects of prompts and recasts in form-focused instruction. *Studies in Second Language Acquisition* 26(3), 399–432. <https://doi.org/10.1017/S0272263104263021>
- Lyster, R. (2015). The relative effectiveness of corrective feedback in classroom interaction. In N. Markee (Ed.), *The handbook of classroom discourse and interaction* (pp. 213–228). Oxford: Wiley-Blackwell.
- Lyster, R., & Izquierdo, J. S. (2009). Prompts versus recasts in dyadic interaction. *Language Learning* 59(2), 453–498. <https://doi.org/10.1111/j.1467-9922.2009.00512.x>
- Lyster, R., & Mori, H. (2006). Interactional feedback and instructional counterbalance. *Studies in Second Language Acquisition* 28(2), 269–300. <https://doi.org/10.1017/S0272263106060128>
- Lyster, R., & Ranta, L. (1997). CF and learner uptake: Negotiation of form in communicative classrooms. *Studies in Second Language Acquisition* 19(1), 37–66.

- Lyster, R., & Ranta, L. (2013). Counterpoint piece: The case for variety in CF research. *Studies in Second Language Acquisition* 35(1), 167–184. <https://doi.org/10.1017/S027226311200071X>
- Lyster, R., & Saito, K. (2010). Oral feedback in classroom SLA: A meta-analysis. *Studies in Second Language Acquisition* 32(2), 265–302. <https://doi.org/10.1017/S0272263109990520>
- Lyster, R., Saito, K., & Sato, M. (2013). Oral corrective feedback in second language classrooms. *Language Teaching* 46(1), 1–40. <https://doi.org/10.1017/S0261444812000365>
- Mackey, A. (1999). Input, interaction and second language development: An empirical study of question formation in ESL. *Studies in Second Language Acquisition* 21(4), 557–587. <https://doi.org/10.1017/S0272263199004027>
- Mackey, A., & Philp, J. (1998). Conversational interaction and second language development: Recasts, responses, and red herrings? *The Modern Language Journal* 82(3), 338–356. <https://doi.org/10.1111/j.1540-4781.1998.tb01211.x>
- McDonough, K. (2005). Identifying the impact of negative feedback and learners' responses on ESL question development. *Studies in Second Language Acquisition* 27(1), 79–103. <https://doi.org/10.1017/S0272263105050047>
- McDonough, K. (2007). Interactional feedback and the emergence of simple past activity verbs in L2 English. In A. Mackey (Ed.), *Conversational interaction in second language acquisition: A series of empirical studies* (pp. 323–338). Oxford: Oxford University Press.
- McDonough, K., & Mackey, A. (2006). Responses to recasts: Repetitions, primed production, and linguistic development. *Language Learning* 56(4), 693–720. <https://doi.org/10.1111/j.1467-9922.2006.00393.x>
- Meisel, J., Clahsen, H., & Pienemann, M. (1981). On determining developmental stages in natural second language acquisition. *Studies in Second Language Acquisition* 3(2), 109–135. <https://doi.org/10.1017/S0272263100004137>
- Mifka-Profozic, N. (2013). *The effectiveness of corrective feedback and the role of individual differences in language learning*. Frankfurt: Peter Lang. <https://doi.org/10.3726/978-3-653-01977-3>
- Myles, F., Mitchell, R., & Hooper, J. (1999). Interrogative chunks in French L2: A basis for creative construction? *Studies in Second Language Acquisition* 21(1), 49–80.
- Nicholas, H., Lightbown, P. M., & Spada, N. (2001). Recasts as feedback to language learners. *Language Learning* 51(4), 719–758. <https://doi.org/10.1111/0023-8333.00172>
- Norris, J. M., & Ortega, L. (2001). Does type of instruction make a difference? Substantive findings from a meta-analytic review. *Language Learning* 51(1), 157–213. <https://doi.org/10.1111/j.1467-1770.2001.tb00017.x>
- Pallant, J. (2010). *SPSS survival manual: A step by step guide to data analysis using SPSS* (4th ed.). Maidenhead: McGraw-Hill Education.
- Philp, J. (1998). *Interaction, noticing and second language acquisition: An examination of learners' noticing of recasts in task-based interaction* (Unpublished doctoral dissertation). University of Tasmania.
- Philp, J. (2003). Constraints on “noticing the gap”: Non-native speakers' noticing of recasts in NN-NNS interaction. *Studies in Second Language Acquisition* 25(1), 99–126. <https://doi.org/10.1017/S0272263103000044>
- Pienemann, M. (1984). Psychological constraints on the teachability of languages. *Studies in Second Language Acquisition* 6(2), 186–214. <https://doi.org/10.1017/S0272263100005015>
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M. (2005). An introduction to Processability Theory. In M. Pienemann (Ed.), *Cross-linguistic aspects of Processability Theory* (pp. 1–30). Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30.03pie>

- Pienemann, M. (2011). The psycholinguistic basis of PT. In M. Pienemann & J.-U. Kefler (Eds.), *Studying Processability Theory: An introductory textbook* (pp. 1–11). Amsterdam: John Benjamins.
- Pienemann, M., & Johnston, M. (1987). *Factors influencing the development of language proficiency*. Adelaide: National Curriculum Resource Centre, Adult Migrant Education Program.
- Pozzan, L., & Quirk, E. (2014). Second language acquisition of English questions: An elicited production study. *Applied Psycholinguistics* 35(6), 1055–1086.
<https://doi.org/10.1017/S0142716412000690>
- Sheen, Y. (2004). Corrective feedback and learner uptake in communicative classrooms across instructional settings. *Language Teaching Research* 8(3), 263–300.
<https://doi.org/10.1191/1362168804lr1460a>
- Sheen, Y. (2006). Exploring the relationship between characteristics of recasts and learner uptake. *Language Teaching Research* 10(4), 361–392. <https://doi.org/10.1191/1362168806lr2030a>
- Spada, N., & Lightbown, P. M. (1993). Instruction and the development of questions in L2 classrooms. *Studies in Second Language Acquisition* 15(2), 205–224.
<https://doi.org/10.1017/S0272263100011967>
- Spada, N., & Lightbown, P. M. (1999). Instruction, first language influence, and developmental readiness in second language acquisition. *The Modern Language Journal* 83(1), 1–22.
<https://doi.org/10.1111/0026-7902.00002>
- Richardson, J. (2011). Eta squared and partial eta squared as measures of effect size in educational research. *Educational Research Review* 6(2), 135–147.
<https://doi.org/10.1016/j.edurev.2010.12.001>
- Schmidt, R. (1990). The role of consciousness in second language learning. *Applied Linguistics* 11(2), 129–158. <https://doi.org/10.1093/applin/11.2.129>
- Schumann, J. (1978). *The pidginisation process: A model for second language acquisition*. Rowley, MA: Newbury House.
- Swain, M. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. M. Gass & C. Madden (Eds.), *Input in second language acquisition* (pp. 235–253). Rowley, MA: Newbury House.
- Swain, M. (1995). Three functions of output in second language learning. In C. Cook & B. Seidlhofer (Eds.), *Principle and practice in applied linguistics: Studies in honour of H. G. Widdowson* (pp. 125–144). Oxford: Oxford University Press.
- Swain, M. (1998). Focus on form through conscious reflection. In C. Doughty & J. Williams (Eds.), *Focus on form in classroom second language acquisition* (pp. 64–81). Cambridge: Cambridge University Press.
- Swain, M. (2005). The Output Hypothesis: Theory and research. In E. Hinkel (Ed.), *Handbook of research in second language teaching and learning* (pp. 471–483). Mahwah, NJ: Lawrence Erlbaum Associates.
- Van de Guchte, M., Braaksma, M., Rijlaarsdam, G., & Bimmel, P. (2015). Learning new grammatical structures in task-based language learning: The effects of recasts and prompts. *Modern Language Journal* 99(2), 246–262. <https://doi.org/10.1111/modl.12211>
- Zobl, H. (1980). Developmental and transfer errors: Their common based and (possibly) differential effects on subsequent learning. *TESOL Quarterly* 14(4), 469–479.
<https://doi.org/10.2307/3586235>
- Yang, Y., & Lyster, R. (2010). Effects of form-focused practice and feedback on Chinese learners' acquisition of regular and irregular past tense forms. *Studies in Second Language Acquisition* 32(2), 235–263. <https://doi.org/10.1017/S0272263109990519>

Can print literacy impact upon learning to speak Standard Australian English?

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Second language learning research mostly investigates literate learners. Based on studies by Tarone, Bigelow and colleagues (2004, 2005, 2006, 2006) this small scale study focuses on low level literacy learners who are acquiring Standard Australian English as their second dialect. It explores whether literacy levels impact upon the processing of language when engaging in oral interaction tasks. Utilising Pienemann's (1998, 2005) stages of question formation, feedback given to the learners targeted questions within the learners' developmental stage. Participants were asked to identify whether the language used differed from their own, and if so, to attempt to reproduce it. The findings show that feedback was often noticed, but no significant relationship was found between literacy level and noticing. However, there was a significant relationship between literacy level and the reproduction of targeted forms. This study, like the others contained within this section, is concerned with the developmental readiness of second language learners to acquire target forms and the approach is closely aligned with that of Li and Iwashita (this volume). However, it does differ in that its participants are learners of a second dialect with low literacy levels, representing an under-studied population.

1. Introduction

It has been suggested in the literature that bilingual people are good language learners because they are able to transfer learned language skills from their first language (L1) to their second (L2) and beyond (August & Shanahan, 2006; Bialystok et al., 2005). Furthermore, Siegel (2010) suggests that this also holds true for second dialect (D2) acquisition. Anecdotally, this appears to be true for the Aboriginal students who reside in remote locations in the Pilbara region of Western Australia who, without any formal language education, acquire Manyjilyjarra and two or more other traditional Aboriginal languages of their respective families. During their childhood and adolescence many also acquire Aboriginal English (AE), a dialect

used by many Australian Aboriginal people. In fact, they use it as their lingua franca and as a way to identify as Aboriginal in environments where non-Aboriginal people would use Standard Australian English (SAE) or a variety of this.

AE differs systematically from SAE at all levels of language (e.g., phonology, vocabulary, morphology, syntax, discourse and semantics). With specific reference to question formation, the main differences between AE and SAE are: zero *be* copula (e.g., You going to finish your schoolwork?), zero auxiliary (e.g., You want to go hunting tomorrow?) (Dept. of Ed. W.A., 2012), subject-auxiliary inversion (e.g., I can go play?) (Berry & Hudson, 1997).

Despite years of formal schooling, these same students who are multilingual in terms of their acquisition of AE and traditional languages often fail to acquire the language of instruction, namely SAE, as their second dialect. This is highlighted in the Australian 2009 national numeracy and literacy testing (NAPLAN) results for year 9 students, which indicate that only 67% of Aboriginal students who sat the reading test achieved minimum standard levels (compared with 93.5% of non-Aboriginal students). In Western Australia, however, only 56.4% attained minimum standards (compared to 92.4% non-Aboriginal students) for the reading test (Australian Curriculum Assessment & Reporting Authority, 2010). Moreover, these scores are likely to be optimistic because of the low rates of participation for this cohort in national testing, particularly by weaker students (Partington & Galloway, 2007). It is unclear why some Aboriginal students, who are multilingual, and who successfully learn a number of traditional Aboriginal languages, creoles and the dialect AE, appear to struggle to acquire and then to achieve well in SAE. This is the focus of the current study.

1.1 Background

A 'second dialect' refers to another variety of the same language that differs from the first in terms of vocabulary, pronunciation and grammar, and is associated with particular regions or social groups (Siegel, 2010: 2). As such Second Dialect Acquisition (SDA) represents a sub-field of Second Language Acquisition (SLA) (Siegel, 2010: 2). The field is relatively new and not a lot is known about how learners acquire a second dialect (Siegel, 2010: 2).

Research to date tells us there are key differences, but also some similarities between SLA and SDA. One notable difference with SDA is that in SLA the two language systems are distinct, allowing for learners to effectively separate and categorise their language knowledge. It has been argued that because a speaker's first and second dialect (D1 and D2) are very similar it is often difficult to distinguish dialectal differences (Siegel, 2010: 172). In turn, this can lead to significant problems

for speakers when code-switching, that is, when moving between the two linguistic codes. It is not surprising, therefore, that some (e.g., Berry and Hudson, 1997) claim teaching SAE as a second dialect (TSESD) differs from teaching English as a Second Language (TESL) in significant ways, most especially with regard to learner perceptions:

While second language learners in a TESL program are aware of the fact that their mother tongue (L1) is different from the language of the school, second dialect learners in a TSESD program may not have such awareness. Thus, for an Aboriginal student who speaks AE, “learning English” may not appear to be a meaningful activity. (Berry & Hudson, 1997: 1)

At the same time, however, the actual processes of SDA and SLA are quite similar. In both cases intermediate forms of speech are produced by language learners. Borrowing from Selinker (1972) these intermediate stages, which are labeled “interlanguage” in SLA (in Ellis, 1994: 30), have been called “interdialect” in SDA (Trudgill, 1986 in Siegel, 2010: 58). In order to facilitate movement along their interlanguage or interdialect continuum, a number of language features are required in the learners’ environment and this is true regardless of whether it is SLA or SDA. These features include comprehensible input, comprehensible output and feedback about their attempts to produce the target language. First, “both children and adults need the language they encounter to be comprehensible for it to become potential intake” (Long, 1990: 658). That is learning the new (target) language is not possible unless it is understandable. However, whilst input is essential, many argue that on its own it is not sufficient (Long, 1990; White, 1987). For instance, learners also need the opportunity to produce output, that is, to use the language in meaningful ways in order for input to become intake so that acquisition can occur (Swain, 1985, 1995, 2005). Furthermore, learners need to receive feedback about their output in the target language as through feedback learners can attend to the gap between the form of their interlanguage/interdialect and the target language and this is necessary for learning to occur. This is described in Long’s (1996) updated interaction hypothesis: “negotiated interaction (...) implicit negative feedback, in the form of recasts, can be elicited, and that such feedback draws learners’ attention to mismatches between input and output” and together this assists SLA (Gass, Mackey & Pica, 1998: 304).

According to Schmidt (1990), drawing learners’ attention to the gap between their production and the target language is pivotal to language learning. Specifically, he suggests that in order for input to become intake, it must first be consciously noticed (see *Noticing Hypothesis*, Schmidt, 1990; Philp, 2003: 101). On this basis, much research has been conducted to identify the variables that impact on learner noticing, including: available attention, readiness of the learner, frequency

and saliency in the input, L1 influence, prior knowledge, familiarity, novelty of the input, or both, linguistic content of the input, the degree of automaticity involved, the complexity of the tasks, individual differences in working capacity and ability, and the relevance of the discourse (Philp, 2003: 103-4).

The Noticing Hypothesis has important implications for SDA. Siegel (2010) points out that in the process of acquiring a second dialect, learners often fail to 'notice' dialect differences and, hence, do not acquire them. This may occur because the linguistic distance between D1 and D2 is less than between L1 and L2, making differences less salient, that is, less "noticeable, prominent or conspicuous" (Siegel, 2010: 120). Therefore, the 'saliency' of the dialect may impact on dialect awareness – because it is difficult for speakers to distinguish and separate their dialects, they are more likely to go unnoticed and consequently not acquired. For example, in the case of Australian Aboriginal students who speak AE it is possible that they have difficulty acquiring SAE because of the lack of saliency between the D1 – AE and the D2 – SAE.

As persuasive as this seems, however, this explanation is difficult to countenance as many SAE and AE speakers do clearly distinguish between the two dialects. Siegel (2010: 62) points out that "many people without linguistics training appear to be sensitive to forms of speech that differ from their own". The question remains why a number of SAE and AE speakers accurately identify dialectal differences, yet other Aboriginal students seem unaware of the difference between SAE and AE, and further seem unable to acquire SAE sufficiently well for academic (i.e., written literacy) and communicative purposes. Based on the work of Bigelow and Tarone (2004) we propose that literacy levels of AE speakers impact on their ability to 'notice' dialect differences and, therefore, their acquisition of SAE.

1.2 Literacy and oral SLA/SDA

Bigelow and Tarone (2004) suggest that current SLA knowledge is premised on the literate world, and yet not all language learners are literate. Further, neurological research using brain imaging has demonstrated that neural structures differ between literate and illiterate people (Pettersson et al., 2000 in Tarone et al., 2006: 100-102). It has been posited that this is due to undeveloped metalinguistic skills, particularly phonological and morphological awareness. Reis and Castro-Caldas (1997) explain that "learning to read and write introduces into the system qualitatively new strategies for dealing with oral language; that is, conscious phonological processing, visual formal lexical representation, and all the associations that these strategies allow" (1997: 445). Ravid and Tolchinsky (2002) add:

specific aspects of language awareness, especially phonological and morphological awareness, both promote and are promoted by learning to read and write. This happens by establishing links between the internal representations of phonemes, syllables and morphemes and their written representations. (2002: 432)

Based on this, Tarone, Bigelow and colleagues in a series of studies (e.g., Bigelow & Tarone, 2004; Bigelow, Delmas, Hansen, & Tarone, 2006; Tarone & Bigelow, 2005; Tarone et al., 2006) have tested the ability of illiterate second language learners to perform oral processing tasks that require an awareness of linguistic segments and specifically to “explore the impact of literacy level on the processing of oral recasts” (Bigelow et al., 2006: 671). Note, a recast has generally been described as the rephrasing of a non-target like “utterance by changing one or more sentence components (subject, verb or object) while still referring to its central meanings” (Long, 1996: 434 in Philp, 2003: 100-01). Collectively their findings do suggest that “literacy level significantly affects L2 learners’ ability to accurately recall corrective feedback they are given in oral interaction” (Tarone et al., 2006: 109). To find out whether the situation is the same for low level Standard Dialect (SD) – in this case, SAE) – learners is the aim of the current study.

Therefore, the current research seeks to answer the following questions:

1. Are the dialectal differences between an AE utterance and the SAE recast noticed by the individual learners?

Based on the current state of research in SDA (Siegel 2010), it is thought that dialect differences are more difficult to detect and, therefore, it is presumed that they will go unnoticed.

2. Is the ability to notice related to the literacy level of the learner?

Based on the research by Bigelow and Tarone (2004; Bigelow et al., 2006; Tarone et al., 2006), it is hypothesised that the literacy levels of the learners will influence their ability to notice dialect differences.

3. Are participants able to accurately reproduce a recast?

Based on current SDA research (Siegel, 2010), it is expected that participants will find it difficult to accurately reproduce the SAE recasts because the dialect differences may not be noticed.

4. Is the ability to reproduce a recast related to the literacy level of the learner?

Based on research by Bigelow and Tarone (2004; Bigelow et al., 2006; Tarone et al., 2006), it is hypothesised that the literacy levels of the learners will influence their ability to reproduce SAE recasts.

2. Method

Informed by cognitive interactionist (SLA) theory, this study involves correlational research methods to “explain the relationship among variables” (Creswell, 2008: 356). The two variables under examination are: (1) literacy levels, and (2) the ability to notice dialectal differences and to reproduce oral recasts.

2.1 Research site

The research site is a very remote Aboriginal community school located in the Pilbara region, Western Australia. It is approximately 814 miles northeast of Perth, the capital of the state, and 373 miles from the nearest large regional town. The school is very small with a student population of between 20 and 30 children aged from four to nineteen years. Due to the extremely remote setting both Aboriginal language and culture are strong. The student population speak Manyjilyjarra as their first language and often a number of other Aboriginal languages as well as Aboriginal English (AE). It should also be noted that because of the oral tradition of Aboriginal languages, the student population do not have literacy in their L1(s).

2.2 Participants

Students in Year 3 and above were invited to participate in the study, resulting in a sample size of 19. The age range was eight to sixteen years old and nine girls and ten boys participated.

2.3 Research design

2.3.1 *Participant literacy levels*

To determine L2 literacy, the participants’ reading, writing and oral skills were examined. The PM Benchmark Reading Test (Nelson, 2003) was used to rank participants according to reading level. This testing instrument was selected as it is a commonly accepted method of assessing reading in Australian schools and the participants are familiar with the administration of this assessment. Reading ability ranged from not registering to level 29 (The PM Benchmark Reading Test is levelled from 1 to 30, which represents reading growth from five to twelve years old).

To assess writing ability, a collection of independent student writing samples were collected from the classroom teachers. These samples were analysed and ranked with assistance from the classroom teachers. The Australian Curriculum

Achievement Standards were used to group the students and assign them a level of achievement. Writing ability ranged from a Foundation Year standard to a Year 3 standard.

It is very difficult to determine participants' oral proficiency based on the communicative interaction alone, as it is generally very limited in its scope. Therefore, to assess oral second language development, participants were ranked according to their *stage of question formation in English* as developed by Pienemann (1998, 2005). The use of question formation is widely recognised and used within this field as a reliable indicator of level of oral language development (Mackey, 1994; Mackey & Oliver, 2003; Philp, 2003). Using an oral spot-the-difference task, participants demonstrated levels of oral proficiency that ranged from stage 1 (i.e., statements) to stage 5 with the majority at stage 3 (i.e., Do-fronting followed by SVO) on the stages of question formation in English (Pienemann, 1998, 2005).

The current study was informed by and aligns with the development of PT as described by Pienemann (1998, 2005), Pienemann & Keßler (2012), and Pienemann (2015). In particular, the stages of question development were used to determine the feedback provided to the participants.

2.3.2 *Participants' ability to notice dialectal differences and reproduce oral recasts*

The current study builds upon a research design initially developed by Mackey (1994) which involves eliciting oral interaction to determine whether “conversational interaction can facilitate second language development” (Mackey, 1999: 557) as Long (1996) had proposed in his Interaction Hypothesis. In this research a spot-the-difference task was chosen to elicit questions and conversational interaction between the research participant and the researcher (see Appendix A for copy of the task). Participant familiarity, enjoyment and ability to participate were other factors that were considered in task selection to ensure face validity within a schooling context. Additionally, the tasks have been previously tested for reliability and validity by Mackey (1994). Since then they have had continued use in a range of research situations (Mackey & Oliver, 2002; Mackey & Oliver, 2003; Oliver, 1998), as well as with illiterate/low literate populations (Bigelow & Tarone, 2004; Bigelow, Delmas, Hansen, & Tarone, 2006; Tarone & Bigelow, 2005; Tarone et al., 2006) thus further establishing the validity and the reliability of the tasks.

Once questions were elicited from the participants, corrective feedback was given at a morpho-syntactic level matching the participant's stage of development. In response to the corrective feedback, the participants were asked to (1) identify whether their language production differed from that of the researchers, and, (2) to reproduce the utterances in the target language. Specifically during the

communicative task, when a non-SAE utterance was produced by the participant, the researcher provided a SAE recast. When a recast was provided the participant was then asked whether the recast was the same as their original utterance: “Did I say the same or different thing to you?” For example:

- (1) Participant Trigger: Do your alien have two eyes?
 Researcher Recast: Does your alien have two eyes? Did I say the same thing or different?
 Participant Response: Same thing.

The purpose of this was to determine whether the participant could notice the difference between the actual utterance and the researcher’s recast. Next the researcher asked the research participant to repeat the recast, “Can you say what I said?” For example:

- (2) Participant Trigger: Do your alien have nose?
 Researcher Recast: Does your alien have a nose? You say what I said.
 Participant Recall: Do your alien have a nose?

Recasts differed according to the developmental stage, or ‘readiness’ of the learner.

Stage 1:

- (3) Participant Trigger: I got no leg, I got one leg.
 Researcher Recast: I have one leg.
 Participant Recall: I got one leg.

Stage 2:

- (4) Participant Trigger: You got moon?
 Researcher Recast: Do you have a moon?
 Participant Recall: Do you have a moon?

Stage 3:

- (5) Participant Trigger: Do you have any shooting star?
 Researcher Recast: Do you have a shooting star?
 Participant Recall: Do you have a shooting star?

Stage 4:

- (6) Participant Trigger: Is anything coming out of one of them stars?
 Researcher Recast: Is there anything coming out of your stars?
 Participant Recall: Is there anything coming out of your stars?

Stage 5:

- (7) Participant Trigger: How many leg is he have?
 Researcher Recast: How many legs does he have?
 Participant Recall: How many leg does he have?

2.3.3 Validity and reliability

To ensure internal consistency and therefore reliability in the administration of the tasks, the researcher remained the same throughout the data collection process. To ensure validity in the data analysis and coding, clear categories and procedures for undertaking this process were established, aided by the work of Philp (2003) and Bigelow et al. (2006). Additionally, a research assistant was trained in the process of analysing and coding the data. Based on a re-analysis of 10% of the data, a Cohen's Kappa score of 0.798 for inter-rater reliability was attained which is deemed to be an acceptable measure of reliability.

3. Results

1. Are the dialectal differences between an AE utterance and the SAE recast noticed by the individual learners?

The results show that the participants only correctly identified differences in just over half the recasts (average rate of 56%). Even when they did produce a SAE utterance and the researcher repeated this, they still could not accurately identify the forms as 'the same' (83% correct identification, see Table 1).

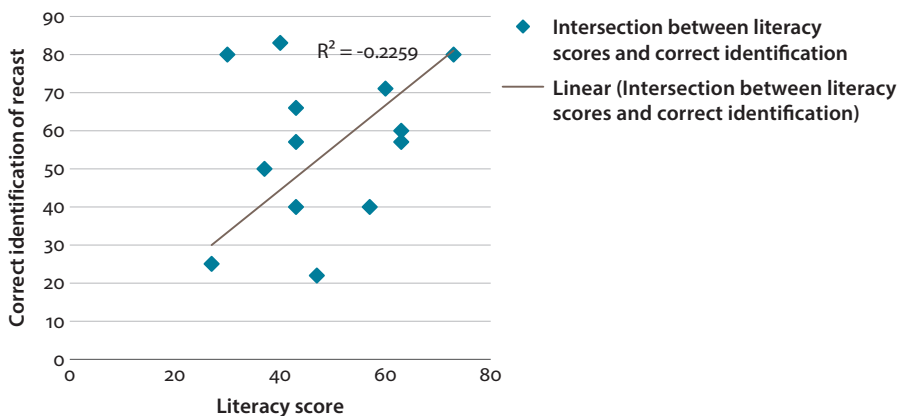


Figure 1. The correlation between literacy levels and participants' ability to notice dialect differences

Table 1. Average frequency of no changes, 1–3 changes, and 4+ changes presented in the SAE recasts and rates of correct identification

Number of changes presented in the recast	Average frequency	Correct identification of dialect difference
No changes	1.6	83%
1–3 changes	3.72	37%
4+ changes	2.69	70%

This occurred despite recasts being provided at the participants' morpho-syntactic level and hence in a way, they should have been developmentally ready to notice.

However, it must also be noted that these findings were based on a reduced sample size of 13 as during the data collection process it became apparent that the task was not understood by a number of the participants. Whilst this is difficult to concretely identify, it was made evident where a respondent only gave one type of response: This response was usually 'different', although in one case a young and low-literacy level participant said 'same' every time. For this reason, the participants who repeatedly gave only one type of response were deleted from the analysis.

Further, there was a high degree of variability amongst the participants' responses with the accuracy rate ranging from 22% to 83%. Such range draws into question whether the results were due to the participants' literacy levels or to other factors, such as the number of changes in the recast. These issues are examined next.

2. Is the ability to notice related to the literacy level of the learner?

When the level of accurate identification is compared to the literacy levels of the participants using Pearson's correlation coefficient, it appears that there is no relationship. Specifically, when the overall literacy score for each participant was plotted against their accuracy of identification of recasts, a positive, but non-significant correlation was found ($r = 0.25$ $p = 0.20$).

Further analysis does show that the accuracy of identification, that is the participants' ability to notice whether the recasts were the same or different, varies according to the number of changes to the original utterance that were presented in the recast. The average number of changes per recast over the whole sample was 2.8. Participants were most successful when no changes or when four or more were made. However, one to three changes per sentences appeared to be more difficult for the participants to 'notice' dialect differences.

Table 1 shows the occurrence rates for no changes, 1–3 changes, and 4+ changes required and the accuracy rate of correct identification for each with the reduced sample size ($n = 13$).

When the correlation between the two was examined using Pearson's correlation coefficient, a negative, minimal correlation of $r = -0.32$ ($p = 0.14$) was found.

Whilst not statistically significant, which is not surprising given the small sample size, it does suggest that the number of changes made per recast may impact upon the participants' correct identification of the recast as being 'same' or 'different'.

The inability of the participants to notice the differences may be due to the lack of "salience" (Trudgill, 1986: 11 in Siegel, 2010: 120) between the AE and SAE. For example, the minimal linguistic distance between AE and SAE and the participant's resultant inability to identify the utterance as 'different' is shown below:

- (8) Participant Trigger: Do you have any shooting star?
 Researcher Recast: Do you have a shooting star? Did I say the same thing or different?
 Participant Response: Same.

Conversely, the greater the linguistic difference and the greater the salience the more likely the participants were to correctly identify the SAE recast as being 'different'. This appeared to occur once the number of changes made in the recast rose to four or more, as shown by the increased rate of correct identification to 70%. According to Schmidt's (1990) Noticing Hypothesis (Philp, 2003: 101) learners cannot acquire language without first consciously noticing it. In the current research, the participants were not able to identify the SAE recasts when they did not notice the linguistic changes. The research provides some legitimacy to this claim as the level of noticing reported for the group (56%) is very similar to the rate of reproduction recorded for the group (59%), as will be discussed in the following section.

3. Are participants able to accurately reproduce a recast?

In the second part of the research, participants were asked to reproduce the recast that was provided to them during the interaction, following a verbal prompt asking them to do so. From a qualitative examination of the transcripts it appeared that a participant's ability to use (uptake) a recast was determined, but only in part, by their level of development. Recasts were provided according to the level of acquisition of the learner. We have done this taking into account the implications of PT that it would not be possible for learners to engage with feedback that is beyond their current stage. For instance, the participant with the lowest literacy score (4) and who was placed at stage 1 of Pienemann's (1998, 2005) Stages of Question Formation when presented with a recast at the same level was only able to correctly reproduce the recast 18% of the time and often making just one, not the multiple changes required:

- (9) Participant Trigger: I got no leg, I got one leg.
 Researcher Recast: I have one leg. You say it.
 Participant Recall: I got one leg.

Whereas, the participant who was at a much higher developmental stage (4) and who also had the highest literacy score was able to fully incorporate the supplied recast in her production:

- (10) Participant Trigger: Is anything coming out of one of them stars?
 Researcher Recast: Is there anything coming out of one of your stars?
 Participant Recall: Is there anything coming out of one of your stars?

However, as the results show, this was not always the case. Despite recasts being at participants' morpho-syntactic level, they were not always able to adopt the changes with the average uptake rate only being 59%. It should be noted that as two participants were only provided with three recasts due to the limited nature of the interaction in which they engaged, they were excluded when the average uptake rate was calculated as it was not seen as indicative. However, they were included in the sample again for the analysis of linguistic features.

This uptake rate (59%) was calculated by examining whether the participants used *any part* of the recasts that enabled them to move towards target-like SAE production. This figure is significantly below the result of 70% found in Philp's (2003) study of the role of corrective feedback in SLA with literate learners. However, it should be noted that there is a methodological difference between the current study and that of Philp (2003: 101): She considered "noticing" to be an "*accurate immediate recall of recasts in its entirety*". If this measure is applied similarly in the current study, then only 30% uptake would be deemed to be achieved.

Further analysis was also undertaken to determine the impact of the linguistic nature of the corrective feedback. Table 2 provides a summary of the data for the total cohort, whereas Appendix B provides individual data. There appears to be some correlation between the individual learners' stage of development, their literacy scores and responses to the recasts.

Table 2. The frequency of linguistic changes presented in the recast, and the participants' rate of uptake

Linguistic feature	Frequency (%)	Rate of uptake (%)
Word choice	56	60
Word morphology	11	63
Question fronting words	11	76
Articles	9	42
Pluralisation	6	45
Verb morphology	4	38
Word Order	3	56

The analysis shows that changes to word choice were by far the most frequently required category of recast (56%) (see Table 2), but they were also amongst one of the easier changes for the participants to adopt (60% reproduced). Word choice included the researcher changing and/or inserting words to turn the sentences into SAE sentences. Most commonly this included replacing ‘any’ with ‘a’ and ‘got’ with ‘have’.

- (11) Participant Trigger: Do you have any one shooting star?
 Researcher Recast: Do you have only one shooting star? Can you say it?
 Participant Recall: Do you have any one shooting star?

And,

- (12) Participant Trigger: Does a alien got a falling star?
 Researcher Recast: Does your alien have a falling star?
 Participant Recall: Does your alien have a falling star?

Next most frequently occurring were word morphology and question fronting words with a significantly lower rate of only 11%, which were both the easiest to adopt in the recalls (word morphology 63%, and question fronting words 76%). Word morphology frequently included changing ‘do’ to ‘does’ and ‘you’ to ‘your’.

- (13) Participant Trigger: Do your alien have a arm?
 Researcher Recast: Does your alien have an arm? Can you say it?
 Participant Recall: Does your alien have a arm?
 ...
 Next participant turn: Does your alien have a moon?

In this example, the participant was not only able to use ‘does’ after the recast (though not the article), but was then able to produce it in his next turn demonstrating his ‘readiness’ to acquire this SAE form.

Every time a participant asked a question without the appropriate question fronting words these were added in the recast to form the category ‘question fronting words’. Question fronting words were only added if they were appropriate to the participant’s morpho-syntactic level. This could explain the exceptionally high uptake of question fronting words (76%) when compared to the average (59%) uptake within the other categories. Another explanation could be that it is easier to remember the beginning of the sentence than the end.

- (14) Participant Trigger: You got two innit? Two shooting star?
 Researcher Recast: Do you have two shooting stars?
 Can you say what I said?
 Participant Recall: Do. You. Have. Two. Shooting. Stars?

In this example you can also see the addition of pluralisation in the recast ('stars') and its successful reproduction. Pluralisation did not occur frequently, representing 6% of the changes suggested. As would be expected in EFL populations, pluralisation (45% recalled) along with verb morphology (38% recalled) and article insertion/deletion (42% recalled) proved to be the most difficult to reproduce.

Verb morphology represented 4% of the changes suggested in the recasts, and frequently included changing 'has' to 'have', as shown in the following example:

- (15) Participant Trigger: Does alien has foot?
 Researcher Recast: Does your alien have a foot?
 Participant Recall: Does your alien have foot?

The above interaction also demonstrates an example of article insertion that was required to form a SAE sentence that in this interaction was not reproduced. This was the case with most incidences of article insertion/deletion, which is the fourth highest occurring category (9%) and amongst the most difficult for participants to reproduce (42%). An example of article deletion is:

- (16) Participant Trigger: Does a alien have a two horns?
 Researcher Recast: Does your alien have two horns?
 Participant Recall: Does your alien have a two horns?

Word order, the least frequently occurring category (3%), had an average rate of uptake (56%).

- (17) Participant Trigger: You got have how many shooting star?
 Researcher Recast: How many shooting stars do you have? Can you say what I said?
 Participant Recall: You got, what?

4. Is the ability to reproduce a recast related to the literacy level of the learner?

When the participants' success at reproducing the recast was compared to their literacy level, a significant, positive correlation was found between the participants' literacy levels and their ability to accurately do so ($r = 0.83, p < 0.0001$). These findings are in keeping with Bigelow et al. (2006) who, in answering the research question of: "Is the ability to recall a recast related to the literacy level of the learner?" found that, "the more literate group recalled, in correct or modified form, all recasts significantly more often than the less literate group ($p = .043$)" (Bigelow et al., 2006: 679). This is shown in the Figure 2 below:

Interestingly, if the participants' percent of correct reproduction is plotted against their reading ability instead of their overall literacy score, a slightly higher correlation of $r = 0.84$ is achieved, suggesting that reading ability may be the more

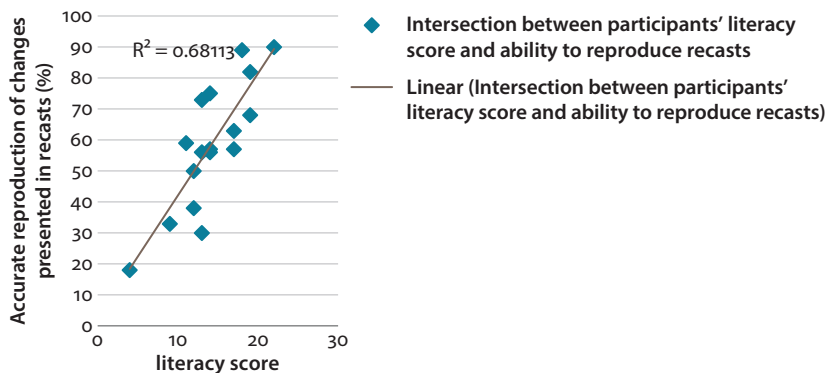


Figure 2. The correlation between the participants' literacy levels and their ability to reproduce SAE recasts

reliable predictor. It may also be that it is simply a more accurate measure of literacy, as it was the test least subject to value judgements in its determination.

The conditions for the correct reproduction of SAE sentences appear to be quite different to those for correctly identifying dialect differences or 'noticing'. Where 4+ changes in the recast make it highly salient, enabling the participants to correctly identify the utterance as 'different', 4+ changes dramatically influence the linguistic complexity of the utterance that greatly reduces the participant's ability to reproduce it. Very similar findings were also reported in Bigelow et al. (2006) where the more literate group showed greater success in recalling recasts with 2+ changes. As explained by Bigelow, Tarone and others, language learners with low literacy levels will struggle to reproduce target language recasts due to their limited ability to segment and re-arrange speech; a skill developed from reading processes (Bigelow, Tarone, & Hansen, 2006; Bigelow & Tarone, 2004; and Bigelow, Delmas, Hansen, & Tarone, 2006). This research shows that this also holds true for these Aboriginal second dialect learners.

4. Discussion and implications

The participants could correctly identify the dialectal differences between their speech and the researcher's at a rate of 56%. Further, there was not a significant correlation between the participants' literacy level and their ability to identify dialectal differences ($r = 0.25, p = 0.20$). It was actually the number of changes required per recast that seemed to determine the participants' ability to correctly identify the dialect differences ($r = -0.32, p = 0.14$). However, and similar to the research of Bigelow et al. (Bigelow, Tarone, & Hansen, 2006; Bigelow & Tarone, 2004; Bigelow,

Delmas, Hansen, & Tarone 2006), there is a correlation between participants' literacy levels and their ability to accurately reproduce SAE recasts at a significant rate of $r = 0.83, p < 0.0001$. Further, the type of linguistic feature appeared to influence the frequency of the uptake: question fronting words (76%), word morphology (63%), word choice (60%), word order (56%), pluralisation (45%), articles (42%), and verb morphology (38%). This has important implications for designing a teaching sequence for these second dialect learners.

In addition to the clear global trends that were observed amongst the group, there was clear evidence of individual differences. These differences reflected individuals' processing capacities or 'readiness' to acquire new forms when presented with corrective feedback, which aligned with the participant's stage in the PT hierarchy. Yet, at the same time, there was significant variability within each participant's responses. This reflected the nature of the interaction as well as their nonlinear development in, or the inconsistency of, their question production. For example, one participant's question, "If your picture have alien's leg?" represents neither Aboriginal English nor Standard Australian English, instead it is indicative of the individual's interlanguage that was not seen elsewhere. These findings are in keeping with Pienemann (2015) that "applying the PT hierarchy to a specific TL will not result in all grammatical features of the TL being lined up in a tight sequence like pearls on a string" (2015: 129). Overall it was observed that there were global trends for question acquisition, but that individual variation was noted as per Pienemann (2015).

Hence, the significance of this research is twofold: theoretical and pedagogical, and, the two aspects are inextricably linked. In the first instance, the role of alphabetic print literacy on oral language is an under-explored area in SLA/SDA theory and as Bigelow et al. (2006: 686) point out "the field of SLA will benefit from further study of neglected populations of L2 learners such as those with minimal alphabetic literacy levels". It highlights that learning how to read appears to be crucial to acquiring a second dialect. As Tarone et al. (2006) argue with respect to second language acquisition:

These findings [that show print literacy impacts upon SLA] increase the urgency of the need to teach alphabetic literacy skills. Lack of native language literacy does not only impede L2 *literacy*. Low literacy overall may also impede the acquisition of oral skills in an L2. This finding obviously makes instruction in alphabetic print literacy, and particularly those decoding skills linked to sound-symbol correspondence, even more important than previously thought. (2006: 117-118)

Consequently, this finding holds greater societal implications in terms of the educational outcomes for this highly disadvantaged group in Australian society. It suggests that learning how to read should be placed high on the agenda for second

language and dialect learners. These findings should, therefore, influence policy decisions at the national level, and teaching program decisions at the school and classroom level.

This research also explores whether those factors currently believed to be beneficial for SLA and SDA (i.e., input, output, interaction, feedback etc.) may have to be re-evaluated in terms of their effectiveness for low literacy populations, particularly with regard to the use of corrective feedback as a language/dialect teaching tool. Instead, in terms of dialect teaching, the results of the current research suggest that dialect differences need to be explicitly taught, including the process of becoming aware of the differences (i.e., ‘noticing’), which as shown earlier is aided by the process of learning to read. It is believed that this will be achieved by a contrastive approach to second dialect acquisition (Siegel, 2010) as it employs both dialects together instead of teaching English in isolation.

Indeed ‘noticing’ appears to present one of the greatest challenges for second dialect learners. This is also a position held by educational experts in the field of Indigenous education and second dialect acquisition (Berry & Hudson, 1997; Siegel, 2010). It is the main tenet of Berry and Hudson’s (1997) *Making the Jump* program that focusses first on achieving ‘awareness’ that a second dialect is spoken before one can ‘move-up’ the dialect acquisition ‘stairway’. Over the last 20 years a number of educational resources have been developed to promote knowledge and understanding of the dialect acquisition issues faced by Indigenous learners, for example, Edith Cowan University’s *Two-Ways* learning program, the Northern Territory Government’s commitment to bilingual education in Indigenous schools (although recently ceased), and the recent development of *Honey Ant* (2010) readers – a range of story books written in AE. These resources appear to align with the current findings as they address the apparent difficulties that SD learners encounter both in acquiring oral, but also written literacy.

However, to date, there has been no research to provide theoretical support for the contrastive or awareness approaches to dialect education. In turn, at a policy level, a less than consistent direction is provided to teachers about which SAE language-learning approach should be used with Aboriginal students. For example, Silburn, Nutton, McKenzie and Landrigan (2011) were commissioned by the Northern Territory Department of Education and Training by the Menzies School of Health Research to undertake a systematic review of the Australian and international literature to establish which English language acquisition and instructional approaches should be used for Aboriginal students with home languages other than English. They found that there were a variety of instructional approaches in use amongst the states. However,

whilst there is a considerable descriptive literature on educational approaches in the Australian Indigenous context, there are relatively few evaluative studies and only three of those reviewed dealt specifically with the issue of an oral based language and acquisition of print literacy.

(Silburn, Nutton, McKenzie, & Landrigan, 2011: vii)

Without substantial research, the SD acquisition process cannot be sufficiently understood, nor will Aboriginal educational disadvantage be addressed. Therefore, the significance of the current research is that it does suggest a relationship between print literacy and oral language development, with specific reference to second dialect acquisition. Although further research is required with more SD learners in different contexts, it does highlight the need for both the development and use of educational approaches suited to these learners.

Lastly, this research may be used to inform curriculum and teaching practice in terms of the insight it provides into the order of SAE dialect acquisition. It clearly showed that some linguistic features are more difficult to notice and/or reproduce. The study showed the rates of uptake for the various linguistic features and placed them in the following order, according to degree of difficulty: question fronting, word morphology, word choice, word order, pluralisation, verb morphology, and articles. This knowledge is useful to classroom teachers planning a SAE dialect teaching sequence to speakers of AE. As indicated in research related to the Teachability Hypothesis, teachers need to be aware of the processing constraints of the different stages of development, and understand learners' readiness to acquire different features of their additional language or dialect.

5. Conclusion

This research suggests that current SLA/SDA knowledge cannot be assumed to apply equally to all learners, particularly those with low literacy levels. It has shown that literacy levels do play a significant role in how learners utilise oral corrective feedback and, therefore, in the development of D2 oral language skills. These findings suggest that low literacy levels may preclude second dialect learners from 'noticing' the differences between their own speech and that of others. These results have important implications for the role that corrective feedback can play in promoting dialect acquisition. The pedagogical consequences of this are that learning to read is vital for second language/dialect learners and that teachers should employ a contrastive and explicit approach to teaching second dialects in order to aid noticing. Beyond this, the research also gave insight into which linguistic features were more and less readily acquired by this group. Such a finding may provide useful evidence for teaching dialect differences.

References

- Anderson, J. R. (2000). *Learning and memory: An integrated approach*. New York, NY: John Wiley.
- August, D., & Shanahan, T. (2006). *Developing literacy in second-language learners: Report of the national literacy panel on language-minority children and youth*. Mahwah, NJ: Lawrence Erlbaum Associates. <http://www.cal.org/projects/archive/nlpreports/Executive_Summary.pdf>
- Berry, R., & Hudson, J. (1997). *Making the jump: A resource book for teachers of Aboriginal students*. Kimberley Region: Catholic Education Office.
- Bialystok, E., Luk, G., & Kwan, E. (2005). Bilingualism, biliteracy, and learning to read: Interactions among languages and writing systems. *Scientific Studies of Reading* 9(1), 43–61. https://doi.org/10.1207/s15327999xssr0901_4
- Bigelow, M., & Tarone, E. (2004). The role of literacy level in second language acquisition: Doesn't who we study determine what we know? *TESOL Quarterly* 38(4), 689–700. <https://doi.org/10.2307/3588285>
- Bigelow, M., Delmas, R., Hansen, K., & Tarone, E. (2006). Literacy and the processing of oral recasts in SLA. *TESOL Quarterly* 40(4), 665–689. <https://doi.org/10.2307/40264303>
- Block, D. (2003). *The social turn in second language acquisition*. Washington, DC: Georgetown University Press.
- Bokamba, E. (1988). Code-mixing, language variation, and linguistic theory: Evidence from Bantu languages. *Lingua* 76(1), 21–62. [https://doi.org/10.1016/0024-3841\(88\)90017-4](https://doi.org/10.1016/0024-3841(88)90017-4)
- Creswell, J. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (3rd ed.). Englewood Cliffs, NJ: Pearson Prentice Hall.
- Department of Education, W.A., & Development, D.o.T.a.W. (2012). *Tracks to two-way learning*. Western Australia: Department of Education, Western Australia and Department of Training and Workforce Development.
- Eagleson, R. D., Kaldor, S., & Malcolm, I. G. (1982). *English and the Aboriginal child*. Canberra, Australia: Curriculum Development Centre.
- Ellis, R. (1994). *The study of second language acquisition*. Oxford: Oxford University Press.
- Firth, A., & Wagner, J. (1997). On discourse, communication, and (some) fundamental concepts in SLA research. *The Modern Language Journal* 81(3), 285–300. <https://doi.org/10.1111/j.1540-4781.1997.tb05480.x>
- Fraenkel, J. R., & Wallen, N. E. (2009). *How to design and evaluate research in education* (7th ed.). Boston, MA: McGraw Hill.
- Gass, S. M. (1997). *Input, interaction, and the second language learner*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Gass, S., Mackey, A., & Pica, T. (1998). The role of input and interaction in second language acquisition: Introduction to the special issue. *The Modern Language Journal* 82(3), 299–307. <<http://www.jstor.org/stable/329956>> <https://doi.org/10.1111/j.1540-4781.1998.tb01206.x>
- James, M. (2010). HONEY ANT. <<http://honeyant.com.au/about/developing-har/>>
- Kasper, G. (1997). “A” stands for acquisition: A response to Firth and Wagner. *The Modern Language Journal* 81(3), 307–312.
- Lightbown, P. M., & Spada, N. (1999). *How languages are learned*. Oxford: Oxford University Press.
- Littlewood, W. (2006). Second Language Learning. In A. Davies & C. Elder (Eds.), *The handbook of applied linguistics* (2nd ed., pp. 501–524). Oxford: Blackwell.
- Long, M. (1990). The least a second language acquisition theory needs to explain. *TESOL Quarterly* 24(4), 649–666. <<http://www.jstor.org/stable/3587113>> <https://doi.org/10.2307/3587113>

- Long, M. H. (1996). The role of the linguistic environment in second language acquisition. In W. C. Ritchie, & T. K. Bhatia (Eds.), *Handbook of second language acquisition* (pp. 413–468). New York: Academic Press.
- Long, M., Inagaki, S., & Ortega, L. (1998). The role of implicit negative feedback in SLA: Models and recasts in Japanese and Spanish. *The Modern Language Journal* 82(3), 357–371. <<http://www.jstor.org/stable/329961>> <https://doi.org/10.1111/j.1540-4781.1998.tb01213.x>
- Mackey, A. (1994). *Using communicative tasks to target grammatical structures. A handbook of tasks and instructions for their use*. Sydney: Language Acquisition Research Centre, University of Sydney.
- Mackey, A. (1999). Input, interaction, and second language development: An empirical study of question formation in ESL. *SSLA* 21(4), 557–587.
- Mackey, A., & Oliver, R. (2002). Interactional feedback and children's L2 development. *System* 30(4), 459–477. [https://doi.org/10.1016/S0346-251X\(02\)00049-0](https://doi.org/10.1016/S0346-251X(02)00049-0)
- Mackey, A., & Oliver, R. (2003). Interactional context and feedback in child ESL classrooms. *The Modern Language Journal* 87(4), 519–533. <https://doi.org/10.1111/1540-4781.00205>
- Mackey, A., & Philp, J. (1998). Conversational interaction and second language development: Recasts, responses, and red herrings? *The Modern Language Journal* 82(3), 338–356. <<http://www.jstor.org/stable/329960>> <https://doi.org/10.1111/j.1540-4781.1998.tb01211.x>
- Nelson Australia. (2003). *The PM Benchmark Kit*. Melbourne: Thomson Learning Australia.
- Oliver, R. (1998). Negotiation of meaning in child interactions. *The Modern Language Journal* 82(3), 372–386. <<http://www.jstor.org/stable/329962>> <https://doi.org/10.1111/j.1540-4781.1998.tb01215.x>
- Oliver, R., Rochecoste, J., Vanderford, S., & Grote, E. (2011). Teacher awareness and understandings about Aboriginal English in Western Australia. *Australian Review of Applied Linguistics* 34(1), 60–74. <https://doi.org/10.1075/aryl.34.1.04oli>
- Partington, G., & Galloway, A. (2007). Issues and policies in school education. In G. Leitner & I. G. Malcolm (Eds.), *The habitat of Australia's Aboriginal languages: Past, present and future* (pp. 239–265). Berlin: Mouton de Gruyter.
- Petersson, K. M., Reis, A., Askelöf, S., Castro-Caldas, A., & Ingvar, M. (2000). Language processing modulated by literacy: A network analysis of verbal repetition in literate and illiterate subjects. *Journal of cognitive neuroscience*, 12(3), 364–382.
- Philp, J. (2003). Constraints on “noticing the gap”: Nonnative speakers' noticing of recasts in NS-NNS interaction. *SSLA* 25(1), 99–126. <https://doi.org/10.1017/S0272263103000044>
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M. (Ed.) (2005). *Crosslinguistics aspects of Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30>
- Pienemann, M., & Kessler, J.-U. (2012). Processability Theory. In S. Gass & A. Mackey (Eds.), *Handbook of second language acquisition* (pp. 228–246). Abingdon: Routledge.
- Pienemann, M. (2015). An outline of Processability Theory and its relationship to other approaches to SLA. *Language Learning* 65(1), 123–151. <https://doi.org/10.1111/lang.12095>
- Ravid, D., & Tolchinsky, L. (2002). Developing linguistic literacy: A comprehensive model. *Journal of Child Language* 29(2), 417–447. <https://doi.org/10.1017/S0305000902005111>
- Reis, A., & Castro-Caldas, A. (1997). Illiteracy: A cause for biased cognitive development. *Journal of the International Neuropsychological Society* 3(5), 444–450.
- Schmidt, R. (1990). The role of consciousness in second language learning. *Applied Linguistics* 11(2), 129–158. <<http://applied.oxfordjournals.org/>> <https://doi.org/10.1093/applin/11.2.129>

- Selinker, L. (1972). Interlanguage. *IRAL-International Review of Applied Linguistics in Language Teaching*, 10(1-4), 209–232.
- Siegel, J. (2010). *Second dialect acquisition*. New York, NY: Cambridge University Press.
<https://doi.org/10.1017/CBO9780511777820>
- Silburn, S. R., Nutton, G. D., McKenzie, J. W., & Landrigan, M. (2011). *Early years English language acquisition and instructional approaches for Aboriginal students with home languages other than English: A systematic review of the Australian and international literature*. Darwin, Australia: The Centre for Child Development and Education, Menzies School of Health Research.
- Swain, M. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. Gass & C. Madden (Eds.), *Input in second language acquisition* (pp. 235–253). Rowley, MA: Newbury House.
- Swain, M. (1995). Three functions of output in second language learning. In G. Cook & B. Seidlhofer (Eds.), *Principle and practice in applied linguistics: Studies in honor of H.G. Widdowson* (pp. 125–144). Oxford: Oxford University Press.
- Swain, M. (2005). The output hypothesis: Theory and research. In E. Hinkel (Eds.), *Handbook of research in second language teaching and learning* (pp. 471–483). Mahwah, NJ: Lawrence Erlbaum Associates.
- Tarone, E. (2010). Second language acquisition by low-literate learners: An under-studied population. *Language Teaching* 43(1), 75–83. <https://doi.org/10.1017/S0261444809005734>
- Tarone, E., & Bigelow, M. (2005). Impact of literacy on oral language processing: Implications for second language acquisition research. *Annual Review of Applied Linguistics* 25, 77–97. <https://doi.org/10.1017/S0267190505000048>
- Tarone, E., Bigelow, M., & Hansen, K. (2006). The impact of alphabetic print literacy level on oral second language acquisition. *The Literacy Institute at Virginia Commonwealth University*, 99–122. <<http://www.theliteracyinstitute.org/projects/pdf/LESLLA%20Research6.pdf>>
- Trudgill, P. (1986). *Dialects in contact* (p. 95). Oxford: Blackwell.
- White, L. (1987). Against comprehensible input: The input hypothesis and the development of L2 competence. *Applied Linguistics*, 8(2), 95–110.

Appendix A. Spot-the-difference task



Appendix B. Individual analysis of linguistic changes presented in the recast, and participant rate of uptake

Participant	Literacy scores /30	Individual recasts recalled	Individual correctly %	Article insertion/deletion		Word morphology		Word choice		Pluralisation		Verb morphology		Word order		Question fronting words	
				correct total	correct total	correct total	correct total	correct total	correct total	correct total	correct total	correct total	correct total	correct total	correct total		
1	4	18%	0	1	1	9	1	1	1	1	1	1	1	1	1	1	3
3	8		1	1	1	5	14	1	1	1	1	1	1	1	1	1	3
5	9	33%	2	8	3	6	6	0	1	0	1	0	1	1	1	1	3
2	10		2	3	1	2	2	1	2	2	2	2	2	2	2	2	3
9	11	59%	1	2	11	18	1	2	2	2	2	0	1	2	2	2	3
8	12	50%	2	3	8	19	0	1	1	1	0	2	1	2	6	9	9
18	12	38%	1	2	4	11	1	1	1	1	0	2	1	1	1	2	2
12	13	30%	1	2	2	9	2	2	2	0	5	1	1	1	2	2	2
4	13	73%	1	1	1	6	7	0	3	1	1	1	1	1	1	1	1
14	13	56%	1	3	5	8	2	4	1	1	1	1	1	1	1	1	3
7	14	75%	2	5	2	3	10	12	1	1	1	1	1	3	3	3	3
10	14	57%	0	2	1	1	2	3	1	1	1	1	1	1	1	1	1
17	14	56%	0	2	2	9	16	16	0	0	1	0	1	3	4	4	4
6	17	63%	1	1	5	8	4	6	0	1	1	1	1	2	2	2	2
15	17	57%	1	4	4	6	6	6	4	2	2	2	2	5	5	5	5
13	18	89%	19	20	0	2	20	0	2	2	2	2	2	2	2	2	2
11	19	82%	10	12	1	2	12	1	2	2	2	2	2	2	2	2	2
16	19	65%	0	1	4	6	10	1	2	2	2	2	2	2	2	2	2
19	22	90%	9	10	9	10	10	10	1	2	2	2	2	2	2	2	2
Group Totals		59%	13	31	24	38	115	192	9	20	5	13	5	9	28	37	
Percent of total (340)			4%	9%	7%	11%	34%	56%	3%	6%	1%	4%	1%	3%	8%	11%	
Percent recalled/reproduced			42%	63%	60%	45%	38%	56%	45%	38%	56%	76%	8%	76%	8%	76%	

The role of grammatical development in oral assessment

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Tests today are usually based on a communicative view of language, with less focus on grammar. In this chapter, a study is presented that investigates whether there is a difference in terms of grammatical development between a group of test-takers who passed and a group who failed an oral language test. The study addresses theories of SLA and language testing, i.e., Processability Theory and the model of Communicative Language Ability, the construct of the test. Data from learners' test performances were analysed using PT in order to see whether there was a consistent relationship between the PT stage analysis and the results derived from the test. The comparison shows a clear difference between the test-takers who passed and those who failed in terms of grammatical development. This implies a correlation between grammatical development and communicative competence in general which may indicate that PT constitutes a useful basis for oral assessment.

1. Introduction

The general aim of the study outlined in this chapter is to establish what significance test-takers' test levels of grammatical development have for their overall communicative competence, in an oral language proficiency test. The aim of the study is twofold: Firstly, I investigate whether there is a difference in terms of grammatical development between test-takers who passed the test and those who failed. Secondly, I explore whether such a difference between test-takers implies a correlation between grammatical competence and communicative competence in general. I then discuss whether grammatical development stages may constitute a useful basis for an assessment tool.

Most language tests today are based on a communicative approach to language learning, such as Bachman & Palmer's (1996) model of Communicative Language Ability (CLA). As a result, more emphasis is placed on the test-taker's communicative

and interactive ability, and less on more formal aspects, such as grammatical correctness. However, some researchers claim that this trend has gone too far (Alderson, 1990; Ellis, 2008; Purpura, 2004). According to Purpura, “language testers can be criticized in many cases [...] for downplaying the role of grammatical accuracy in favour of ‘communicative effectiveness’” (2004: 37). Researchers have also pointed out that language testing is under-informed regarding research on grammatical assessment and that there is a lack of appropriate tools to assess grammatical competence (Ellis, 2008; Purpura, 2004; Rimmer, 2006). According to Rimmer, the notion of grammatical competence is “severely under-developed” (2006: 503), although models of the CLA type take grammar into account.

Purpura (2004) is critical of form-based linguistic theories limited to the levels of morphology and syntax, and rejects grammatical assessment based on a fixed developmental order. He questions the number of structures that actually develop in a natural order. Instead, he argues that testing should be based on both grammatical form and semantic–pragmatic meaning. Other SLA researchers claim that language tests should be constructed based on findings from SLA research, such as specific orders of development (Alderson, 2007). According to Ellis (2008), for example, theories of developmental stages, such as Processability Theory (PT) (Pienemann, 1998, 2005), may provide a useful measure by which to assess the language development of a learner. However, he is hesitant to propose this approach to language testers, as current trends within second language testing “emphasize what learners can *do* with language rather than what they *know*” (Ellis, 2008: 18), examples of this being Bachman and Palmer’s (1996) model of CLA mentioned above or specific tasks aimed at reproducing authentic activities (McNamara, 1996). Chapelle et al. (2010) also claim that it may be fruitful to use morphological and syntactic features to assess grammatical development. However, there are few attempts to apply such developmental stages in assessment. Two exceptions are the computer software *Direkt Profil* (Granfeldt & Ågren, 2014) and *Rapid Profile* (Keßler & Liebner, 2011), the latter based on PT.

The Teachability Hypothesis (Pienemann, 1984) preceded PT. However, it is now formalised within PT to justify its claim that learners benefit more from instruction that they are developmentally ready for. If developmental stages are useful for assessment, how could this be operationalised? Regarding learner outcome and developmental readiness it is an interesting issue when a structure is acquired, which is further investigated in Baten (this volume) and whether it is the emergence or the mastery of certain structures that determines this. As Hulstijn (2015) points out, the journey from emergence to mastery has not been fully investigated yet.

The tension between different views on language testing and on grammatical competence, and on the issue of emergence and mastery, prompts an investigation of the significance of learners’ grammatical stages of development for their results

in a communicative language test based on CLA. This chapter reports, re-analyses and discusses findings from a larger study of oral tests from a grammatical perspective (Eklund Heinonen, 2009), which had the aim to investigate the difference between test-takers who passed an oral test and those who failed, in terms of grammatical development. For the grammatical analysis, PT is applied (Pienemann, 1998, 2005). The aim here is not to discuss the notion of grammatical competence or the optimum way of assessing grammatical development. My aim is to discuss PT's relevance for communicative language testing. It is hoped that the study will contribute to bridge the gap, highlighted by Bachman and Cohen (1998), between linguistic theories of second language acquisition and testing theories.

2. Theoretical background

The present study is an attempt to apply PT to the results of a language test based on CLA, namely the Swedish national language test Tisus (Test in Swedish for University Studies), in order to investigate whether there is any correlation between the test-takers' grammatical stages of development and the assessors' perceptions of their CLA, as reflected in their test results. In the following, a brief outline of PT applied to L2 Swedish is provided, as well as of the widespread communicative approach to language testing. At the end of the section, the aim of the study and the research questions are stated.

2.1 Processability hierarchy of Swedish

Pienemann and Håkansson (1999) have suggested a PT hierarchy for the acquisition of Swedish that is based on previous findings of developmental stages in L2 Swedish, outlined below.

Stage 1: At the initial stage, the learner has access to a number of L2 words that appear in invariant forms as single constituents and memorised chunks, since the learner has not yet developed the ability to use morpho-syntactic procedures.

Stage 2: At this stage, the first procedure appears, that is, the ability to categorise the lexicon with diacritic features, e.g., number for nouns:

- (1) *bil*-_ - *bil*-ar
 car-SG car-PL
 'car' 'cars'

The word order at this stage is canonical (SVO in Swedish).

Stage 3: At this level, the phrasal procedure develops, that is, the ability to exchange grammatical information between head and modifier, e.g., plural agreement:

- (2) *en grön- bil- - flera grön-a bil-ar*
 a green-SG car-SG many green-PL car-PL
 ‘a green car’ ‘many green cars’

The learner also begins to vary the word order with adverb topicalisation. Swedish is a V2 language, which means that such a procedure requires subject-verb inversion (ADV-VSO), but since the exchange of grammatical information is limited to the phrase, the learner is unable to process inter-phrasal procedures, and structures like the following example may appear (*ADV-SVO):

- (3) **igår jag gick till skolan*
 yesterday I went to school
 ‘yesterday I went to school’

Stage 4: This stage involves exchange of grammatical information, such as number and gender, between phrases (S-procedure), allowing inter-phrasal morphology, e.g., predicative agreement:

- (4) *bil-ar-na är grön-a - hus-et är grön-t*
 car-PL-DEF are green-PL house-NEUT/DEF is green-NEUT
 ‘the cars are green’ ‘the house is green’

Since the learner has mastered unification of features over the whole clause, subject-verb inversion appears in declaratives with an adverb in initial position (ADV-VSO):

- (5) *igår gick jag till skolan*
 yesterday went I to school
 ‘yesterday I went to school’

Stage 5: The final procedure to be acquired is the subordinate clause procedure, involving the exchange of grammatical information between clauses. This level implies that the learner can distinguish between main and subordinate clauses by applying different word order rules. In main clauses, negation follows the finite verb, whereas subordinate clauses have preverbal negation (preceding the finite verb):

- (6) *...en bil som inte är grön*
 ...a car that not is green
 ‘...a car that is not green’

For this fifth stage, no morphological structure has been suggested for L2 Swedish. The hierarchy described here will form the basis for the grammatical analysis to follow.

2.2 Communicative Language Ability

The language test examined in the present study is, like many such tests today, based on a communicative approach to language deriving from Hymes' (1972) notion of *communicative competence*. This concept has been further developed by several researchers. Canale and Swain (1980) have designed a model of communicative competence for second language learners. Based on that model, Bachman (1990) has developed a model called Communicative Language Ability (CLA), which has been further elaborated by Bachman and Palmer (1996). CLA means a lot more than just managing simple everyday conversations. According to this approach, language skills require deep and profound knowledge at different levels. Language ability is divided into two main categories: *organisational competence* and *pragmatic competence*. Organisational competence is the ability to interpret and formulate utterances that are meaningful and grammatically correct, using the phonological and morphological system, syntax and lexicon of the language. Pragmatic competence involves the ability to formulate utterances that are appropriate for different communicative functions in different situations. In addition, learners need abilities of a more general, cognitive nature, *strategic competence*, in order to use their linguistic resources optimally in a given situation.

2.3 Aim of the study and research questions

The general aim of this study is to investigate learner performance on the oral sub-test of Tisus to find out whether there is any difference with respect to grammatical development between test-takers who passed and those who failed. To this end, the following research questions were formulated:

1. Do the two groups of learners reveal different developmental stages?
2. Does the test-takers' ability to process certain grammatical structures have any relevance for their overall test results?
3. Is PT applicable in oral assessment?

A pilot test conducted with eight test-takers indicated a difference in grammatical development between the test-takers who passed and the test-takers who failed (Eklund Heinonen 2005). The hypothesis is that this pattern will remain in this larger study indicating a correlation between the grammatical stages of development and the raters' perceptions of the test-takers' language ability, which motivates a discussion on whether PT may provide a tool for oral language testing.

3. Design of the study

This section describes the test and the test-takers in the present study and discusses the methodology applied.

3.1 The oral test

Data were collected from the national language test Tisus. In Sweden, most university instruction is given in Swedish, except for courses conducted in English. Consequently, prospective students are required to have a solid proficiency in Swedish in order to be admitted. Tisus consists of three subtests: written and oral proficiency and reading comprehension. This study focuses on the oral subtest, which is a conversation between an interlocutor, the test-taker and a rater on a topical theme which the test-taker has prepared in advance. The aim of the test is to elicit authentic language use in an instruction-like setting. A fixed battery of questions is used, designed to elicit communicative functions at different levels of difficulty. The test lasts about 30 minutes, and the interlocutor and the rater reach their decision immediately after the conversation using established assessment criteria. These criteria reflect a communicative approach, namely the CLA model described above, which means that the focus is first on content and communication, before formal errors are assessed. The first group of assessment criteria reflects pragmatic competence, the test-taker's ability to use communicative functions such as describe, narrate, investigate, analyse, argue and speculate, scored on a scale of 1–5 (the highest score is 5). The second group of criteria reflects organisational competence, focusing on pronunciation, vocabulary and grammar, and is likewise scored 1–5. A score of at least 3 has to be achieved on both parts for the test-taker to pass the test, which corresponds to level C1 on the Common European Framework of Reference (CEFR) scale (Council of Europe, 2001).¹

3.2 The test-takers

The data were drawn from all the test conversations recorded at a Swedish university over a period of three years. The recordings were not primarily made for research purposes, but to enable the raters, or an external rater, to re-listen to the conversations in the event of uncertainty or disagreement about the scoring. The material available comprises 148 conversations, including 33 recordings of test-takers who failed the oral test (referred to here as the F-group). Since considerably more

1. Nowadays the test has a different format.

test-takers passed the test (115, referred to as the P-group), a random sample of 33 of these was chosen to form an equally large P-group.

The sample reflects the great variety of test-takers that usually participate in the test. Both groups are thus heterogeneous, having a varied background as regards age, gender and L1. The P-group consists of twelve test-takers with different L1s, of which German is the most common (twelve test-takers) followed by English (five test-takers), Arabic (three test-takers), Bengali, Croatian, Finnish and Iranian (two test-takers of each), and single speakers of Bosnian, Dutch, French, Lithuanian and Yoruba. The F-group is even more heterogeneous, consisting of 18 different L1s, the most frequent being German and Russian (four test-takers of each), followed by English, Italian and Kurdish (three test-takers of each) and then Arabic, Iranian, Romanian (two test-takers of each) and single speakers of Finnish, French, Japanese, Korean, Latvian, Moldavian, Polish, Portuguese, Serbian and Spanish.

3.3 Methodology

The tape recordings were digitised and 15 minutes from each conversation were transcribed, providing a corpus of 16.5 hours of conversation time. A pilot study was conducted with a sample of eight test-takers (Eklund Heinonen, 2005), applying the *emergence criterion* in the analysis. According to this criterion, the first systematic use of a structure implies that the learner is able to process it, since PT assumes that one cannot produce a structure one is unable to process. However, because this criterion proved rather difficult to apply, given that one systematic use may not necessarily indicate productive use of a structure, it was combined with accuracy measures, namely 50% and 80% accuracy, in order to capture the more advanced learners. The operationalisation of the emergence criterion varies in previous research. In Glahn et al. (2001) the criterion is defined as a single use. However, more often the emergence criterion is defined as a minimum of three contexts (see Baten, this volume and Roos, this volume). Davies et al. point out that different measures are required, depending on whether the focus is SLA research or language assessment, “Second Language Acquisition being more concerned with suppliance (i.e., first occurrence of a linguistic feature), Language Testing more with mastery (i.e., consistent control over that feature)” (1999: 176). Since the present study aims to combine the two fields, it is reasonable to apply the emergence criterion alongside accuracy measures.

One disadvantage with spontaneous data is that the fact that a test-taker does not use a certain structure does not necessarily indicate that she is unable to process it. The pilot study also showed that it was difficult to find enough morphological structures indicating PT stage 4 (i.e., predicative agreement) in the data. However, regarding syntax, all test-takers produced a large number of obligatory contexts

for subject-verb inversion, which is also a stage 4 structure. At PT stage 5, other sentence adverbials with preverbal position in sub clauses, besides negation, were included in the analysis, since there were expected to be relatively few contexts for this structure (Rahkonen & Håkansson, 2008: 153). As a result, the following structures were singled out for analysis:

- Stage 1: single constituents: words and phrases
- Stage 2: word category procedure (suffixes: e.g., plural and past tense)
- Stage 3: noun phrase agreement
- Stage 4: subject-verb inversion
- Stage 5: preverbal negation (or other sentence adverbials) in sub clauses

The results of the PT analysis were compared with the test-takers' test results and their scores on the assessment criteria, in order to capture the raters' perceptions of the test-takers' CLA.

4. Results

The results will be reported as follows. First, the quantitative data from the analysis will be presented at a group level. Second, the PT stages of the test-takers will be demonstrated using implicational scales, based on the three criteria for analysis: the emergence criterion, 50% accuracy and 80% accuracy. Finally, a correlation analysis will be performed between the test-takers' PT stages and their test scores.

In Table 1 and 2 the results of the quantitative analysis are presented at the group level. It was considered most relevant to focus on the top three levels of the PT hierarchy, as none of the test-takers were at the very beginning of their L2 learning process. All of them thus had a large set of words that they combined into phrases. Table 1 provides an overview of the average number of contexts used by the two groups of test-takers, in order to permit comparisons between the groups. All such comparisons have been tested for significance using the t-test (Hatch & Lazaraton, 1991: 258), with significance levels set at $p < 0.05$.

Table 1. Average number of contexts used at PT stages 3, 4 and 5 in the two groups

Test-takers	PT stage 3 (attributive agreement)	PT stage 4 (inversion)	PT stage 5 (preverbal negation)
F-group	27.4	22.2	2.7
P-group	36.2	26.9	3.2

Table 2. Average frequency of command at PT stages 3, 4 and 5 in the two groups

Test-takers	PT stage 3, % (attributive agreement)	PT stage 4, % (inversion)	PT stage 5, % (preverbal negation)
F-group	86	32	17
P-group	94	83	56

The data presented in Table 1 indicate an interesting difference between the F-group and the P-group: The test-takers who passed the test use the structures analysed more often than those who failed.² At stage 3, the average use of a context requiring attributive agreement is 27.4 times in the F-group, compared with 36.2 times in the P-group.³ A similar difference is observed at PT stage 4: On average, the F-group use a context requiring inversion 22.2 times, the P-group 26.9 times.⁴ A difference in use is also noted at stage 5, where the F-group have an average of 2.7 contexts for preverbal negation, compared with 3.2 for the P-group. However, the difference is not as marked as at the other levels, nor is it statistically significant.⁵

Another interesting result obtained from the data is that there is also a clear difference between the two groups regarding their command of the structures analysed (see Table 2). At PT stage 3, the F-group have a frequency of command (accuracy) of 86% for structures with attributive agreement, while the figure for the P-group is 94%.⁶ There is an even greater difference between the two groups at stage 4, where the F-group have only a 32% command of inversion, while test-takers in the P-group correctly produce inverted clauses in 83% of obligatory contexts. The analysis of stage 5 also shows a significant difference between the F-group (17%) and the P-group (56%) regarding the use of preverbal negation in relative clauses.⁷

To sum up, at a group level the quantitative analysis demonstrates that the test-takers who passed the test use the structures investigated more often than those who failed and, in addition, have a more consistent command of them. Consequently, it appears that improved language ability also results in more frequent use of the structures. However, caution must be applied when interpreting these findings, since an analysis at group level cannot necessarily be extrapolated to

2. Despite the same average number of words (1333 in the F-group and 1386 in the P-group).
3. The difference is statistically significant ($p = 0.004$).
4. The difference is not quite statistically significant (but the p -value of 0.058 is very close). An explanation might be the great variation in the number of contexts between test-takers.
5. $p = 0.274$.
6. The difference is statistically significant ($p = 0.002$).
7. Both PT levels 4 and 5 show a statistically significant difference ($p = 0.000$).

all individuals. In the following analysis, the results are therefore presented in implicational scales, enabling them to be shown both at a group level and for individuals. The presentation begins with an analysis based on the emergence criterion and continues with the 50% and 80% accuracy measures. To verify the implicational hierarchy, scalability was calculated according to Hatch and Lazaraton (1991: 210ff.), who claim that a coefficient above 0.60 indicates scalability.

The results obtained using the emergence criterion are presented in Table 3. Parentheses indicate that the result is based on few (less than three) or uncertain contexts, while a slash means no contexts. As can be seen from the data, all the test-takers are able to process structures at stage 3 (attributive agreement) according to this criterion. In the F-group, three of the test-takers, F9, F11 and F22, show no sign at all of being able to process structures at stage 4 (inversion), while all the test-takers in the P-group have at least two systematic uses of inversion. Stage 5 shows a clearer difference, since 23 test-takers in the P-group have at least one occurrence of preverbal negation, while the corresponding number in the F-group is 10. Another interesting difference between the two groups is that eight test-takers in the F-group have no context at all at stage 5, compared with four in the P-group. More advanced learners thus appear to use subordinate clauses with negation more frequently than less advanced learners. Hence, a difference between the two groups can be detected in the analysis based on the emergence criterion.

Table 4 shows the results using the 50% accuracy measure. In the F-group, one of the test-takers, F9, has not yet reached stage 3 according to this criterion. All the other test-takers in the F-group are able to process structures at stage 3 (attributive agreement) and eleven of them (33%) can also process stage 4 (inversion). However, a closer look at the accuracy rate of these test-takers shows that many of them have an accuracy of just over 50%. Only F2 and F6 are clear exceptions, with 100% and 90% mastery of inversion, respectively.

The analysis also reveals that only three test-takers in the F-group, F1, F4 and F12, show a tendency to be able to process stage 5 (preverbal negation). Regarding F1, the analysis is based on one context only, indicating that caution is called for in interpreting the result. F1 also seems to deviate from the implicational pattern by not being able to process stage 4, which may be explained by the fact that the analysis of stage 4 is based on more contexts (10) and therefore more reliable than the analysis of stage 5. Thus, the results for F1 cannot be claimed to contradict the implicational acquisition order suggested by PT.

Turning now to the test-takers who passed the test, we find a different pattern emerging from the PT analysis (see Table 4). In the P-group, all the test-takers have reached stage 3 according to the 50% accuracy measure, and a majority of them, 28 of 33 (84%), have also reached stage 4. A minority of the successful test-takers have not yet mastered inversion (P5, P9, P10, P11 and P12). However, three of these, P9,

Table 3. PT stages in the two groups, based on the emergence criterion.

Scalability: F-group 1; P-group 1

PT stages	1	2	3	4	5	PT stages	1	2	3	4	5
Test-takers						Test-takers					
F9	+	+	+	-	-	P7	+	+	+	+	(-)
F11	+	+	+	-	/	P15	+	+	+	+	-
F22	+	+	+	-	/	P26	+	+	+	+	(-)
F2	+	+	+	+	(-)	P31	+	+	+	+	-
F16	+	+	+	+	(-)	P18	+	+	+	+	(-)
F21	+	+	+	+	(-)	P25	+	+	+	+	(-)
F27	+	+	+	+	(-)	P6	+	+	+	+	/
F6	+	+	+	+	-	P10	+	+	+	+	/
F8	+	+	+	+	-	P11	+	+	+	+	/
F10	+	+	+	+	-	P22	+	+	+	+	/
F17	+	+	+	+	-	P12	+	+	+	+	(+)
F20	+	+	+	+	-	P9	+	+	+	+	+
F29	+	+	+	+	-	P4	+	+	+	+	(+)
F30	+	+	+	+	-	P8	+	+	+	+	(+)
F31	+	+	+	+	-	P21	+	+	+	+	(+)
F32	+	+	+	+	-	P32	+	+	+	+	(+)
F33	+	+	+	+	-	P1	+	+	+	+	+
F14	+	+	+	+	/	P2	+	+	+	+	+
F15	+	+	+	+	/	P3	+	+	+	+	+
F23	+	+	+	+	/	P5	+	+	+	+	+
F24	+	+	+	+	/	P23	+	+	+	+	(+)
F26	+	+	+	+	/	P13	+	+	+	+	+
F28	+	+	+	+	/	P14	+	+	+	+	+
F1	+	+	+	+	(+)	P16	+	+	+	+	+
F12	+	+	+	+	(+)	P17	+	+	+	+	+
F3	+	+	+	+	+	P19	+	+	+	+	+
F4	+	+	+	+	+	P20	+	+	+	+	+
F5	+	+	+	+	+	P24	+	+	+	+	+
F7	+	+	+	+	+	P27	+	+	+	+	+
F13	+	+	+	+	+	P28	+	+	+	+	+
F18	+	+	+	+	+	P29	+	+	+	+	+
F19	+	+	+	+	+	P30	+	+	+	+	+
F25	+	+	+	+	+	P33	+	+	+	+	+

P10 and P11, have a mastery quite close to the acquisition criterion, using inverted word order in 48%, 46% and 37% of contexts requiring it. Test-takers P5 and P12 have significantly lower accuracy rates of 27% and 23%. This shows that the results depend on where the accuracy measure is set.

Table 4. PT stages in the two groups, based on 50% accuracy.
Scalability: F-group 0.933; P-group 0.89

PT stages	1	2	3	4	5	PT stages	1	2	3	4	5
Test-takers						Test-takers					
F9	+	+	-	-	-	P5	+	+	+	-	-
F5	+	+	+	-	-	P11	+	+	+	-	/
F7	+	+	+	-	-	P10	+	+	+	-	/
F8	+	+	+	-	-	P15	+	+	+	+	-
F10	+	+	+	-	-	P20	+	+	+	+	-
F13	+	+	+	-	-	P27	+	+	+	+	-
F18	+	+	+	-	-	P31	+	+	+	+	-
F19	+	+	+	-	-	P7	+	+	+	+	(-)
F20	+	+	+	-	-	P18	+	+	+	+	(-)
F29	+	+	+	-	-	P25	+	+	+	+	(-)
F30	+	+	+	-	-	P26	+	+	+	+	(-)
F31	+	+	+	-	-	P6	+	+	+	+	/
F32	+	+	+	-	-	P22	+	+	+	+	/
F33	+	+	+	-	-	P12	+	+	+	-	(+)
F16	+	+	+	-	(-)	P9	+	+	+	-	+
F11	+	+	+	-	/	P23	+	+	+	+	(+)
F14	+	+	+	-	/	P4	+	+	+	+	(+)
F15	+	+	+	-	/	P8	+	+	+	+	(+)
F22	+	+	+	-	/	P21	+	+	+	+	(+)
F23	+	+	+	-	/	P32	+	+	+	+	(+)
F24	+	+	+	-	/	P1	+	+	+	+	+
F3	+	+	+	+	-	P2	+	+	+	+	+
F6	+	+	+	+	-	P3	+	+	+	+	+
F17	+	+	+	+	-	P13	+	+	+	+	+
F25	+	+	+	+	-	P14	+	+	+	+	+
F2	+	+	+	+	(-)	P16	+	+	+	+	+
F21	+	+	+	+	(-)	P17	+	+	+	+	+
F27	+	+	+	+	(-)	P19	+	+	+	+	+
F26	+	+	+	+	/	P24	+	+	+	+	+
F28	+	+	+	+	/	P28	+	+	+	+	+
F1	+	+	+	-	(+)	P29	+	+	+	+	+
F12	+	+	+	+	(+)	P30	+	+	+	+	+
F4	+	+	+	+	+	P33	+	+	+	+	+

At PT stage 5, too, the P-group show a much greater command than the F-group, with 14 test-takers (42%) able to process structures at stage 5 and another 6 with single occurrences at that stage (see Table 4). P12 appears to deviate from the implicational pattern by using preverbal negation, but since this result is based on only

one occurrence it must be interpreted with caution. However, P9 also appears to diverge from the implicational pattern, having a mastery of stage 5 but not stage 4. In this case, the analysis of stage 4 is based on 10 occurrences out of 21 contexts (48%). One more occurrence would have meant that the test-taker was able to process this level according to the criterion. Again, we can see that the accuracy measure is somewhat arbitrary and affects the results. At stage 5 the analysis is based on considerably fewer contexts, with three occurrences out of four contexts (75%). Consequently, the deviant result may be attributed to the fact that the analysis of stage 5 is based on few contexts, and also to the specific acquisition criterion chosen. To sum up, the analysis based on the criterion of 50% accuracy shows a clear difference between the two groups, with the P-group able to process the structures at both stage 4 and 5 to a much greater extent than the F-group.

Finally, the results obtained using an accuracy measure of 80% are presented in Table 5. As can be seen from the implicational scaling, the P-group have reached significantly higher PT stages than the F-group. The data from this table reinforce the pattern shown in Table 4, indicating that the accuracy measures capture the difference between the two groups. In the F-group, four test-takers (F5, F9, F15 and F32) cannot yet process structures at stage 3 (attributive agreement) according to the criterion applied. At stage 4, only two test-takers, F2 and F6, are able to process inversion. Only one, F1, shows any sign at all of processing stage 5 (preverbal negation), but since there is only one occurrence at that stage and the test-taker in question is far from able to process stage 4, this single occurrence cannot be claimed to indicate that the test-taker is really able to process stage 5 (see discussion above). Apart from these few exceptions, the tendency is clear: The test-takers who failed are not able to process either stage 4 or stage 5.

The test-takers in the P-group have all reached stage 3 according to the 80% criterion (see Table 5). A majority (26 test-takers, 79%) are also able to process inversion and have thus reached stage 4. A number of test-takers in the P-group (eight, and another four with single occurrences of preverbal negation) have in addition reached stage 5, but the number has obviously declined compared with the analysis based on 50% accuracy (Table 4). However, this is still a significant difference compared to the F-group, in which no test-taker is clearly shown to have reached stage 5 yet. P12 and P8 appear to deviate from the implicational pattern suggested by PT, but as reported above P12 has only one occurrence at stage 5.

To sum up, the analyses performed according to all three criteria showed a difference between the test-takers who failed the Tisus test and the ones who passed it. The criteria of 50% and 80% accuracy, in particular, successfully captured the more advanced learners and demonstrated a clear difference between the two groups, which was increasingly apparent the more stringent the accuracy measure used. There appears to be a kind of watershed at PT stage 4, in that test-takers in the

Table 5. PT stages in the two groups, based on 80% accuracy.

Scalability: F-group 0.86; P-group 0.89

PT stages	1	2	3	4	5	PT stages	1	2	3	4	5
Test-takers						Test-takers					
F5	+	+	-	-	-	P5	+	+	+	-	-
F9	+	+	-	-	-	P9	+	+	+	-	-
F32	+	+	-	-	-	P25	+	+	+	-	(-)
F15	+	+	-	-	/	P10	+	+	+	-	/
F3	+	+	+	-	-	P11	+	+	+	-	/
F4	+	+	+	-	-	P1	+	+	+	+	-
F7	+	+	+	-	-	P3	+	+	+	+	-
F8	+	+	+	-	-	P14	+	+	+	+	-
F10	+	+	+	-	-	P15	+	+	+	+	-
F13	+	+	+	-	-	P19	+	+	+	+	-
F17	+	+	+	-	-	P20	+	+	+	+	-
F18	+	+	+	-	-	P27	+	+	+	+	-
F19	+	+	+	-	-	P30	+	+	+	+	-
F20	+	+	+	-	-	P31	+	+	+	+	-
F25	+	+	+	-	-	P4	+	+	+	+	(-)
F29	+	+	+	-	-	P7	+	+	+	+	(-)
F30	+	+	+	-	-	P21	+	+	+	+	(-)
F31	+	+	+	-	-	P26	+	+	+	+	(-)
F33	+	+	+	-	-	P32	+	+	+	+	(-)
F12	+	+	+	-	(-)	P6	+	+	+	+	/
F16	+	+	+	-	(-)	P22	+	+	+	+	/
F21	+	+	+	-	(-)	P12	+	+	+	-	(+)
F27	+	+	+	-	(-)	P8	+	+	+	-	(+)
F11	+	+	+	-	/	P23	+	+	+	+	(+)
F14	+	+	+	-	/	P18	+	+	+	+	(+)
F22	+	+	+	-	/	P2	+	+	+	+	+
F23	+	+	+	-	/	P13	+	+	+	+	+
F24	+	+	+	-	/	P16	+	+	+	+	+
F26	+	+	+	-	/	P17	+	+	+	+	+
F28	+	+	+	-	/	P24	+	+	+	+	+
F2	+	+	+	+	(-)	P28	+	+	+	+	+
F6	+	+	+	+	-	P29	+	+	+	+	+
F1	+	+	+	-	(+)	P33	+	+	+	+	+

P-group are largely able to process inversion in main clauses, while those in the F-group (with two exceptions) are not. Stage 5 also shows a difference between the two groups, but since quite a large number of test-takers use few or no structures with preverbal negation in sub clauses, caution must be applied when interpreting the results for this stage.

Another result of the study is that it confirms the implicational order suggested by PT. In both groups and according to all three criteria, the scalability coefficient exceeds 0.60 (see Table 3, 4 and 5), verifying the implicational hierarchy between the structures analysed. The present study thus supports the PT hierarchy of L2 Swedish proposed by Pienemann and Håkansson (1999).

The results above suggest a link between the test-takers' PT stages and their test results. To further explore this question, a correlation analysis was performed.⁸ Since the PT hierarchy consists of 5 stages and the Tisus test is scored on a scale of 1–5, it is possible to correlate these numbers in order to establish whether a high PT level implies a high score on the Tisus test. Table 6 shows the results of the correlation analysis between the test-takers' PT stages according to the 80% accuracy measure and their results on the different assessment criteria, as well as their overall test results.

Table 6. Correlation analysis between the test-takers' PT stages and test scores

Correlated scores	Correlation coefficient
PT stage – pragmatic competence	0.583
PT stage – organisational competence	0.705
PT stage – grammar	0.682
PT stage – total score	0.692

The correlation analysis shows quite a strong correlation between PT stages and scores for the different assessment criteria. The first part of the assessment reflects the pragmatic competence element of CLA. As can be seen in Table 6, the correlation coefficient is quite high, 0.583,⁹ when PT stages are correlated with the test results for pragmatic competence. The second group of assessment criteria covers pronunciation, vocabulary and grammar, reflecting organisational competence. When PT stages are correlated to the results for organisational competence, an even stronger correlation, 0.705, is found. Separating out grammar produces an equally positive correlation of 0.682. It seems reasonable that organisational competence should show a higher correlation than pragmatic competence, given that the grammatical development is related to organisational competence. Although the results of the correlation analysis must be interpreted with caution, they do indicate a positive correlation between the test-takers' PT stages and the raters' perceptions of their CLA, expressed by their scoring.

8. In the analysis, the Spearman's rank order correlation coefficient was applied (Butler, 1985: 145).

9. In a sample of 66 individuals, the correlation coefficient has to be at least 0.214 in order to be statistically significant ($p = 0.05$) (Butler, 1985: 181).

5. Discussion of the results

The aim of the present study was to investigate the significance of grammatical development for the overall performance of test-takers in an oral language test. PT (Pienemann, 1998, 2005) was applied and the analysis was based on three criteria: the emergence criterion, 50% accuracy and 80% accuracy.

The first research question was whether grammatical development differed between the F-group and the P-group in terms of different developmental stages. The results of the analysis show a clear difference in grammatical development between the two groups. According to all three criteria, a majority of the test-takers who passed the test have reached higher developmental stages than the ones who failed. The accuracy measures especially showed a significant difference that suggests a kind of watershed at PT stage 4. Only two test-takers in the F-group are able to process inversion in 80% of the cases, whereas a vast majority in the P-group have a command of this structure. Stage 4 appears to be a serious challenge to learners, since most test-takers who passed the test are found at this stage, or higher, whereas those who failed have not yet reached stage 4, but are to a large extent at stage 3. A mastery of inversion thus appears to be a sign of advanced language learning, implying that learners who can manage inversion after a topicalised non-subject in spontaneous speech are also considered to have an overall communicative language ability that allows them to pass the Tisus test. There thus seems to be a correlation between the test-takers' grammatical development and their communicative language ability in general, since this is what the test aims to assess. The procedures involved must be strongly automatised if the test-taker is able to process them with an accuracy rate of 80% in a stressful conversational setting such as an oral test. One can assume that these procedures have been automatised in interactive language use in which the learner has had many opportunities to acquire a communicative language ability. The results corroborate Håkansson and Norrby's (2005) finding that there is a correlation between learners' ability to process morphological and syntactic structures and their pragmatic competence.

The second question in this study was whether the test-takers' ability to process certain grammatical structures had any relevance to their overall test results. An initial observation drawn from the data is that the P-group use all three analysed structures more frequently than the F-group (see Table 1). Another interesting observation is that there is also a clear difference between the two groups regarding their mastery of the structures analysed. The patterns that can be observed from the implicational scales are reflected in the average relative frequency of command at a group level (see Table 2). At PT level 3, both groups meet the criterion of 80% accuracy, although the accuracy rate is slightly higher in the P-group, at 94%,

compared to 86% in the F-group. However, it can be concluded that both groups are largely able to process stage 3. The most striking difference can be observed at PT stage 4, where the average accuracy rate is 83% in the P-group, but only 32% in the F-group. This further supports the conclusion that stage 4 is the crucial threshold that test-takers have to master in order to pass the oral test. The results also show a difference at stage 5, with 56% accuracy in the P-group, but only 17% in the F-group. Bolander (1988) has found that high-proficiency learners use negated subordinate clauses more frequently than low-proficiency learners of Swedish L2, at the same time as they apply the preverbal placement rule more often. Her explanation for this is that negated sub-clauses are more complex than non-negated ones. In addition, Rahkonen and Håkansson (2008) have shown that contexts at stage 5, such as negated sub-clauses, are less frequently used by learners than contexts at stages 4 and 3. These findings are corroborated by the present study, in which the test-takers likewise produce fewer negated sub-clauses than inverted main clauses. While this is to be expected, it could also be a methodological problem in this type of investigation of spontaneous oral production, where conversations have not been designed to elicit certain structures. The results regarding stage 5 therefore need to be interpreted with caution.

Another reservation is that, despite the evident differences between the test-takers who failed and the ones who passed, one cannot disregard the fact that there are exceptions to the general pattern. In the F-group, there are only two test-takers with a deviating pattern according to the 80% accuracy measure, i.e., they failed the test despite a mastery of structures at stage 4. It could be concluded that if a test-taker can manage inversion, she is likely to pass the test. However, the reverse is not as clear, since seven test-takers passed the test without being able to process inversion. Interestingly, all of these seven, except P25, took the test on the same test occasion. Had this occasion not been included in the study, the pattern would have been even clearer. In addition, test-taker P25 cannot be claimed to be a notable exception, since she uses inversion in 11 out of 15 obligatory contexts, 73%, which is close to the criterion of 80% accuracy. One more occurrence would have meant that she had reached stage 4. This shows that the accuracy measure is arbitrary, which affects the validity of the measure (cf. Baten, this volume). Still, it is interesting to investigate what may have contributed to the test results of these test-takers. A follow-up study (in Eklund Heinonen, 2009) did not contradict the assumption that there is a correlation between a high PT stage and passing Tisus. On the contrary, it showed that the exceptions were simply exceptions or, in certain instances, borderline cases.

6. Conclusion

The findings reported above indicate that the structures analysed could be seen as indications of language development, which leads us to the third question: Can PT be applied in oral assessment? The results support the idea that a test based on developmental stages such as the PT hierarchy could serve as tool for assessment (cf. Ellis, 2008). However, there are some practical challenges to address. One difficulty in applying PT in a performance test aimed at eliciting authentic language, like the one in the present study, is that there is no guarantee that the test-taker will use the targeted structures. In this study, many test-takers did not use any structures at stage 5. This indicates that the oral interview would have to be combined with some kind of communicative task designed to elicit the structures in question. Another difficulty is the variability of learner language. As Purpura (2004: 37) suggests, it is not clear how accuracy measures of grammatical development should be applied in tests. Another problem with accuracy measures is their arbitrariness regarding the measure, as Baten (this volume) points out. Where should the cut-off point be set? In the present study, most test-takers used both target- and non-target-like versions of the structures analysed. One attempt to implement the PT hierarchy in oral testing is the computer-based Rapid Profile test (Keßler & Liebner, 2011; Pienemann, 1998). According to Keßler (2007), Rapid Profile offers a simple and easily implemented alternative to other methods of language testing based on CLA or the CEFR scale (Council of Europe, 2001). In Rapid Profile, the variability problem is resolved by the fact that the test is based on the emergence criterion. However, the results of the study reported here, indicate that what clearly distinguishes the test-takers who passed from those who failed is not the emergence of the structures of interest, but mastery of them, which is far more difficult and time-consuming to capture. This implies that even if the grammatical stages suggested by PT may constitute a useful basis for analysis in oral assessment, the question whether they are practically applicable in this type of a communicative language test, with more advanced test-takers, remains unresolved. The Teachability Hypothesis and PT have so far focused on the emergence criterion rather than the mastery criterion regarding developmental readiness. This calls for further research on how to promote learners' journeys from emergence to mastery and how to practically apply mastery criteria on language testing.

References

- Alderson, J. C. (1990). Language testing in the 1990s: How far have we gone? How much further have we to go? In S. Anvian (Ed.), *Current developments in language testing* (pp. 1–26). Singapore: SEAMEO Regional Language Centre.
- Alderson J. C. (2007). The challenge of (diagnostic) testing: Do we know what we are measuring? In J. Fox, M. Wesche, D. Bayliss, L. Cheng, C. E. Turner & C. Doe (Eds.), *What are we measuring? Language testing reconsidered* (pp. 21–39). Ottawa: University of Ottawa Press.
- Bachman, L. F. (1990). *Fundamental considerations in language testing*. Oxford: Oxford University Press.
- Bachman, L. F., & Palmer, A. S. (1996). *Language testing in practice*. Oxford: Oxford University Press.
- Bachman, L. F., & Cohen, A. D. (1998). Language testing – SLA interfaces: An update. In L. F. Bachman & A. D. Cohen (Eds.), *Interfaces between second language acquisition and language testing research* (pp. 1–31). Cambridge: Cambridge University Press.
- Bolander, M. (1988). Is there any order? On word order in Swedish learner language. *Journal of Multilingual and Multicultural Development* 9(1-2), 97–113.
<https://doi.org/10.1080/01434632.1988.9994322>
- Butler, C. (1985). *Statistics in linguistics*. Oxford: Blackwell.
- Canale, M., & Swain, M. (1980). Theoretical bases of communicative approaches to second language teaching and testing. *Applied Linguistics* 1(1), 1–47. <https://doi.org/10.1093/applin/1.1.1>
- Chapelle, C. A., Chung, Y.-R., Hegelheimer, V., Pendar, N. & Xu, J. (2010). Towards a computer-delivered test of productive grammatical ability. *Language Testing* 27(4), 443–469.
<https://doi.org/10.1177/0265532210367633>
- Council of Europe. (2001). *Common European Framework of Reference for Languages: Learning, teaching, assessment*. Cambridge: Cambridge University Press.
- Davies L., Brown, A., Elder, C., Hill, K., Lumley, T., & McNamara T. (1999). *Dictionary of language testing*. Cambridge: Cambridge University Press and UCLES.
- Eklund Heinonen, M. (2005). Godkänd eller underkänd? Hur processbarhetsteorin kan tillämpas vid muntliga språkstester av andraspråksinlärare [Pass or fail? Processability theory applied in oral tests of second language learners] (FUMS Report 215). Uppsala: Uppsala University.
- Eklund Heinonen, M. (2009). *Processbarhet på prov. Bedömning av muntlig språkfärdighet hos vuxna andraspråksinlärare* [Processability in tests. Assessment of oral proficiency in adult second language learners]. Uppsala: Department of Scandinavian Languages, Uppsala University.
- Ellis, R. (2008). Investigating grammatical difficulty in second language learning: Implications for second language acquisition research and language testing. *International Journal of Applied Linguistics* 18(1), 4–22. <https://doi.org/10.1111/j.1473-4192.2008.00184.x>
- Glahn, E., Håkansson, G., Hammarberg, B., Holmen, A., Hvenekilde, A., & Lund, K. (2001). Processability in Scandinavian second language acquisition. *Studies in Second Language Acquisition* 23(3), 389–416. <https://doi.org/10.1017/S0272263101003047>
- Granfeldt, J., & Ågren, M. (2014). SLA developmental stages and teachers' assessment of written French: Exploring Direkt Profil as a diagnostic assessment tool. *Language Testing* 31(3), 285–305. <https://doi.org/10.1177/0265532214526178>

- Hatch, E., & Lazaraton, A. (1991). *The research manual: Design and statistics for applied linguistics*. New York, NY: Newbury House.
- Hulstijn, J. H. (2015). Discussion: How different can perspectives on L2 development be? *Language Learning* 65(1), 210–232. <https://doi.org/10.1111/lang.12096>
- Hymes, D. H. (1972). On communicative competence. In J. B. Pride & J. Holmes (Eds.), *Sociolinguistics* (pp. 269–293). Harmondsworth: Penguin Books.
- Håkansson, G., & Norrby, C. (2005). Grammar and pragmatics. In S. Foster-Cohen, M. García-Mayo & J. Cenoz (Eds.), *Eurosla Yearbook* 5 (pp. 137–161). Amsterdam: Benjamins.
- Keßler, J.-U. (2007). Assessing EFL-development online: A feasibility study of Rapid profile. In F. Mansouri (Ed.), *Second language acquisition research. Theory-construction and testing* (pp. 119–143). Newcastle upon Tyne: Cambridge Scholars.
- Keßler, J.-U., & Liebner, M. (2011). Diagnostic L2 development. Rapid Profile. In M. Pienemann & J.-U. Keßler (Eds.), *Studying Processability Theory* (pp. 132–148). Amsterdam: John Benjamins. <https://doi.org/10.1075/palart.1.11dia>
- Levelt, W. J. M. (1989). *Speaking: From intention to articulation*. Cambridge, MA: The MIT Press.
- McNamara, T. (1990). Item response theory and the validation of an ESP test for health professionals. *Language Testing* 7(1), 52–75. <https://doi.org/10.1177/026553229000700105>
- McNamara, T. (1996). *Measuring second language performance*. London: Longman.
- Pienemann, M. (1984). Psychological constraints on the teachability of languages. *Studies in Second Language Acquisition* 6(2), 186–214. <https://doi.org/10.1017/S0272263100005015>
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M., & Håkansson, G. (1999). A unified approach towards the development of Swedish as L2: A processability account. *Studies in Second Language Acquisition* 21(3), 383–420. <https://doi.org/10.1017/S0272263199003022>
- Pienemann, M. (2005). *Cross-linguistic aspects of Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30>
- Purpura, J. E. (2004). *Assessing grammar*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511733086>
- Rahkonen, M., & Håkansson, G. (2008). Production of written L2-Swedish – Processability or input frequencies? In J.-U. Keßler (Ed.), *Processability approaches to second language development* (pp. 135–161). Newcastle upon Tyne: Cambridge Scholars.
- Rimmer, W. (2006). Measuring grammatical complexity: The Gordian knot. *Language Testing* 23(4), 497–519. <https://doi.org/10.1191/0265532206lt3390a>

How does PT's view of acquisition relate to the challenge of widening perspectives on SLA?

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As the various chapters in this book have exemplified, even though acquisition is a key construct in SLA, it is understood in multiple ways, even when it is being used within a single theoretical framework. Our aim in this chapter is to relate different definitions and operationalisations of 'acquisition' to one another as part of forming a wider view of (second) language acquisition processes that will allow different theoretical positions to be consistently related to one another.

Core considerations addressed in this chapter are (1) the relationships between (a) emergence and mastery as well as (b) accuracy and variation, (2) how to understand acquisition in the context of multi-faceted features (e.g., the passive in English or case in Russian), (3) whether we can speak of acquisition in contexts other than production (e.g., in comprehension) and (4) how we can relate the idea of acquisition in PT to measures of additional language development that are used in e.g., teaching or proficiency assessment. In one way these considerations are not new, but since there are multiple perspectives (in the book and elsewhere) on each of these issues, it seems important to consider whether they can be coherently connected with one another.

PT and emergence

As discussed in the introduction and in some of the chapters of this book, there are various versions of what it means to 'acquire' an aspect of language. This meaning may also vary depending on whether what is being acquired is a single feature or a structure (resulting from the combination of features) or a more abstract capacity to combine different features. The dominant thread in the definition of acquisition for each of the three aspects that relate to PT is the connection between emergence and acquisition. As illustrated in the chapters by Kawaguchi and Yamaguchi and

by Roos (see also Nicholas, 1984; Pienemann, 1998; Pienemann, 2005), emergence is associated with the point in time of an individual learner's acquisition of the in-principle capacity to produce a particular feature. As the chapters by Artoni, Zhang and Baten show, emergence in production is operationalised in slightly different ways according to the number of instances that are required to be identified and the number of contexts that need to be present in the learner data before emergence can be considered to have occurred. For example, Zhang does not make explicit the emergence criterion that she used. In order to define the point of emergence, Magnani uses a single occurrence whereas Li and Iwashita use two occurrences and Heinonen uses three. Not only is the operationalisation of emergence an issue of the number of contexts that is considered, but also an issue of which features are being explored. As we indicated in the introduction, operationalising emergence is a complex issue that needs explicit consideration in order to develop a coherent solution.

Regardless of the specific criterion used to operationalise emergence, attending to emergence as the point of acquisition of capacities has the advantage of enabling researchers to describe variation between learners in their control of various features that can be shown to be (in principle) available to the learner (see Meisel et al., 1981; Pienemann, 1989). However, because of the punctual nature of emergence, this construct has relatively little to say about the other end of the process of gaining control, which is normally associated with the approach to *mastery* of a particular feature (see however the discussion in Zhang; Baten; Heinonen; Li & Iwashita; Roos for exploration of some of the issues involved in attempting to relate these two different ends of the acquisition spectrum).

The complexities of relating 'emergence' to the other end of the acquisition spectrum underline that the emergence view of acquisition enables us to identify the different points in time at which features emerge in the learner's L2 system. This can result in the identification of the sequence of emergence of different features. However, the emergence criterion has little to offer as a means of capturing the durative dimension of changes in a learner's control over a feature once that feature has emerged. We will return to the issue of 'control' and how it is to be understood later.

The emergence approach to acquisition is also fundamentally and inherently connected with the use by an individual of a particular feature. As a result, it presents particular challenges for researchers working with groups of learners, as is often the case in instructional contexts. The notion of the distributional analysis of features across the different contexts in which they may be used means that it is not possible to determine an 'average' level of acquisition for a group of learners if the emergence criterion is used. Profiles of acquisition can be compared, but averages cannot be calculated. As a result, a favourite tool for measuring progress in learning, the calculation of average levels of performance, is rendered inoperable if

the emergence criterion is used. It is possible to compare changes in distributions of use of features in various contexts, but it is not possible to represent this process via a single number (whole or percentage). As a result, the use of the emergence criterion makes it complicated to calculate the effect for more than one individual at a time (on acquisition) of an instructional intervention. While it is possible to perform calculations of the relative use of one or more 'target-like' feature-context combinations, this is only ever a partial picture of what the learner is doing and has the cost of neither being able to describe the non-'target-like' forms nor being able to explain 'how' the learner's interlanguage system has produced this outcome.

As is discussed in the chapters by e.g., Baten, Eklund Heinonen, Hjelde et al., Li and Iwashita, and by Roos, questions have been asked about the relationship between times of emergence of particular features and times (possibly sequences) of mastery. Sometimes these questions have also been asked in the intriguingly reversed situation of language attrition (see the chapter by Hjelde et al.), but unless the criterion of the analysis of the individual learner's pattern of distribution of a feature is consistently implemented, these approaches run the risk of comparing apples with oranges.

PT and the data underpinning the emergence criterion

The emergence criterion was formulated and operationalised for (1) oral language and (2) production. It rests on the assumption that what learners do (relatively) spontaneously when speaking in a (relatively) unplanned manner reflects (relatively) directly the learner's cognitive representations of the language and the procedures to combine and produce features available to that learner at a particular time. A corollary of this approach is that features found in (the much more planned and reflective context of) writing might not be subject to the same regularities – because the learners potentially have access to many more resources (e.g., dictionaries and advisors or explanations of grammar 'rules' in textbooks) than just their own representations of the language and their spontaneous production procedures. However, that does not mean that PT approaches are excluded from discussions involving L2 writing. One perspective on the relationship between speaking on the one hand and reading/writing on the other appears in the chapter by Steele and Oliver. Their engagement with how learners' varied levels of literacy interact with their processing of linguistic cues in speech raises new issues related to how to recognise acquisition and control and the assumptions that may need to be made about the mechanisms underpinning variation in learner language.

Similarly, new issues emerge when data from L2 comprehension (see the chapters in Section 1) are considered. The chapter by Lenzing suggests that comprehension is governed by two sets of mechanisms, namely those related to the

use of world knowledge and semantics and those related to the processing of features of morpho-syntax. The set of mechanisms based in world knowledge and semantics precedes and perhaps renders unnecessary any attention to the set of morpho-syntactic features, which means that overall the development of what learners comprehend is not necessarily a mirror image of what they can produce. However, Lenzen assumes that as far as syntactic processing is concerned, the same processing procedures are involved in the comprehension and the production process. In possible contrast to this position, the chapters by both Spinner & Jung and Buyl suggest that linguistic features do not (necessarily) emerge at the same point in time in comprehension and in production or, indeed, that there may be no commonality between the emergence of the grammatical contribution to L2 comprehension on the one hand and L2 production on the other.

The data underpinning the emergence criterion have historically been restricted to the processes underlying the generation of specific morpho-syntactic features. The dominant features studied in the PT framework have been ones that operate in relative isolation (e.g., subject-verb agreement in languages such as German or English). When studying multi-faceted structures such as case, passive or relative clauses that consist of combinations of different features in many different contexts with complex interactions with both semantics and pragmatics (see the chapters by Artoni, Magnani, Lenzen, Nottbeck, or by Kawaguchi & Yamaguchi), the question of 'what' is the target of acquisition is raised anew. Further, over time, the conceptualisation of processes associated with L2 morpho-syntactic capacities has also changed. The use of Lexical-Functional Grammar as grammatical formalism in PT means that some comparisons between earlier and later work need to be done very carefully since ways of understanding what underpins the acquisition process have changed. We also need to ask whether the acquisition of a multi-faceted feature such as the passive in English can be treated as separate from the acquisition of the features that are combined in it (e.g., non-linear mapping between arguments and grammatical functions and morpho-syntactic processing). Do multi-faceted features such as relative clauses (see the chapters by Nottbeck and by Kawaguchi & Yamaguchi) bring with them a requirement for a different kind of durative perspective that is more than a list of the times of emergence of specific features? Similarly multi-faceted but different are both discourse-related features (see the three chapters by Zhang, Artoni and Magnani) and the related morphological features (see the chapters by Artoni and Magnani) or wider aspects of the communicative repertoire (see the chapter by Nicholas & Starks). These aspects combine to raise the question of how to trace a learner's interlanguage development over time and in consequence how to refer to the process as a whole if the notion of acquisition is restricted to the punctual aspects of the emergence of specific features.

Emergence and mastery

The fourth section of this book draws particular attention to the tensions between emergence and mastery, but also to the tensions between dealing with individuals and dealing with groups (classes) of learners. Since one of the purposes of educational interventions is to enable learners to function effectively in worlds outside classrooms, control over the features taught in the classroom is a valued outcome. One of the questions that emerges while contemplating this issue is whether 'control' is the same as mastery. Regardless of which term we use, the fundamental perspective is on the individual learner. This understanding is challenged when studies seek to make use of group or average data.

Fundamental to PT is a focus on the individual learner, whether singly or in relation to other individuals. The assumptions and methods underpinning this approach rule out the use of average data to make claims about emergence. Group data could potentially be used to describe relative control of features once they have emerged, but not the emergence of those features.

As has been observed,

PT does not make claims with respect to relative mastery of related structures after their emergence, thus remaining silent on the long developmental journey after emergence and on possible differences in the duration of that journey between different processing stages. (Hulstijn, 2015: 225)

The open question that therefore remains is: How can the process that begins after emergence be described and formalised in PT? Data such as have been discussed in Section 3 in the work of Zhang, Kawaguchi and Yamaguchi, or Nicholas and Starks are consistent with the broad understanding of multiple pathways for learners. Each study demonstrates in different ways (or in relation to different language features) that there is no single path from zero to full mastery. This means that, while it might be argued that some notion of accuracy might be able to be defined that could constitute 'mastery', even the notion of relative mastery cannot capture the process of moving beyond emergence. We suggest, therefore, that a more useful label to cover the process beyond emergence is 'gaining control'. In suggesting this term, we acknowledge the well-established variation between learners. 'Gaining control' is proposed as a term that can be used to refer to individuals' PROCESSES of moving along trajectories of development. There is no fixed a priori view of what might constitute control. Different learners could establish control in various ways. Some might seek to 'gain control' over their L2 (use) by limiting the array of language forms that they use to those formulae that are part of their regular daily routines. For others, the process of 'gaining control' might occur via experimentation in which they actively engage in different ways of producing the additional

language. In each (and all the other) case(s), the idea of ‘gaining control’ refers to how the individual learner traverses their individual trajectory. Both the overall process of gaining control of each learner and the overall outcome will be different. Although it is possible to predict in which sequence particular features will emerge, the relationships between the emergence and subsequent use of different features will be individual.

Emergence is embedded in other processes

As the previous discussion has suggested and the data in the chapter by Kawaguchi and Yamaguchi have documented, despite being punctual, emergence is not instantaneous. It is preceded by experiences and analyses that create the capacity to produce a feature. Exactly how these prior experiences relate to emergence is unclear. And exactly what occurs between features that are part of multi-faceted structures is also open to debate, as revealed in the chapters by Magnani, Artoni as well as those by Nottbeck and by Kawaguchi and Yamaguchi.

So as already indicated in Pienemann (1984) there are steps that *precede a transition* from one stage to the next but there are also *steps within stages* that seem to have a regularity for particular features, as suggested in the chapter by Nottbeck, as well as in the chapters by Artoni and Magnani. And the complexity of what occurs is increased when issues of feedback (see the chapter by Li & Iwashita), the larger issue of the communicative repertoire (see the chapter by Nicholas & Starks) and issues of instructional intervention (see the chapters in Section 4) are incorporated in a view of what needs to be acquired.

What does acquisition look like for variational features?

As indicated in the introduction and in the chapter by Nicholas and Starks, a major change between the Multidimensional Model and the subsequent PT is the relationship between developmental and variational features. Both the Multidimensional Model and PT have this relationship as a key principle. However, the relationship between these two aspects in the Multidimensional Model is descriptive and focusses on the difference between the dimensions. In contrast, PT seeks to make use of Hypothesis Space to elaborate a theoretically-motivated framework predicting patterns in both the developmental and the variational dimension. The key question for both views is how the mechanisms that underpin changes along the developmental dimension relate to whatever is involved in creating the conditions for the

emergence and subsequent process of gaining control of a (cluster of) variational feature(s) (see the chapters by Zhang and Nicholas & Starks). While it is possible to formulate some initial speculations (or lines of enquiry) about what might create conditions for noticing developmental features (see the chapter by Lenzing and her descriptions of the transition from semantic/world knowledge processing to morpho-syntactic processing), the very idea of variational features challenges the assumption of predictable relationships between features. One path is to explore the underpinnings of Hypothesis Space in much greater detail, both within the scope of features identifiable via Lexical-Functional Grammar and within larger frames such as are entailed by either those PT-internal discussions about Focus (see Bettoni & Di Biase, 2015) or alternative frameworks such as Multiplicity (Nicholas & Starks, 2014). But this question will require researchers working in the PT tradition to engage much more explicitly with the idea of Hypothesis Space, the extent of the features that should be incorporated within it and ways of framing relationships between those features. An additional issue is how researchers working in close relationship with PT might elaborate a more formalised view of the relationships between the individual learner and others (whether teachers or peers inside or outside classrooms) who might contribute to the learning experiences of the individual. If PT is to widen its scope and to build stronger connections with other theoretical frames so that theoretical arguments are more clearly focussed, then some of this work will need to be done.

Where to now?

As a result of how the field has been developed and labelled, 'acquisition' will continue to be used as a general term for the totality of the learning process. Under these circumstances, other terms are needed for specific aspects of the overall process. We have suggested that there is a clear need for a view of the punctual aspect of acquisition that is the emergence of particular capacities. There is then a need for a general label for processes beyond emergence. This label must acknowledge two key issues, that, first, what is being explored is a PROCESS and that, second, it is an individualised process. We have suggested that the term 'gaining control' might be a useful candidate for this label and suggested the conditions that would need to characterise its meaning. We have pointed to problems with the idea of 'mastery' and suggested that it is more important to pay attention to the processes beyond emergence than to attempt to define some (potentially arbitrary and already highly disputed) end point of such a process. This means that work within PT must focus much more attention on the issues of

- what happens after emergence
- what happens alongside emergence
- what happens in ‘changes’ within variational features
- how we capture the relationships between individual features and the multi-facetted structures of which they are part
- what the roles are of significant ‘others’ in shaping the processes of emergence and gaining control (in various contexts)

The contributions in this book have shown that it is possible for researchers working in other traditions to ‘reach into’ the space paradigmatically the concern of PT (e.g., the developmental sequences of morpho-syntax, but also variation within and between learners) and for researchers working within PT to reach out into other theoretical areas. When this is done with an explicit acknowledgement of the theoretical requirements of each tradition, interesting exchanges have and can continue to occur.

References

- Bettoni, C., & Di Biase, B. (2015). Processability Theory: Theoretical bases and universal schedules. In C. Bettoni & B. Di Biase (Eds.), *Grammatical development in second languages: Exploring the boundaries of Processability Theory* (pp. 19–79). Paris: The European Second Language Acquisition Association.
- Hulstijn, J. H. (2015). Discussion: How different can perspectives on L2 development be? *Language Learning* 65(1), 210–232. <https://doi.org/10.1111/lang.12096>
- Meisel, J., Clahsen, H., & Pienemann, M. (1981). On determining developmental stages in natural second language acquisition. *Studies in Second Language Acquisition* 3(2), 109–135. <https://doi.org/10.1017/S0272263100004137>
- Nicholas, H. (1984). ‘To be’ or not ‘to be’, is that really the question? Developmental sequences and the role of the copula in the acquisition of German as a second language. In R. Andersen (Ed.), *Second languages: A cross-linguistic perspective* (pp. 299–317). Rowley, MA: Newbury House.
- Nicholas, H., & Starks, D. (2014). *Language education and applied linguistics: Bridging the two fields*. London: Routledge. <https://doi.org/10.4324/9781315818030>
- Pienemann, M. (1984). Psychological constraints on the teachability of language. *Studies in Second Language Acquisition* 6(2), 186–214. <https://doi.org/10.1017/S0272263100005015>
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.15>
- Pienemann, M. (1989). Is language teachable? Psycholinguistic experiments and hypotheses. *Applied Linguistics* 10(1), 52–79. <https://doi.org/10.1093/applin/10.1.52>
- Pienemann, M. (Ed.). (2005). *Cross-linguistic aspects of Processability Theory*. Amsterdam: John Benjamins. <https://doi.org/10.1075/sibil.30>

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This book explores relationships between Processability Theory approaches and other approaches to SLA. It is distinctive in two ways. It offers PT-insiders a way to see connections between their familiar traditions and theories with other ways of working. Parallel to this it offers readers who work in other traditions ways of connecting with a research tradition that makes specific testable claims about second language acquisition processes. These dual perspectives mean that both beginning and established SLA researchers as well as those seeking to connect their work with views of language learning will find something of interest. Studies of multiple languages and multiple aspects of language are included. Chapters cover areas as diverse as literacy, language comprehension, language attrition and language testing.

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