

A processability approach to the L2 acquisition of Chinese syntax

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Statement: on originality

I declare that the research presented here, unless otherwise acknowledged, is my own original work and has not been submitted to any other institution for the award of a degree.

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Abstract

This study explores L2 Chinese acquisition at syntactic level with Processability Theory (PT) (Pienemann, 1998b; Pienemann, Di Biase, & Kawaguchi, 2005) as its theoretical framework. The research aim was to document the acquisition process of L2 Chinese sentence structures ranging from basic word order (declaratives and interrogatives), to word order variations (adjunct and object topicalization/fronting), and to complex structures (passive, existential and causative). They were six word order patterns: SVO, ADJUNCT_{TOPIC}+SVO, NP_{TOPIC}+SVO, OSV, SOV and SO_{BA}V, and three structures with complex lexical operations: passive, existential and causative. The documentation was conducted under the guidance of PT. Two PT-based processing principles, i.e. information exchange (Pienemann, 1998b) and the mapping of three parallel levels of structure (argument structure, constituent structure and functional structure) (Pienemann, Di Biase, & Kawaguchi, 2005) were employed to propose two processing hierarchies respectively for the acquisition of word order and complex structures. The study aimed to address two research questions: (1) what were the observed sequences for the acquisition of word order and complex structures; (2) whether the observed sequences were consistent with the two proposed PT-based processing hierarchies.

To achieve the research aims, a longitudinal investigation over one academic year was conducted on the acquisition sequence of the targeted sentence structures by six Chinese L2 learners of different language backgrounds and of three different proficiency levels (beginning, intermediate and advanced). The six learners were enrolled in a Chinese language program in a Chinese university. Interviews with each of the six informants were conducted on a regular basis to record their learning progress through free conversations with supplementary communicative elicitation tasks. All interviews were audio-recorded, transcribed and segmented into sentences for grammatical tagging. Following PT an emergence criterion was adopted to decide the acquisition status of the targeted structures.

The results showed that the acquisition of the targeted sentence structures proceeded successively from basic word order to word order variations and complex structures. The observed orderly acquisition sequences were consistent with the two hypothesized PT-based processing hierarchies. Not every structure at the same stage emerged on time. However, only the stage of a lower level of processing procedures had been reached before the stage of a higher level was reached. The study contributes to the research of acquisition sequence of Chinese syntax as a second language. The observed acquisition sequences can serve as a reference for the design of teaching syllabus and classroom instruction, to improve teaching and learning efficiency. The study also provides further empirical support for the predictive and explanatory power of Processability Theory in the acquisition of L2 syntax.

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Abbreviations

ADJ	adjunct
BA	marker of the BA-structure
BEI	marker of the passive BEI-structure
CL	classifier
COMP	complement
XPCOMP	open complement
DE	verbal complement particle
DF	discourse function
DUR	durational marker of <i>-zhe</i>
EXP	experiential marker of <i>-guo</i>
GEN	genitive marker of <i>-de</i>
GF	grammatical function
LFG	the Lexical Functional Grammar
OBJ	object
OBJ _θ	indirect object
OBL _θ	oblique
PF	perfect marker
POSS	possessive marker of <i>-de</i>
PP	preposition phrase
PRED	predicate
PT	Processability Theory
QUE	question marker
SUBJ	subject
TOP	topic

Chapter 1 Introduction

This PhD study investigates the acquisition of L2 Chinese¹ syntactic structures through a processability approach. The research aims to document six word order patterns: SVO, ADJUNCT_{TOPIC}+SVO, NP_{TOPIC}+SVO, OSV, SOV and SO_{BAV}, and three structures with complex lexical operations (complex structures hereafter): passive, existential and causative. The documentation is conducted under the guidance of Processability Theory (PT) (Pienemann, 1998b; Pienemann, Di Biase, & Kawaguchi, 2005). The study addresses two research questions: (1) what are the observed sequences for the acquisition of word order and complex structures; (2) whether the observed sequences are consistent with the two proposed PT-based processing hierarchies.

Since the 1970s, second language acquisition (SLA) researchers have been investigating learner language. They endeavor to explain L2 competence and L2 development. L2 competence refers to “the nature of the mental representations comprising the internal grammar of learners”, and L2 development refers to “the processes and mechanisms by which those representations and the ability to use them change over time” (Ortega, 2009b, p. 110). This study follows the latter line of research to investigate how L2 acquisition proceeds in terms of language use, and adopts Processability Theory as its theoretical basis. The theoretical motivations and their significance for this thesis are outlined in the following paragraphs.

Processability Theory (PT) proposes a set of universal L2 processing procedures, which describe, explain and predict the interlanguage development of morphology and syntax. Therefore, PT is an appropriate SLA theory to examine the developmental features of a L2 grammar. Empirical studies on a range of typologically different languages have

¹ The term ‘Chinese’ used in this thesis refers to *putonghua*, which literally means “common language” in the People’s Republic of China and is “a constructed norm based upon the language, a variety of Northern China, spoken in the capital city, Beijing” (Sun, 2006, p. 6)

provided ample evidence to support the PT-based universal hierarchy of the developmental sequence of L2 grammar, for languages such as German, Italian, Japanese, English, and Chinese to name a few. Moreover, a theory-driven study will contribute to the development of SLA as a discipline. Zhao (2011) reviewed a number of studies in L2 Chinese research and found that most research is descriptive in nature without reference to relevant SLA theories. Zhao states, “although description and hypothesis generation are fundamental, they are not enough if L2 Chinese studies are to play a role in SLA theory structure” (p. 568). He further points to a future direction for L2 Chinese studies—“to explore problems in L2 Chinese acquisition within the framework of SLA research in general” (p. 568). The current research on how L2 Chinese syntactic acquisition develops is theoretically motivated by PT, a SLA theory, and will thus contribute to the discipline of SLA in exploring the developmental problem of how language learning proceeds.

The original framework of Processability Theory (Pienemann, 1998b) has been extended to include a pragmatic-structural interface (Pienemann, Di Biase, & Kawaguchi, 2005) to expand PT’s explanatory and predictive dimension. Three hypotheses, the Unmarked Alignment Hypothesis, the Topic Hypothesis and the Lexical Mapping Hypothesis, take discourse-pragmatic factors into consideration and utilize the mapping principles of word order, complex structure and functional structure to predict, describe and explain the L2 syntactic development. Empirical studies from different languages have provided evidence to support the three PT-based hypotheses. However, compared to the original framework of PT, more evidence is needed to lend further support to the three hypotheses, which is especially the case for the Lexical Mapping Hypothesis. This hypothesis has not yet been tested for many languages and not for L2 Chinese syntax.

In terms of data and research methods, PT-based studies value longitudinal observations on spontaneous speech data, which “offer a window into ability for use in real time and across communicative contexts, and such a focus is particularly useful when

investigating development” (Ortega, 2009b, p. 111). Zhao (2011) identified a lack of longitudinal studies in L2 Chinese research. He points out, “longitudinal studies are rare, probably because they are time-consuming. However, longitudinal studies complement cross-sectional studies and are indispensable to understanding the natural process of L2 acquisition” (p. 568). Three PT-based empirical studies on L2 Chinese (Charters, 2005; Gao, 2005; Zhang, 2005, 2007)² are longitudinal studies and they were conducted in a foreign language setting. My study will provide speech data collected in the target language environment over one academic year.

One goal of SLA research is to inform the learning process and contribute to pedagogy. Processability Theory advocates teaching processable grammar, because teaching will be beneficial if it focuses on structures that are processable or ready to be processed by L2 learners. Therefore, a comprehensive understanding of how L2 grammatical acquisition proceeds is essential to language pedagogy in terms of syllabus design, classroom instruction, and language testing, to improve teaching and learning efficiency.

To sum up the theoretical motivations and significance of the current study, to investigate the developmental problem under the guidance of a well-tested theory will make a contribution to the exploration of the development problem in SLA and L2 Chinese pedagogy and provide further empirical evidence for the applicability of Processability Theory to L2 Chinese syntax.

The following are the key terms used in this thesis:

(1) Processing procedures (Pienemann, 1998a)

Processing procedures are the prerequisites for the production of L2 morpho-syntactic

² Gao (2005) conducted both longitudinal and cross-sectional investigations. Her longitudinal investigation was in a foreign language setting (Australia). Her cross-sectional investigation was in a target language setting (China).

forms. Processing procedures are activated successively from lower levels to higher levels of processing hierarchy.

(2) Acquisition sequence

The acquisition of L2 forms does not take place randomly. Instead, the acquisition proceed in an orderly and sequential manner, with structure A proceeding B and structure B activating C.

(3) Word order

Word order is the language specific ways of structuring the sentence constituents, such as NP, VP and PP.

(4) Lexical mapping (Bresnan, 2001)

The linking/mapping of the argument roles, such as agent and patient to universal units of grammatical functions, such as SUBJ and OBJ is lexically driven.

In Chapter 2, the theoretical background for the current study is discussed. Major approaches in the SLA literature addressing developmental issues are reviewed, with a focus on the theoretical basis of the current study, Processability Theory, including its major processing principles, its theoretical bases and its universal processing hierarchies for L2 grammar.

In Chapter 3, the typological features of Chinese are reviewed first. Then the Chinese syntactic structures under investigation are described according to PT-based processing principles, together with a formal description of these structures within the framework of Lexical Functional Grammar. The description of Chinese syntax is followed by a review of four empirical studies on L2 Chinese syntax from a processing perspective. Finally, two sets of processing hierarchies of L2 Chinese syntax are proposed on the basis of processing principles of information exchange and the different mappings of complex structure and word order onto functional structure. Chapter 3 is concluded with

the research questions.

Chapter 4 presents the research methodology of the current research, including the methods of informants' selection and data collection and analysis. Chapter 5 gives a detailed description of the developmental sequences of Chinese syntax in terms of six word order patterns and three complex structures. Chapter 6 discusses the observed acquisition sequences of L2 Chinese syntax within and beyond Processability Theory and in comparison with other studies. The results and findings are summed up in Chapter 7, together with discussion of the contributions, limitations and implications for further research and pedagogy.

Chapter 2 Theoretical background: Processability Theory

This chapter presents the theoretical background for the current study. Major approaches in the SLA literature to address developmental issues are reviewed, with a focus on the theoretical basis of this study, i.e., Processability Theory. The major processing principles of PT are presented, together with its theoretical bases, its universal processing hierarchies for L2 grammar and its empirical support.

Early SLA studies from the 1940s to the 1960s focused on the systematic comparison between L1 and L2 to explore the L2 acquisition process, which is known as Contrastive Analysis (CA). This line of research assumed that similarities between two languages facilitated language learning, while differences incurred negative L1 transfer and these differences could be used to predict learner difficulties and errors (Lado 1957 and Weinreich 1953, cited in Larsen-Freeman & Long, 1991). However, when CA-based predictions were subject to empirical tests, cases of under prediction and over prediction were found, indicating that CA was not born out of facts (Larsen-Freeman & Long, 1991). Partly grown out of CA, Error Analysis started to focus on learner errors. Errors, from a CA perspective, are regarded as the intrusion of a L1 habit over which learners have no control. EA researchers took errors as a sign that “learners are not passive recipients of target language input, but rather they play an active role, processing input, generating hypotheses, testing them and refining them” (Larsen-Freeman & Long, 1991, p. 61). This view on errors is a contribution to SLA research in that learners are active in constructing gradually target-like languages, indicating the necessity to study the learner language in its own right. This leads to the study of learner language, termed as ‘interlanguage’ (Selinker, 1972).

2.1 Early interlanguage research

Ortega (2009b) summaries two traditions in the study of learner language: formal

linguistic studies of L2 acquisition and interlanguage studies. Researchers from the former tradition seek to explain L2 competence. They believe that “an innate Universal Grammar would constrain L2 acquisition, as it was believed to constrain L1 acquisition” and they aim to “describe the universal and innate bounds of the mental representations of grammar that learners build” (p. 111). Researchers from the latter tradition were motivated by the L1 research findings on the existence of a natural order in L1 acquisition of English morphemes in the 1970s (e.g. Brown, 1973). They seek to explain L2 development and believe that “the same general cognitive learning mechanisms that help humans learn and process any other type of information help them extract regularities and rules from the linguistic data available in the surrounding environment” (Ortega, 2009b, p. 111). They base their analysis on the spontaneous L2 speech and try to find out how their actual uses of the L2 evolve over time and why. The current study follows this tradition. The following sections present an overview of the major theories and empirical research of interlanguage.

Interlanguage research began with early morpheme studies (e.g. Bailey, Madden, & Krashen, 1974; Dulay & Burt, 1974), which investigated the L2 acquisition of English morphemes (e.g. past tense *-ed*) by both child and adult learners with different L1 backgrounds. These studies provided early empirical evidence of the existence of L1-neutral acquisition order for a subset of English grammatical morphemes and led to subsequent research on developmental sequences. Later studies went beyond the acquisition of morphology to include syntax, such as English negation and WH-questions (Ravem, 1968, 1970), English interrogatives (Cazden, Cancino, Rosansky, & Schumann, 1975) and English negation (Milon, 1974; Wode, 1976). The main findings were that L2 learners of different L1s tended to travel along a similar path of acquisition of the observed structures and there were some similarities between L1 and L2 acquisition. Unlike researchers of morpheme studies who simply offered a list of acquisition order for a set of isolated morphemes, researchers on sequence studies of sentence structures provided evidence for the acquisition of developmentally related structures. However, the major problems for these studies were, like morpheme studies,

(a) language-specific, thus precluding cross-linguistic generalizations; (b) lack of theoretical motivation and in need of explanation for observed acquisition order or sequences (Larsen-Freeman & Long, 1991).

One of the early attempts to explain the observed sequence in SLA was made by a group of German researchers in the early 1980s (Meisel, Clahsen, & Pienemann, 1981). These researchers conducted a cross-sectional study of 45 adults and a two-year longitudinal study of 12 adults of the naturalistic acquisition of German as a second language by speakers of Spanish and Italian. They found a five-stage developmental sequence for L2 German word-order rules, summarized in (Pienemann, 1998b, p. 45):

Stage X: canonical order (SVO)

- 2.1 die kinder spielen mit ball
'the children play with the ball'

Stage X+1: Adverb preposing (ADV)

- 2.2 da kinder spielen
'there children play'

Stage X+2: Verb separation (SEP)

- 2.3 alle kinder muß die pause machen
'all children must the break have'

Stage X+3: Inversion (INV)

- 2.4 dann hat sie wieder die knoch gebringt
'then has she again the bone bringed'

Stage X+4: Verb Final (V-END)

- 2.5 er sagt, daß er nach hause kommt
'he said that he home comes'

These rules constituted an implicational scale, that is, the presence of one rule in an interlanguage implied the presence of earlier rules in the sequence, but not later ones. To account for the observed sequence, Clahsen (1984b) proposes three processing

strategies, which are abandoned successively during the course of interlanguage development.

(1) The Canonical Order Strategy (COS)

Based on the NVN strategy (Bever, 1970), movement into or out of the fixed canonical string is blocked.

(2) The Initialization-Finalization Strategy (IFS)

This strategy is based on the fact in perception and memorization that the first and the final position of a stimulus are more salient than stimulus-internal positions. Therefore movements of sentence constituents to internal positions are blocked.

(3) The subordinate Clause Strategy (SCS)

This strategy is based on experimental evidence that subordinate clauses are processed differently from main clauses.

At stage X, no German word order rules are utilized. Sentence constituents appear in the fixed linear order: NP (AUX/MOD) V (NP) (PP). At stage X+1, adverbials are moved into sentence salient initial positions. At stage X+2, nonfinite parts of discontinuous verbal elements are moved into sentence-final position. The Canonical order Strategy is abandoned. At stage X+3, following the proposed complements, the SUBJ appears after the finite verb. Adverbials appear optionally between the finite verb and the OBJ. The Initialization-Finalization Strategy is abandoned. At stage X+4, the finite verb appears in clause-final position in embedded sentences. The subordinate Clause Strategy is abandoned.

These strategies were ordered in a sequence relating to the notions of psychological complexity and permutation, thus having potential generalizability to other developmental sequences and to other languages (Larsen-Freeman & Long, 1991). The strategies approach contributed to the SLA research beyond mere description of the

observed sequence. However, two major limitations were identified by Pienemann (1998). One was that this approach lacked a set of explicit grammatical rules for the specification of linguistic forms. The other was that, due to its connection to Transformational Grammar, which does not take into account psychological plausibility, it cannot be used to explain acquisition in terms of language processing.

2.2 Processability Theory (PT)

Processability Theory (Pienemann, 1998b, 2005a) endeavors to describe, explain and predict a universal interlanguage developmental trajectory from a processing perspective. The original framework of PT was proposed by Pienemann (1998b), and it was later extended to include discourse-pragmatic aspects (Pienemann, Di Biase, & Kawaguchi, 2005). The underlying logic of PT is that “at any stage of development learners can produce and comprehend only those L2 forms which the current state of their language processor can handle” (summarized in Pienemann, 2007, p. 137). Following this logic, PT proposes that learning a second language is to develop processing procedures or routines underlining oral production of L2 structures in the course of communication. Based on these processing procedures, PT proposes a universal L2 developmental sequence. These processing procedures constitute an implicational scale, that is, the presence of one procedure implies the presence of earlier procedures in the sequence, but not later ones. The following are the major claims made by PT.

- (a) PT accounts for both universal stages of L2 development and individual variation within stages. The Hypothesis Space proposed within the PT framework (Pienemann, 1998b) specifically accounts for the possible range of interlanguage variation under the leeway of processability available at a given point in L2 development.
- (b) Formal teaching may affect the rate of L2 acquisition and ultimate attainment, but it cannot alter the hypothesized universal L2 acquisition sequence. This principle is

formulated as the Teachability Hypothesis (Pienemann, 1984, 1987, 1989, 1998b).

(c) L1 transfer is developmentally moderated (Pienemann, Di Biase, Kawaguchi, & Håkansson, 2005). When certain grammatical structures are identical in both L1 and L2, the relevant L1 processing procedures cannot be utilized in L2 until certain processing prerequisites have been acquired in L2.

2.2.1 Theoretical bases for PT

Two theoretical bases are essential in PT. One is Levelt's (1989) Speech Production Model and the other is the Lexical Functional Grammar (LFG) (Bresnan, 1982, 2001).

Levelt's model adopts a lexicalist's approach to offer a psycholinguistic account of speech production from intention to articulation in native speakers. The model was originally proposed by Levelt (1989) and was further developed by Levelt, Roelofs, and Meyer (1999). The model inherited its lexicalist approach from LFG. As pointed out by Kormos (2006), "based on Bresnan's (1982) lexical theory of syntax, Levelt (1989) assumed that the selection of the lemma activates its syntax, which, in turn, triggers syntactic building procedures" (p. 10). Three strata of lexical system are necessary for language processing: the conceptual level (lexical meanings), the lemma level (grammatical features and their values in words, such as number +/-plural and tense +/-past), and the lexeme level (the morphological and phonological shape of words). Speech production starts from formulating a preverbal message in the 'conceptualiser' at the conceptual level, from which relevant expressions from the mental lexicon are selected to realise communicative goals. Then the preverbal message is passed on to the 'formulator', which translates the conceptual structures into a linguistic structure in two steps: grammatical encoding at the lemma level and phonological encoding at the lexeme level.

The lemma level, where the grammatical encoding operates, is incorporated into the PT framework to formulate the L2 processing procedures. Human psychological constraints

such as word access and memory are imposed on grammatical encoding. When storage for grammatical information is needed, the matching of underlying meaning onto surface form is no longer linear. This is *linearization problems* (Levelt, 1983, as cited in Pienemann 1998). For example, to produce the sentence ‘*Peter sees a dog*’, the grammatical information in the SUBJ ‘*Peter*’ (+singular, +3rd person) needs to be stored temporarily in a memory buffer and be compared with the verb features (+ singular, +3rd person, +present), before the 3rd person singular morpheme –s is inserted after the verb is selected. The need to store grammatical information on PERS and NUM during sentence generation creates the non-linear morphological process. The information matching (‘feature unification’ in LFG terms and ‘information exchange’ in PT terms) at different morpho-syntactic levels (e.g. within a phrase and across phrases) necessitates the temporary information storage in a memory buffer and cause different degrees of linguistic-linearity in the surface structure, thus imposing different degrees of processing complexity on speech production.

To describe the target grammar in a formal way and model the different degrees of linguistic linearity in the surface structure, PT relies on Lexical Functional Grammar (LFG). LFG is a lexically driven and psychologically and typologically plausible theory of grammar. It offers a psychologically plausible grammar that explains how speakers arrive at morpho-syntactically correct utterances by means of a lexically driven grammar. Three major reasons account for why PT adopts LFG as its grammatical formalism. First, LFG adopts a lexicalist’s approach, hence is compatible with Levelt’s model; second, “LFG has a constraint-based, parallel correspondence architecture; it has no serial derivations (unlike transformational grammar)” (Bresnan, 2001, p. vii). This non-derivational nature of sentence construction endows LFG with psycholinguistic plausibility. Pickering, Branigan, and McLean (2002) conducted four syntactic priming experiments on sentence generation. They found that “construction of syntactic structure takes place in a single stage” (p. 603), as suggested by the title of their paper *Constituent structure is formulated in one stage*. The finding lends support to the non-transformational architecture of LFG; third, its grammatical framework has been

extensively applied to and tested against diverse languages.

Two major LFG-based concepts are adopted in PT: one is the lexically driven feature unification (information exchange in PT's terms) and the other is the correspondence of three LFG levels of structure: argument structure, constituent structure and functional structure. For example, the non-linear morphological process in '*Peter sees a dog*' can be formally presented in Figure 2-1, which shows the features' (PERS and NUM) unification of SUBJ and PRED in c-structure. The grammatical information exchange happens across phrases, i.e. the noun phrase and the verb phrase, thus requiring the S-procedure.

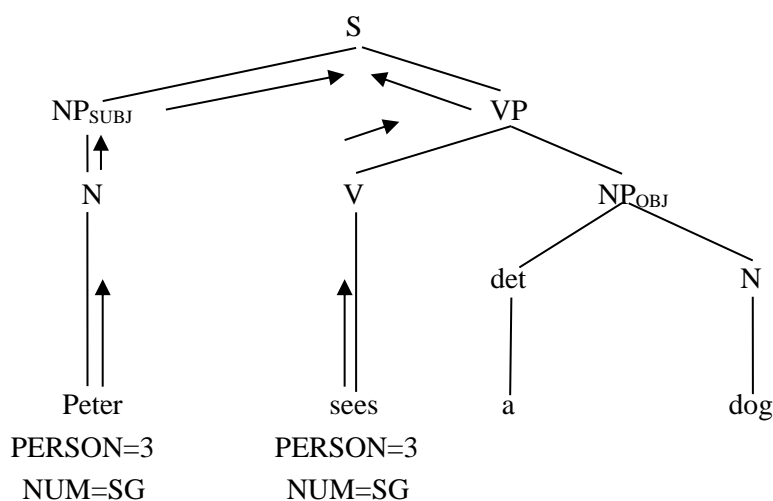


Figure 2-1. Feature unification in the S-procedure (Pienemann, Di Biase, & Kawaguchi, 2005, p. 200)

PT (1998b) and its extension (Pienemann, Di Biase, & Kawaguchi, 2005) utilize different processing principles to account for L2 morpho-syntactic development. The former uses the principle of information exchange in or across sentence constituents (presented in subsection 2.2.2) and the latter uses the mapping principles of c-structure, a-structure and f-structure (presented in subsection 2.2.3).

2.2.2 Information exchange

PT (1998b) proposes a staged morpho-syntactic development based on the processing principle of information exchange and salience. Processing complexity is measured by the syntactic level of information exchange (e.g. the phrase level or inter-phrasal level) and whether the salience principle is utilized, thus defining the progressive sequence of L2 morpho-syntactic development. PT (1998b) predicts a six-stage developmental hierarchy for L2 morpho-syntactic acquisition (Pienemann, 1998b, p. 87).

At the first lemma access stage, single words (e.g. '*bus*') and formulaic expressions (e.g. '*My name is Peter*'; '*How are you*') are processed as invariant forms and formulaic expressions without analysis. No grammatical encoding is evolved and no grammatical information exchange takes place.

At stage 2, the category procedure is activated. Lexical morphemes, such as English past tense marker *-ed*, the generic plural marker *-s* (*I like flowers*) and progressive *-ing* (*He singing*), are processable, because these morphemes are read directly off the conceptual structure and only access the category procedure to identify lexical categories of words (e.g. N, V). Therefore, no information exchange is involved in lexical morphemes.

At the syntactic level, identification of lexical categories makes it possible to map semantic roles (e.g. agent/patient) directly onto surface form in a strictly serial word order, similar to Bever's (1970) NVN strategy, therefore no information exchange is required.

At stage 3, the phrasal procedure is in position when grammatical information exchange occurs within a phrase. For example, in a NP '*these flowers*', the grammatical information NUM=PLURAL between the head noun '*flowers*' and its modifiers '*these*' need to be exchanged to ensure the number agreement.

In terms of syntax, the phrasal procedure makes it possible to identify the positions, defined as phrases (e.g. noun phrases and verb phrases). PT proposes that the adherence to strictly serial word order, i.e. the canonical schema, would be active after the salient position has been processed on the basis general cognitive principle of salience, i.e., sentence initial and final positions are perceptually more salient than sentence internal position (see Figure 2-2).

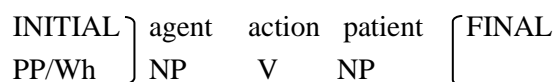


Figure 2-2. Salience and canonical schema (Pienemann, 1998b, p. 85)

Pienemann follows Rutherford (1989) to term the use of salience principle in conjunction with canonical word order as ‘pragmatic’ word order options. These options allows L2 learners to “imitate a range of L2 syntactic phenomena without full access to L2 procedures” (Pienemann, 1998b, p. 85). For example, in ‘*yesterday I bought a book*’ and ‘*where they are?*’, the initial salient positions are occupied by an adverbial ‘*yesterday*’ and a Wh-word ‘*where*’ respectively, and the rest of the sentences are still canonical.

At stage 4, the simplified sentence procedure is active, which allows information exchange between constituents in sentence internal and salient positions. This stage is called ‘simplified’ sentence procedure, because one of the constituents that needs to exchange information is at a salient position, either initial or final position. German verb separation is a case in point. In sentence (2.6), the auxiliary, *hat* ‘has’, is treated as V and takes VP-complements, *ein Bier getrunken* ‘a beer drunk’. The two verbs (i.e. *hat* ‘has’ and *getrunken* ‘drunk’) need to exchange information on tense (i.e. PARTICIPLE=PAST and V-COMP PARTICIPLE=PAST) and to be inserted in the correct position in c-structure. One of the constituents (i.e. the nonfinite verb *getrunken* ‘drunk’) that exchanges information is in a non-canonical, but perceptually salient position, the sentence final.

2.6 er hat ein Bier getrunken
he has a beer drunk
'He has drunk/drank a beer.' (Pienemann, 1998b, p. 100)

At stage 5, the sentence procedure is active. In terms of morphology, information distribution goes beyond phrasal boundaries, such as SUBJ-verb agreement in English. In '*Peter sees a dog*', the grammatical information in the SUBJ '*Peter*' (+singular, +3rd person) needs to be exchanged with the verb features (+ singular, +3rd person, +present) to ensure the 3rd person singular morpheme *-s* inserted after the verb.

At the syntactic level, the sentence procedure allows information exchange at the interphrasal level without resorting to the pragmatic word order options (the use of salience principle in conjunction with canonical word order). That means "word order can be structured syntactically according to L2 constraints; i.e. the pragmatic word order principles can be replaced by syntactic ones" (Pienemann, 1998b, p. 85).

At the final stage 6, subordinate clause procedure is in position, which allows information exchange between the matrix and the subclasses. For example, in order to produce '*I don't know where they are*', the learners need to identify the matrix '*I don't know...*' and the subclause '*...where they are*' in order to cancel the inversion of the auxiliary in the subclause. It is called the 'cancel inversion' rule in PT.

The evidence for the validity of the processing procedures first came from Pienemann's (1998) tests of these procedures against his own data collected from his longitudinal case study on a German L2 learner of L1 English and also against the data from other previous L2 acquisition studies, such as English (Johnston, 1985; Pienemann & Mackey, 1993), Swedish (Pienemann & Håkansson, 1999) and Japanese (Huter, 1996; Kawaguchi, 1996). Later empirical evidence for the information exchange-based processing hierarchy comes from L2 Japanese and Italian (Di Biase & Kawaguchi, 2002; Kawaguchi, 2002), L2 Chinese (Charters, 2005; Gao, 2005; Zhang, 2001), and L2 German (Jansen, 2008) to name a few.

Two major limitations were identified by Pienemann (2005b) when he reviewed the original PT framework. The first limitation concerns the inclusion of the general cognitive principle of salience, which is critically reviewed by Hammarberg (1996), Hulstijn (1987, 1998) and Jordan (2004). Pienemann (2005b) summarizes the problems as follows: (1) this principle is included in PT on an *ad hoc* basis and it is not related to an LFG-specific modularity assumption, upon which everything else in PT rests; (2) it is not formally defined and presented. Pienemann (2005b) points out two areas where the original PT utilized the salience principle: (a) the German split verbs (see the reproduced sentence 2.6); (b) ADJ-preposing in German and related phenomena in other languages. Pienemann argues that the case of (a) German split verbs could be very well explained relying solely on feature unification of the information ‘PART=PART’, that is present in both verb entries, in VP. This explains why German S-V agreement is one stage higher on the developmental hierarchy, in which case the feature unification of SUBJ and VERB occurs at S(entence)-node, one level higher than VP. Therefore the reliance on salience is unnecessary.

2.6 er hat ein Bier getrunken
he has a beer drunk
‘He has drunk/drank a beer.’

However, feature unification alone cannot explain ADJ-preposing in German and related phenomena in other languages, in which cases serial word order and saliency were originally utilized. In the extended PT (Pienemann, Di Biase, & Kawaguchi, 2005), this limitation is remedied by the Topic Hypothesis (see section 2.2.3.2).

The other limitation is the internal inconsistency in PT identified by Kempen (1998). Kempen points out that PT proposes that L2 learners are able to assemble sentences initially through the structural hypothesis of serial word order, i.e. the direct mapping, which implies that the S-procedure must be available at that early point in time. However, the S-procedure is hypothesized to emerge at level 5. Pienemann (2005b) admits that it is problematic to take direct mapping as an alternative to assemble

sentence before S-procedure, although the concept goes back to a long time ago and has empirical support. Pienemann summarizes the problems as: (1) no formal detail of the direct mapping processes in the context of an overall theory; (2) no formal (Lee, 2001) interface with the architecture of the proposed theory of language development. This limitation is remedied by the Unmarked Alignment Hypothesis in the extended PT (see section 2.2.3.1).

2.2.3 The mapping principles

Pienemann (1998b) attributes one source of linguistic non-linearity at the morpho-syntactic level to the necessity of storing grammatical information, which need to be exchanged in or across sentence constituents. This process of information exchange can be modelled by feature unification within word order (c-structure) within the original framework of LFG.

Pienemann, Di Biase, and Kawaguchi (2005) incorporate two elements in the revised architecture of LFG (Bresnan, 2001; Bresnan & Mchombo, 1987) into the extended PT. One is that the discourse roles (e.g. TOP and FOC) are regarded as syntacticised functions and are represented in f-structure. The second is the Lexical Mapping Theory (Bresnan, 2001), which puts forward the guiding principles in the mapping of argument structure to functional structure. These two elements enable PT to capture other sources of linguistic non-linearity at the syntactic level, which are beyond the transfer of grammatical information within c-structure and can be mapped onto the processability hierarchy. The non-linearity can be modelled by different kinds of mapping among the three levels of structures: argument structure, constituent structure and functional structure (Bresnan, 2001).

Argument structure (a-structure) includes such thematic roles as agent, patient and theme. Verbs dictate the number and type of arguments. For instance, the arguments governed by the verb '*see*' are experiencer and theme (see a-structure in Figure 2-3). Following a number of researchers (e.g. Foley & Van Valin, 1984; Givón, 1984;

Jackendoff, 1972), Bresnan (2001) uses a thematic hierarchy which demonstrates the ordering of the argument roles in an a-structure based on their relative prominence from left to right: agent > beneficiary > experiencer/goal > instrument > patient/theme > locative (p. 307). This hierarchy explains why the experiencer (a more prominent thematic role) is ordered to the left of theme in the a-structure in Figure 2-3.

Constituent structure (c-structure) refers to language-specific word orders. For example, the basic word order for English is SVO, as demonstrated in c-structure in Figure 2-3, while for Japanese it is SOV.

Functional structure (f-structure) consists of universal units of grammatical functions, including core functions as SUBJ, OBJ, non-core functions as oblique and complement, and discourse functions as TOP and FOC. These functions are related to word order in a language-specific way and serve to connect a-structure and c-structure.

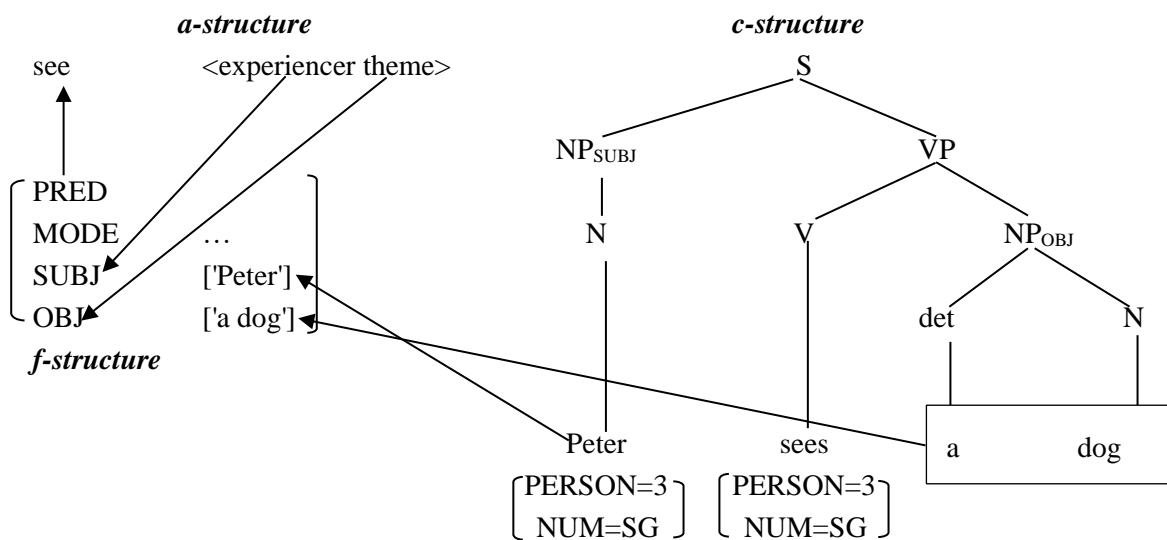


Figure 2-3. Three parallel structures in LFG (Pienemann, Di Biase, & Kawaguchi, 2005, p. 200)

According to LFG, the three structures are independently motivated and need to be mapped onto each other, giving rise to two mapping processes: a-structure to f-structure mapping and c-structure to f-structure mapping, as the arrows show in the above Figure 2-3. Both argument roles (experiencer and theme) in the a-structure and the sentence constituents (the initial NP 'Peter' and the second NP 'a dog') in c-structure are mapped

onto their corresponding grammatical functions (SUBJ and OBJ). This corresponding mappings are demonstrated in the following simplified Figure 2-4.

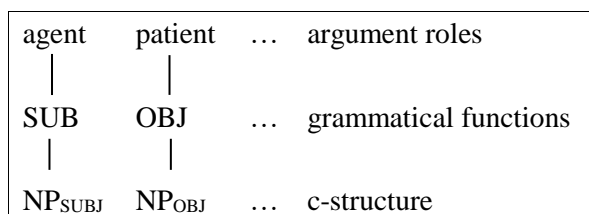


Figure 2-4. Three parallel structures in LFG (Pienemann, Di Biase, & Kawaguchi, 2005, p. 226)

In psycholinguistic terms, Pienemann, Di Biase, and Kawaguchi (2005) argue that the mapping cannot be assumed to be always linear, as shown in Figure 2-4. They state, “semantic predicate-argument relationships could not be only expressed by fixed surface word and phrase configurations” (p. 201). Otherwise, surface structure variations would not be possible. This is because, in discourse, native speakers of a language use various linguistic devices to guide the listener’s attention, such as topicalization and passivization (Levelt, 1989). These attention-direction devices are necessitated by the nature of the comprehension process and give rise to structural variations. However, Pienemann et al. point out that these devices come at a cost in terms of processing, because they change the relationship between either a-structure and f-structure or between c-structure and f-structure. These changes lead to linguistic non-linearity and can be mapped onto processability hierarchy.

Three hypotheses in the extended PT (Pienemann, Di Biase, & Kawaguchi, 2005) are proposed to demonstrate the processing procedures in syntactic development by spelling out the correspondences among the three structures (argument structure, constituent structure and functional structure). They are the Unmarked Alignment Hypothesis, the Topic Hypothesis, and the Lexical Mapping Hypothesis.

2.2.3.1 The Unmarked Alignment Hypothesis

It has been pointed out that one limitation of the original PT is that it does not offer a formal account of the direct mapping process, which is taken as an alternative or simplified procedure to form sentences before sentence procedure develops. This limitation is remedied in the extended PT by formally presenting the direct mapping process based on the revised architecture of LFG. Pienemann, Di Biase, and Kawaguchi (2005) formulate the direct mapping process into the Unmarked Alignment Hypothesis on the basis of two key sources. One is Pinker's (1984) characterization of the direct links between grammatical functions and thematic functions and the other is Lee's (2001) proposal of a Universal Scale of unmarked mapping within the framework of Optimality Theory (OT)-LFG.

Pinker (1984) presents the canonical mapping as non-crossing links between two ordered tiers (i.e. grammatical functions and thematic relations, see Figure 2-5) and characterizes the canonical mapping as follows:

In a language's 'basic forms' (roughly, simple, active, affirmative, declarative, minimally presuppositional and pragmatically neutral sentences; see Keenan 1976), agents (if present) are realized as subjects, themes are realized as subjects if there is no agent and as objects otherwise, and sources, locations, and goals are realized as oblique objects if there is an agent or a theme or both, or as objects if there is only a theme (Pinker, 1984, p. 297).

SUBJ	OBJ	OBLIQUE	(grammatical functions)
agent	theme	goal/source/location	(thematic relations)

Figure 2-5. Canonical mapping (after Pinker, 1984, p. 297)

Lee (2001) derives the harmonic alignment (unmarked mapping) within the framework of OT-LFG on the basis of Universal Scales of the grammatical function, the case and

the structure position (see Figure 2-6). According to the Universal Scales, SUBJ is less marked than Non-SUBJ, nominative case is less marked than oblique case and the initial position is less marked than the non-initial position. Therefore an initial nominative-marked SUBJ is more harmonic (less marked) than a non-initial oblique-marked SUBJ.

GF:	SUBJ	>	NonSUBJ	(from the grammatical function scale)
Case:	NOM	>	OBL	(from the case scale)
Position:	Initial	>	Noninitial	(from the structural position scale)

Figure 2-6. Universal Scales (after Lee 2001, p. 97)

Based on the above two sources, Pienemann et al. (2005) formulate the direct mapping into the Unmarked Alignment Hypothesis as the following:

In second language acquisition learners will initially organize syntax by mapping the most prominent semantic role available onto the subject (i.e. the most prominent grammatical role). The structural expression of the subject, in turn, will occupy the most prominent linear position in c-structure, namely the initial position (Pienemann, Di Biase, & Kawaguchi, 2005, p. 229).

Figure 2-7 shows the unmarked alignment of a-, c-, and f-structure. For instance, in the example sentence *'I ate an apple'*. The most prominent argument role (i.e. the agent *'I'*) is mapped directly onto the most prominent functional role (i.e. the SUBJ). The structural expression of the SUBJ, in turn, occupies the most prominent position in c-structure, namely the initial position. The less prominent argument role (i.e. the patient *'an apple'*) is mapped onto the next function on the universal hierarchy of grammatical core functions (i.e. the OBJ *'an apple'*).

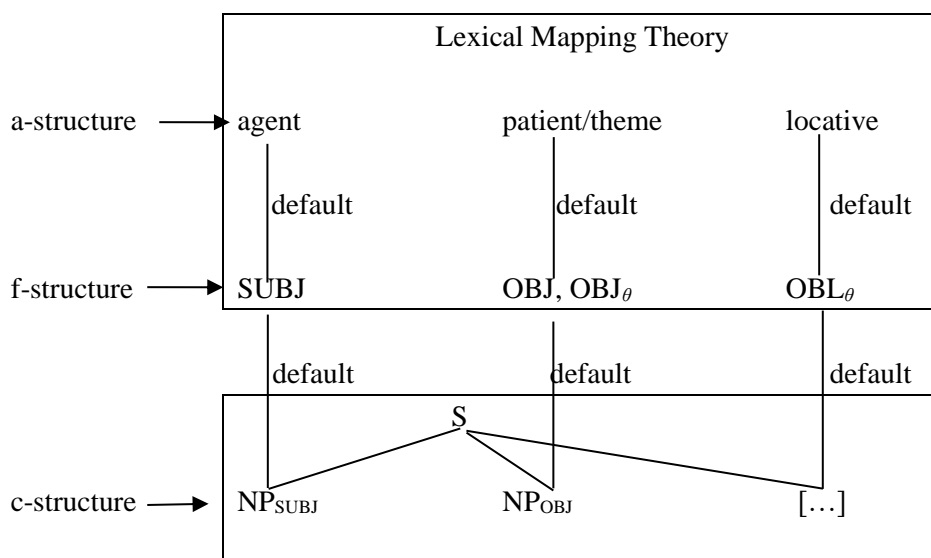


Figure 2-7. One-to-one correspondence (Pienemann, Di Biase, & Kawaguchi, 2005, p. 230)

The one-to-one correspondence between a-structure and f-structure and between c-structure and f-structure results in entirely linear structures and “guarantee the computationally least costly manner of organizing L2 syntax and rely entirely on aspects of the syntactic machinery that are not language-specific, including f-structure, the thematic hierarchy and universal aspects of c-structure” (Pienemann, Di Biase, & Kawaguchi, 2005, p. 230).

Pienemann, Di Biase, and Kawaguchi (2005) reviewed a number of corpus-based studies and found that the initial hypothesis of syntax is based on canonical word order, for example, children language processing (e.g. Bever, 1970; Bloom, 1994; Strohner & Nelson, 1974) and adult language processing (e.g. Bates & MacWhinney, 1981, 1982, 1987; Weyerts, Penke, Münte, Heinze, & Clahsen, 2002). Within the PT framework, a number of empirical studies have provided evidence for the learner’s initial reliance on the canonical word order of the target language, such as SVO in L2 Italian (Di Biase, 2007), L2 Chinese (Zhang, 2007), L2 English (Yamaguchi, 2010) and SOV in L2 Japanese (Kawaguchi, 2005).

After this initial stage of default mapping, two paths of syntactic development are ahead, leading to non-linearity of mapping. The two paths are formulated in the

following two hypotheses, the Topic Hypothesis and the Lexical Mapping Hypothesis.

2.2.3.2 The Topic Hypothesis

In the revised architecture of LFG (Bresnan, 2001; Bresnan & Mchombo, 1987), the discourse roles (i.e. TOP and FOC) are treated as syntacticised discourse functions and they need to be presented in f-structure under the constraint of the Extended Coherence Condition: FOCUS and TOPIC must be linked to the semantic predicate complex structure of the sentence in which they occur, either by functionally or by anaphorically binding an argument.

This revision of the LFG architecture allows PT to add a pragmatic-discourse dimension to its processing hierarchy and capture one source of non-linearity of mapping c-structure onto f-structure. The non-linearity, according to Pienemann, Di Biase, and Kawaguchi (2005), is “created by the addition of adjuncts to canonical structure and the assignment of discourse functions (FOC and TOP) to dislocated elements in c-structure” (p. 223). The Topic Hypothesis is formulated as follows to capture the development of syntacticised discourse functions in L2 acquisition:

In second language acquisition learners will initially not differentiate between SUBJ and TOP. The addition of an XP to a canonical string will trigger a differentiation of TOP and SUBJ which first extends to non-arguments and successively to arguments thus causing further structural consequences (Pienemann, Di Biase, & Kawaguchi, 2005, p. 239).

Table 2-1. The Topic Hypothesis (adapted from Pienemann, Di Biase, & Kawaguchi, 2005, p. 239)

Stage	Discourse principle	c- to f- mapping	Structural outcomes	English examples
3	Topicalization of core arguments	TOP=OBJ	Topicalization of core argument other than SUBJ	<i>Books I like.</i> <i>What did he buy?</i>
2	XP adjunction	TOP=ADJ	ADJ+canonical word order	<i>Yesterday I read a book.</i>
1	Canonical order	SUBJ=default TOP	Canonical word order (SVO or SOV)	<i>I like books.</i>

Stage 1: SUBJ=TOP

At stage 1, L2 beginners are constrained by the unmarked alignment, and three levels of structure are mapped one to each other in a strictly one-to-one manner. The first and most prominent position in c-structure is occupied by the most prominent syntactic function (i.e. the SUBJ) representing the most prominent argument available (i.e. the agent). At this stage, the SUBJ occupies the first position as the default TOP. The close association between SUBJ and TOP, i.e. the universal default that optionally identifies SUBJ and TOP, is reflected in the typological perspective of LFG. Therefore, the syntacticised discourse function TOP is not differentiated from SUBJ in the initial interlanguage. For example, in the sentence ‘*I like books*’, ‘*I*’ can be SUBJ and/or TOP, as shown in Figure 2-8 by the optional or default link between the TOP and the SUBJ.

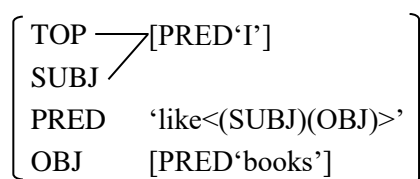


Figure 2-8. The f-structure of English canonical SVO

Stage 2: TOP=ADJ

When the first position is occupied by a non-SUBJ constituent, the mapping between c- to f-structure becomes non-default. This breaks the default link between the first sentential position and the SUBJ, as envisioned in the Unmarked Alignment Hypothesis. According to XP-adjunction rules (Bresnan, 2001), constituents adjoined to XP should

be assigned one of the non-argument functions TOP, FOC or ADJ. The Topic Hypothesis predicts that the XP-adjunction is first applied to non-core arguments, such as ADJ, because “the rest of c-structure is mapped canonically onto the universal hierarchy of grammatical core functions” (Pienemann, Di Biase, & Kawaguchi, 2005, p. 238). For instance, Figure 2-9 shows that in ‘*Today I study English*’, the ADJ ‘*today*’ is the TOP, indicated by the link. Figure 2-10 shows that the initial position is occupied by the ADJ TOP ‘*today*’, with the rest of the sentence constituents mapped canonically onto the universal hierarchy of grammatical core functions, i.e. SUBJ ‘*I*’ > OBJ ‘*English*’.

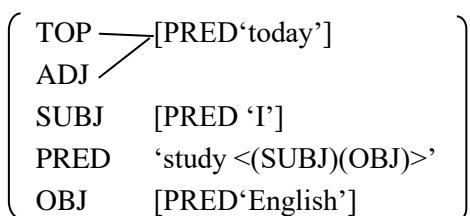


Figure 2-9. The f-structure of ADJ TOPs

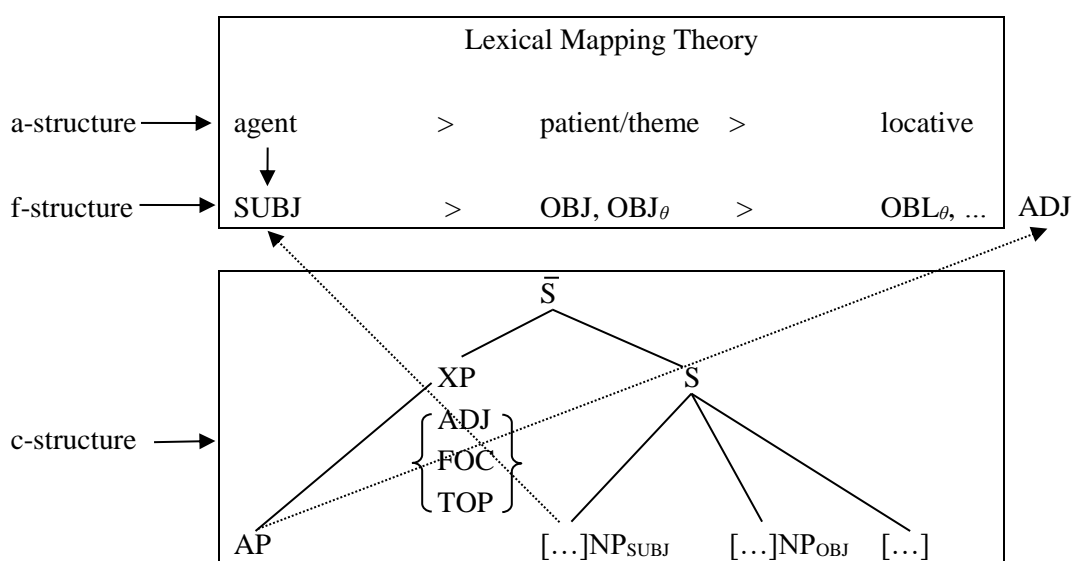


Figure 2-10. XP-adjunction in interlanguage (after Pienemann, Di Biase, & Kawaguchi, 2005, p. 234)

Pienemann, Di Biase, and Kawaguchi (2005) reported that “the assumption that in the presence of XP-adjunction the rest of the canonical pattern can nevertheless be accounted for by one-to-one mapping is supported by the developmental trajectories found in German, Swedish and English interlanguage system” (p. 233). In the verb 2nd

languages, such as German and Swedish, XP-adjunction constrains the verb into second position while in English, the XP-adjunction of non-SUBJ Wh-words constrains an auxiliary into second position. However, empirical evidence shows that the XP-adjunction constraints are always violated by L2 beginners, who produce ungrammatical interlanguage forms, with XP followed by the canonical patterns. Bettoni and Di Biase (2011) reported that in the L2 acquisition of Italian Wh-questions, L2 Italian learners also violated the constraint of XP-adjunction on SUBJ to the final position in mature Italian grammar and produced the ungrammatical interlanguage form of Wh+SV.

Stage 3: TOP=OBJ

When the initial position is occupied by a core-argument, such as OBJ and OBJ_θ, the canonical string that SUBJ precedes OBJ is broken. In the sentence ‘Books I like’, the OBJ ‘Books’ is promoted to the sentence initial position to receive the prominence and is bound by the discourse function of TOP, required by the Extended Coherence Condition, as demonstrated in Figure 2-11. The non-default mapping of less prominent grammatical function (i.e. the OBJ) preceding the most prominent grammatical function (i.e. the SUBJ) is demonstrated in Figure 2-12.

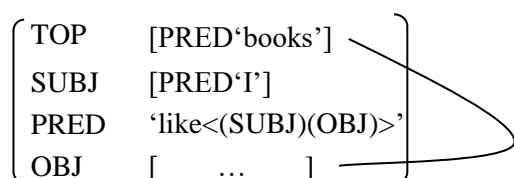


Figure 2-11. The f-structure of OSV

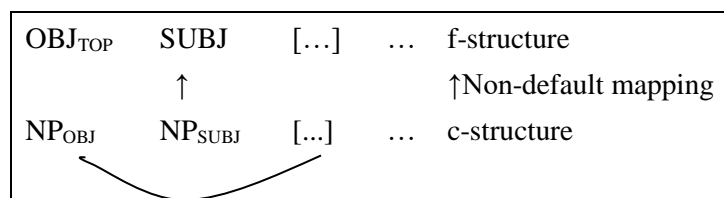


Figure 2-12. Non-default mapping of OSV

The same non-default mapping also occurs in the case of Wh-questions, where the discourse function FOC is linked to the argument function OBJ. For instance, in ‘*what*

did he buy', in order to meet the completeness and coherence conditions, the discourse function FOC is allowed to satisfy the unsatisfied argument function, i.e. OBJ, as illustrated by the link in the f-structure in Figure 2-13. Pienemann, Di Biase, and Kawaguchi (2005) also refer to information exchange to explain this non-default mapping. They point out, "information about the link between FOC and OBJ needs to be exchanged between the two grammatical functions, and this information exchange creates one aspect of non-linearity that is present in WH-questions" (p. 236).

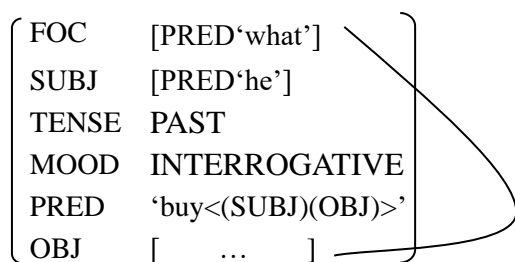


Figure 2-13. The f-structure of '*What did he buy?*'

Empirical evidence for the Topic Hypothesis has been provided from a number of studies of typologically different languages, such as L2 Japanese (Kawaguchi, 2005, 2010), L2 Italian (Bettoni & Di Biase, 2011; Di Biase, 2007), L2 English (Yamaguchi, 2010), L2 Chinese (Zhang, 2007) and Japanese-English bilingual first language acquisition (Itani-Adams, 2009).

2.2.3.3 The Lexical Mapping Hypothesis

The Topic Hypothesis shows that, after the initial one-to-one mapping, c- to f-structure mapping becomes non-linear (non-default) when non-SUBJ constituents are assigned discourse functions. In terms of a- to f-structure mapping, it can be non-linear as well. "Here non-linearity is caused by exceptional lexical entries with intrinsic non-canonical a-structure (e.g. 'receive' or 'please') and non-default verb forms (e.g. passive, causative structures)" (Pienemann, Di Biase, & Kawaguchi, 2005, p. 223). The formal presentation of this non-linear mapping process is made possible through Lexical Mapping Theory (Bresnan 2001).

Lexical Mapping Theory formulates some guiding principles that systematically explain how the argument structure mediates the mapping of conceptual representation of thematic roles onto the grammatical functions. Based on the relevant mapping principles of a- to f-structure mapping, Pienemann, Di Biase, and Kawaguchi (2005) propose the Lexical Mapping Hypothesis to explain how L2 learners go through the default mapping of a- to f-structure to non-default mapping and finally to complex mapping, as summarized in Table 2-2.

Table 2-2. The Lexical Mapping Hypothesis (adapted from Pienemann, Di Biase, & Kawaguchi, 2005)

Stage	a- to f- structure mapping	Structural outcomes	English Examples
3	Complex mapping	Causative	<i>She made her son wash the car.</i>
2	Non-canonical mapping	Passive	<i>The apple was eaten by him.</i>
	Lexically uncanonical mapping	Exceptional verbs	<i>He received a letter from John.</i>
1	Canonical mapping	Canonical Order	<i>He ate an apple.</i>

At stage 1, L2 Learners are constrained by one-to-one mapping and follow the default AGENT-to-SUBJ mapping. The most prominent role (i.e. the agent), is mapping onto the most prominent grammatical function (i.e. the SUBJ) in their respective prominence hierarchies. In ‘*He ate an apple*’, the most prominent role, the agent ‘*He*’, is mapped onto the SUBJ, the most prominent grammatical function (see Figure 2-14).

Active: eat	<agent,	patient>	a-structure
	SUBJ	OBJ	f-structure
	He	an apple	c-structure

Figure 2-14. Default mapping of a- to f-structure

When non-agent argument, i.e. less prominent roles such as patient or recipient, are mapped onto the SUBJ, the one-to-one correspondence, in terms of prominence, of AGENT-to-SUBJ and PATIENT-to-OBJ is disrupted and the mapping is non-default. In ‘*He received a letter from John*’, the recipient role ‘*He*’ is mapped onto the SUBJ, which is required by the exceptional verb ‘*receive*’ (see Figure 2-15). In ‘*The apple was*

eaten by him’, the patient ‘*the apple*’ is mapped onto the SUBJ, which is required by passivization (see Figure 2-16).

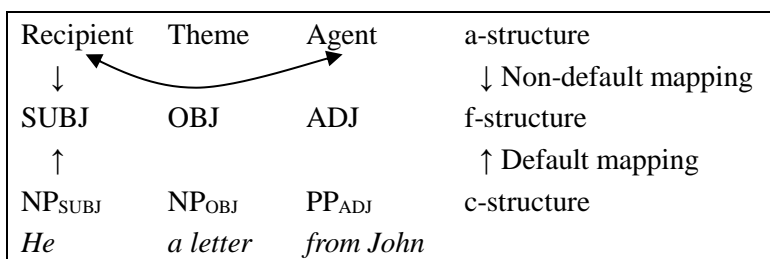


Figure 2-15. Non-default mapping of a- to f-structure (exceptional verbs)

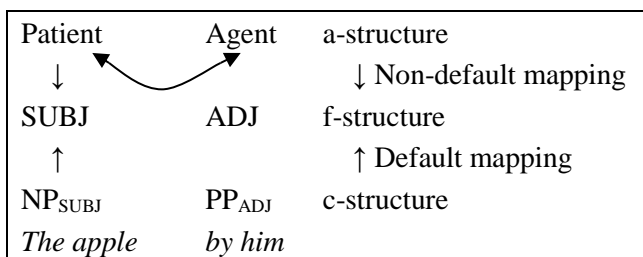


Figure 2-16. Non-default mapping of a-, and f-structure (passive)

After the stage of non-default mapping, learners are able to do complex mapping, as in “*She made her son wash the car*”, where the OBJ “*her son*” assumes two argument roles: one is the patient of the main verb “*made*” and the other is the agent of the verb “*wash*” (see Figure 2-17).

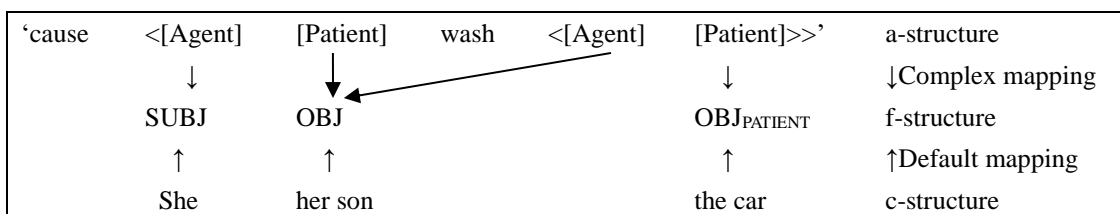


Figure 2-17. Complex mapping of a- to f-structure (causative) (adapted from Pienemann, Di Biase, & Kawaguchi, 2005)

Empirical evidence for the Lexical Mapping Hypothesis is not as robust. The evidence mainly comes from Kawaguchi’s studies on L2 Japanese passive, causative and benefactive structures (Kawaguchi, 2005, 2009, 2010), three studies on L2 English passive structures (Keatinge & Kessler, 2009; K. Wang, 2009, 2010) and one study on L2 Italian postverbal SUBJ structures (Bettoni, Di Biase, & Nuzzo, 2009). So far, no

empirical study on L2 Chinese has been conducted to apply the Lexical Mapping Hypothesis.

The above three PT-based hypotheses, i.e. the Unmarked Alignment, the Topic Hypothesis and the Lexical Mapping Hypothesis, depict the syntactic developmental path that L2 learners go through in their interlanguage development, from the linear alignment of the three parallel levels of structure to non-default mapping of c- and a- to f-structure.

Chapter 3 Chinese syntax from a processability perspective

The previous chapter laid out the theoretical basis for this thesis. In particular, a detailed account was given to the PT-based processing principles, i.e. information exchange and mapping principles. The current chapter is to utilize these principles to propose two processing hierarchies for L2 Chinese syntax. The general typological features of Chinese language are presented first, with a focus on topic-prominence features and word order of Chinese syntax. Then the Chinese syntactic structures under investigation are described according to PT-based processing principles, together with a formal description of these structures within the framework of Lexical Functional Grammar (Bresnan, 2001). The description of Chinese syntax is followed by a review of four empirical studies on L2 Chinese syntax from a processing perspective. Lastly, two PT-based processing hierarchies for L2 Chinese syntactic structures are hypothesized and research questions for the current study are reiterated.

3.1 The typological features of Chinese language

The Chinese language is known as an isolating or analytic language, because the words of Chinese do not have morphological complexity in terms of grammar. A typical word is made up of a single morpheme. As a result, many of the grammatical relationships that involve morphological markers (e.g., plural, tense, gender, case, agreement) in inflectional languages, either do not exist or are expressed through the lexicon, independent particles or word order (Norman, 1988). Three major typological features are reviewed in the following paragraphs.

The first typological feature of Chinese language is that tense is not grammatically realized in Chinese. Time references can be indicated through the lexicon (see *meitiang* ‘everyday’ underlined in sentence 3.1, indicating a present event) or particles (see the perfect aspect particles *le* in sentence 3.2, indicating a past event).

3.1 他 每天 学习 汉语
ta meitian xuexi hanyu
he everyday study hanyu
'He studies Chinese everyday.'

3.2 他 去 了 北京
ta qu le Beijing
he go PF Beijing
'He went to Beijing.'

The second typological feature is that no internal changes is involved in the Chinese words themselves. The verb *xuexi* 'study' in (3.1) does not need to agree with the third person singular SUBJ *ta* 'he' and the verb *qu* 'go' does not need to change its form to reflect the past tense. In comparison, these two instances require corresponding changes of verb forms in English, as indicated in the translations (the 3rd singular present morpheme '-s' and the irregular past tense form '*went*').

The third typological feature is that Chinese is regarded as a topic-prominent language from a functional point of view (e.g. Chu, 1995; C. N. Li & Thompson, 1976; C. N. Li & Thompson, 1981; Tsao, 1990). In topic-prominent languages, a sentence often starts with a nominal representing a TOP that names what the sentence is about. The TOP is definite or generic and refers to something that a speaker assumes the listener knows about (C. N. Li & Thompson, 1981). Li and Thompson (1976) point out that the major difference between SUBJ and TOP is that SUBJ is a sentence-internal notion and the TOP is a discourse notion. SUBJ can be understood best in terms of its functions within the sentence structure; thus SUBJ is normally determined by the verb, and is selectionally related to the verb. TOP can be understood best in terms of the discourse; thus TOP is discourse-dependent, serves as the centre of attention of the sentence, and must be definite.

Li and Thompson (1981) classify Chinese simple declarative sentences into the following four types according to the above definitions of TOP and SUBJ. The TOPs in the following sentences are double-underlined and the SUBJs are single-underlined.

(1) In the first type (see 3.3), the SUBJ and the TOP are identical, which is *wo* 'I' (underlined).

3.3 我 喜欢 吃 苹果
wo xihuan chi pingguo
I like eat apple
'I like to eat apples.'

(2) The second type (3.4) has both a TOP (i.e. *nashi gou* 'that dog') and a SUBJ (i.e. *wo* 'I').

3.4 那 只 狗 我 已经 看 过 了
na zhi gou wo yijing kan guo le
that CL dog I already see EXP PF
'The dog, I have seen already.'

(3) The third type has a TOP only (see *na ben shu* 'that book' in 3.5). The SUBJ is absent because it is understood from the context or because it is unnecessary and unimportant. In this case, the unmentioned SUBJ is 'someone'.

3.5 那 本 书 出版 了
na ben shu chuban le
that CL book publish PF
'That book, (someone) has published it.'

(4) The fourth type is the sentence without both TOP and SUBJ. This type often occurs in answers to questions, as in sentence 3.6, the TOP/SUBJ *wo* 'I' is understood from the context and therefore is omitted.

3.6 Question-你 看 过 李四 没有
ni kan guo lisi meiyou
you see EXP Lee not
'Have you seen Lee?'
Answer-(我) 没 看 过
(wo) mei kan guo
(I) not see EXP
'(I) haven't.'

Tsao (1990) proposes that there could be more than one TOPs in a sentence and a TOP does not necessarily occupy the sentence-initial position. He elaborates on a number of

properties of Chinese TOPs. The major properties are: (1) TOP is always definite; (2) TOP may, and often does, extend its semantic domain to more than one clause; (3) TOP is in control of the pronominalisation or deletion of all the coreferential NPs, when it extends its semantic domain to more than one clause; (4) TOP, except in clauses in which it is also SUBJ, plays no role in such processes as true reflexivization, Equi-NP deletion, and imperativization; (5) TOP can occupy the sentence-initial position and the preverbal position.

According to Tsao's list of TOP properties, a TOP is not restricted only to the sentence-initial position. It also appears in the preverbal position. This view is shared by Chu (1993, 1998). Tsao (1990) distinguishes the primary TOP and the secondary TOP. For example, sentence (3.7) contains a fronted OBJ in the preverbal position. Tsao labels the SUBJ *ta* 'he' as the primary TOP and the fronted OBJ *na ben shu* 'that book' as the secondary TOP.

3.7 他_i 那 本 书_j 看 完, ______i______j 就 还 给 我 了
 ta_i na ben shu_j kan wan, ______i______j jiu huan gei wo le
 he_i that CL book_j read finish, ______i______j then return to me PF
 'He finished reading the book and then (he) returned (it) to me immediately.'

Tsao argues that, except for its non-sentence-initial position, the fronted OBJ has three major semantic and syntactic properties of the sentence-initial TOP. First, a secondary TOP is definite or generic in reference. If the definite OBJ NP, *na ben shu* 'that book' in (3.7), is replaced by an indefinite OBJ NP *yi ben shu* 'one book', the sentence will be ungrammatical. Second, a secondary TOP extends its semantic domain to more than one clause, as evident in *i* and *j* in sentence (3.7). Third, a secondary TOP controls the coreferential NP deletion and pronominalisation when it extends its semantic domain to more than one clause, evident in the English translation of sentence (3.7).

Another group of Chinese linguists (e.g. Her, 1991; Tan, 1991), who study Chinese within a LFG framework, agree that TOP and SUBJ co-exist in Chinese grammar.

However they point out an inconsistency in the literature of Chinese linguistics in the use of TOP as a syntactic as well as a semantic notion. This inconsistency often results in imprecise definitions of TOP. Following the categorization of grammatical functions in LFG, they treat TOP as a grammatical function, a syntactic notion parallel to SUBJ and OBJ. They hold that there are stricter constraints on TOP than they seem to be. Tan (1991) points out that, “a topic has to bind a subcategorizable argument or refer to a set, of which the referent of an argument is a member or a subset” (p. 174). This point comes from the Extended Coherence Condition: FOCUS and TOPIC must be linked to the semantic predicate complex structure of the sentence in which they occur, either by functionally or by anaphorically binding an argument (Bresnan & Mchombo, 1987)

To sum up the above discussion on Chinese TOP, a TOP in Chinese

- (1) can be identical with a SUBJ and can be omitted if understood
- (2) can appear either in the sentence initial position or in the preverbal position
- (3) is a syntacticised discourse function and has to meet the Extended Coherence Condition

The final typological feature of Chinese to be reviewed is that Chinese word order plays an important role in marking grammatical relationships in Chinese. Word order not only indicates grammatical functions, such as SUBJ (see *wo* ‘I’ in 3.8 and 3.9) and OBJ (see *shu* in 3.8 and 3.9), but also signals definiteness and indefiniteness. According to Li & Thompson (1975, 1981), the postverbal position often encodes indefiniteness (see the translation of the postverbal OBJ *shu* as ‘a/some book/s’ in 3.8) and the preverbal position often encodes definiteness (see the translation of the preverbal OBJ *shu* as ‘the book/s’ in 3.9).

3.8 我 买 书 了
 wo mai shu le
 I buy book PF
 ‘I bought a/some book/s.’

3.9 书 我 买 了
shu wo mai le
book I buy PF
'The book/s I bought.'

Li & Thompson (1981) point out that Chinese demonstrates typological word order features of both SVO languages (e.g. postverbal auxiliaries and prepositions) and SOV languages (e.g. postpositions and aspect markers following the verb), according to Greenberg's (1966) word order universals.

Despite the fact that Chinese demonstrates both features of SVO and SOV languages, it is now well-accepted among Chinese linguistics that the basic word order of Chinese is SVO. Keenan (1976) offers a number of features that the basic word order possesses, such as the greatest privileges of occurrences, the easiest to adjoin to other sentences and to topicalize out of. They are roughly the simplest sentences syntactically and relatively free from presupposition. Pinker (1984) breaks these features down to one statement that the basic forms of a language are "roughly the simple, active, affirmative, declarative, minimally presuppositional, and pragmatically neutral sentences" (p. 297). Chinese SVO structure meets these criteria. According to Li & Thompson (1981), there are three possible positions for OBJ: the postverbal position as in a SVO sentence (see reproduced sentence 3.8), the initial position as in an OSV sentence (see reproduced sentence 3.9) and the preverbal position as in a SOV sentence (see 3.10).

3.8 我 买 书 了
wo mai shu le
I buy book PF
'I bought a/some book/s.'

3.9 书 我 买 了
shu wo mai le
book I buy PF
'The book/s I bought.'

3.10 我 书 买 了
wo shu mai le
I book buy PF
'I bought the book/s.'

Li and Thompson point out that, among these three possibilities, SVO is essentially pragmatically neutral, because it simply states the fact that *wo* 'I' have bought a/some book/s, thus requiring no presupposition (an implicit assumption) about the world or background belief relating to the utterance. In terms of the OSV and SOV counterparts, a presupposition is imposed on the listener that she/he is supposed to know what book/s the speaker is talking about.

The empirical evidence that the basic word order in Chinese is SVO comes from a number of quantitative studies. These studies were conducted to calculate the frequency of SVO sentences, among other word orders, in written and spoken texts. For example, Li & Thompson (1981), based on a sample text count, found that most of the simple declarative sentences, which are basically pragmatically neutral, have SVO order. Similar results were also reported in other statistical studies (e.g. Wen Jiang, 2013; Sun & Givón, 1985; M. Wang, 1988). Some studies from child first language acquisition (e.g. Chang, 1992; Erbaugh, 1992) also reported that SVO structures are acquired the earliest.

3.2 Chinese syntax from processability perspective

Given the above typological features of Chinese, it is now possible to give a detailed account of the Chinese syntactic structures investigated in this thesis from a processability perspective. The information exchange in PT (Pienemann, 1998b) and the mapping principles of c- to f-structures and a- to f-structures in the extend PT (Pienemann, Di Biase, & Kawaguchi, 2005) are utilized to describe the structures under investigation. The formal presentations of these structures are given within a LFG framework.

The Chinese syntactic structures under investigation are described according to the following categories in Table 3-1. Four major types of Chinese structures are:

- (1) Canonical SVO structures
- (2) XP + Canonical SVO structures
- (3) Non-canonical word order structures
- (4) Structures with complex lexical operations (complex structures)

Type (1) includes declaratives, Y/N questions and Wh- words questions. Type (2) has ADJ and NP TOP structures (ADJ/NP_{TOP}+SVO). Type (3) includes non-canonical word order structures with OBJ TOPs (OSV; SOV; SO_{BA}V). Type (4) includes structures with complex lexical operations (the existential, passive and causative structures).

Table 3-1. Chinese syntactic structures

Types	Categories	Structures
(1)	Canonical structures	Declarative/Y/N questions/Wh-questions
(2)	XP+canonical structures	ADJ/NP _{TOP} +SVO
(3)	Non-canonical word order structures	OSV/SOV/SO _{BA} V
(4)	Complex structures	Existential/Passive/Causative

3.2.1 Canonical structures

As has been discussed, the Chinese canonical word order is SVO. Three types of canonical SVO structures are investigated in the current study: declaratives, Y/N questions and Wh- words questions. Chinese declaratives have three subtypes according to the types of verbs (underlined), one with lexical verbs as *xuexi* 'study' in sentence (3.11), one with copular verb as *shi* 'is' in (3.12) and one with stative verbs as *gao* 'tall' in (3.13).

3.11 他 学习 汉语
 ta xuexi hanyu
 he study Chinese
 'He studies Chinese.'

3.12 他 是 学生
 ta shi xuesheng.
 ta is student.
 ‘He is a student.’

3.13 他 很 高
 ta hen gao
 ta very tall
 ‘He is very tall.’

The functional structure of sentence (3.11) is presented in Figure 3-1. The link between the TOP and the SUBJ indicates a default identification of both functions. A TOP needs to bind an argument, which is required by the extended coherence condition in LFG.

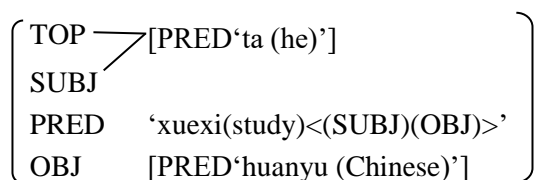


Figure 3-1. The f-structure of canonical SVO structures

Chinese Y/N questions and Wh-questions are also constructed in the same word order as declaratives. The former is formed by putting an interrogative marker *ma* (underlined) at the end of the sentence as in (3.14). The latter is formed by keeping the Wh-word in situ as *shenme* ‘*what*’, underlined in (3.15).

3.14 他 学习 汉语 吗?
 ta xuexi hanyu ma?
 he study Chinese QUE?
 ‘Does he study Chinese?’

3.15 他 学习 什么?
 ta xuexi shenme?
 he study what?
 ‘What does he study?’

In terms of the mapping principles, the Unmarked Alignment Hypothesis predicts that when the three levels of structure are mapped onto each other in a strictly one-to-one manner based on their prominence (see the reproduced Figure 2-7), the mappings of a-

to f-structure and c- to f-structure are default. The structural outcome is the canonical structure, which is language specific. For Chinese, it is SVO. In the above sentence (3.11) for example, the most prominent semantic role available (i.e. the agent *ta* 'he') is mapped onto the most prominent grammatical role (i.e. the SUBJ), which occupies the most prominent linear position in c-structure, namely the initial position. The less prominent semantic role (i.e. the theme *hanyu* 'Chinese') is mapped onto the less prominent grammatical role (i.e. the OBJ), which occupies the less prominent position (in the postverbal position in Chinese). In terms of information exchange, no information exchange among sentence constituents is required because of the strictly one-to-one correspondence of the three levels of structure on their hierarchically ordered prominence.

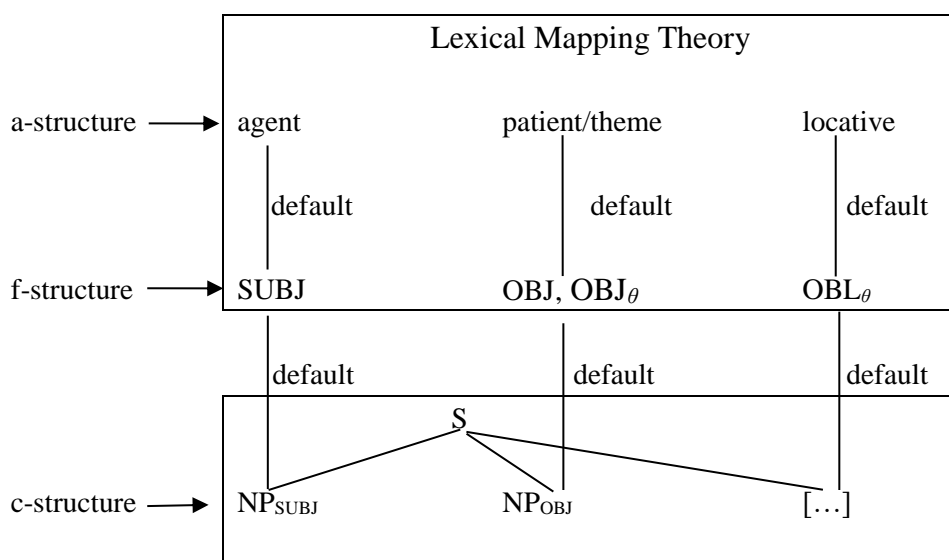


Figure 2-7. One-to-one correspondence (Pienemann, Di Biase, & Kawaguchi, 2005, p. 230)

3.2.2 XP + Canonical structures

XP + Canonical structures indicate that an external constituent (XP) is attached to the canonical string in the sentence initial position as a TOP. Two types of XP TOPs are investigated in the current study: Adjunct (ADJ) TOPs (e.g. *jintian* 'today' in 3.16) and NP TOPs (e.g. *zhege xiaohai* 'this kid' in 3.17).

3.16 今天 我 去 超市
jintian wo qu chaoshi
today I go supermarket
 ‘Today I will go to the supermarket.’

3.17 这个 小孩 他 吃 了 一 个 苹果
zhe ge xiaohai ta chi le yi ge pingguo
this CL kid he eat PF one CL apple.
 ‘This kid, he ate an apple.’

According to XP-adjunction rule of LFG, XP constituents should be assigned one of the non-argument functions TOP, FOC or ADJ. In sentence (3.16), the time ADJ *jintian* ‘today’ is adjoined to XP and is simultaneously the TOP of the sentence, as indicated by the link in Figure 3-2.

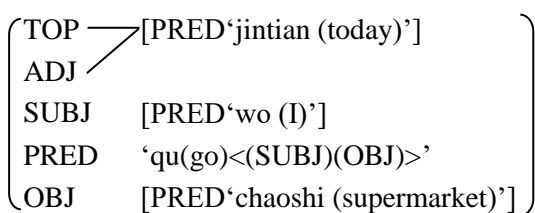


Figure 3-2. The f-structure of ADJ TOPs

In sentence (3.17), the nominal phrase *zhege xiaohai* ‘this kid’ is adjoined to XP as the sentence TOP. This kind of structure is termed the left-dislocation structure. The TOP (e.g. *zhege xiaohai* ‘this kid’ in sentence 3.17) in the left-dislocation structure is sometimes referred to as a dislocated TOP, or ‘external TOP’ (Aissen 1992, King 1995, as cited in Bresnan 2001, p. 68). According to LFG (Bresnan 2001), in order to meet the extended coherence condition, a dislocated TOP needs to be anaphorically linked to a pronominal element within the clause. The anaphorical link is shown in Figure 3-3, where the dislocated TOP *zhege xiaohai* ‘this boy’ is anaphorically linked to the pronominal element *ta* ‘he’.

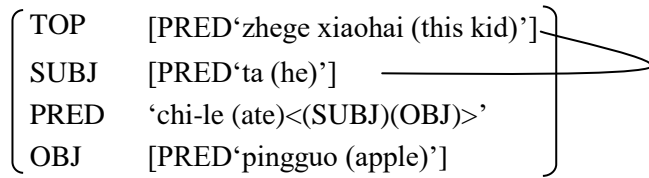


Figure 3-3. The f-structure of NP TOPs

In terms of processing procedures, the Topic Hypothesis predicts that when the initial prominent position is occupied by a non-core argument, such as an ADJ, the mapping of the c- to f-structure is non-default, because the most prominent initial position is not occupied by the most prominent argument (i.e. the SUBJ) (see the reproduced Figure 2-10). The rest of the sentence still remains canonical. The ADJ *jintian* ‘today’ in sentence (3.16) and the NP *zhege xiaohai* ‘this kid’ in (3.17) occupy the prominent sentence initial position as TOPs. The remaining constituents of the sentence remain canonical and it is fully complete and coherent on its own.

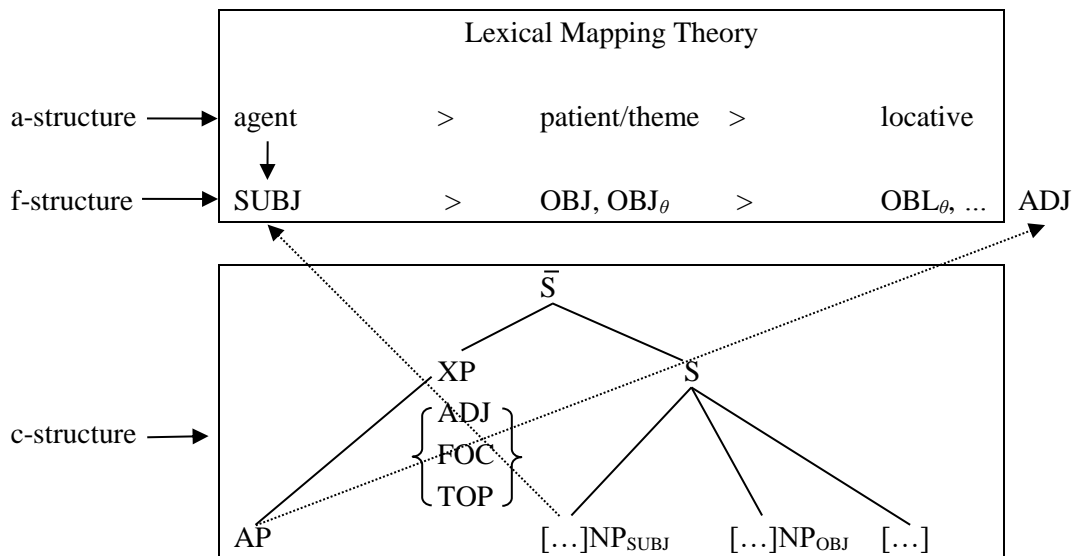


Figure 2-10. XP-adjunction in interlanguage (after Pienemann, Di Biase, & Kawaguchi, 2005, p. 234)

In terms of information exchange, according to Bresnan (2001), “the ADJ function binds to a PRED rather than to one of its arguments: an ADJ satisfies completeness and coherence by occurring in the same f-structure as the PRED it modifies” (p. 97). In other words, ADJs have their own PRED; therefore they do not need to exchange information with other constituents. As for NP TOPs (external/dislocated TOPs in LFG

terms), according to LFG, the referential index of the NP TOPs needs to identify with that of the pronominal elements within the clause, i.e., the SUBJ. In sentence (3.17) for example, the referential index (i.e. PERSON, NUM and GENDER) of the NP TOP *zhege xiaohai* ‘this kid’ needs to exchange the referential index (i.e. PERSON and NUM) of the SUBJ, *ta* ‘he’, as shown in Figure 3-4.

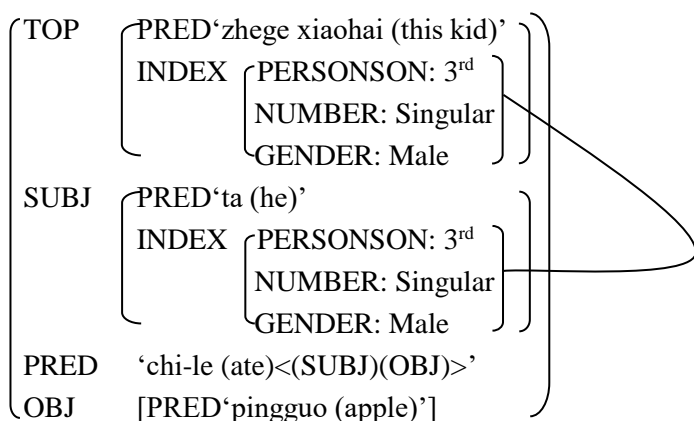


Figure 3-4. The f-structure of NP TOPs

3.2.3 Non-canonical structures

There are three types of non-canonical word order structures in Chinese syntax: the OSV structure (see 3.18), the SOV structure (see 3.19) and the SO_{BA}V structure (see 3.20). They all have an OBJ TOP, underlined in each sentence.

3.18 苹果 他 切 了
pingguo ta qie le
apple he cut PF
 ‘The apple, he cut.’

3.19 我 作业 做 了
 wo zuoye zuo le
 I homework do PF
 ‘Homework I’ve done.’

3.20 我 把 那 所 房子 卖 了
 wo ba na suo fangzi mai le
 I BA that CL house sell PF
 ‘I have sold that house.’

3.2.3.1 The OSV structure

In the OSV structure, the OBJ is in the prominent initial position as the TOP. According to the extended coherence condition, TOP needs to bind an argument, as indicated by the link in Figure 3-5.

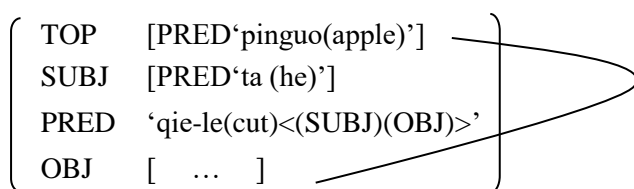


Figure 3-5. The f-structure of OSV

In terms of mapping, according to the Topic Hypothesis, when a less prominent syntactic function, such as an OBJ or OBJ_θ, is mapped to the most prominent initial position in c-structure, the mapping between c- to f-structure is no longer following the canonical mapping according to the prominence hierarchies. The structural outcome is the non-canonical structure, as shown in Figure 2-12 (reproduced from Chapter 2).

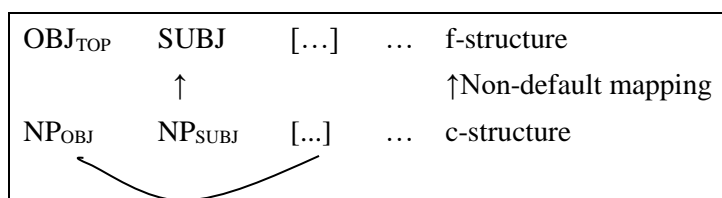


Figure 2-12. Non-default mapping of OSV

In terms of information exchange, according to LFG, the discourse function of TOP need to identify the clause-internal syntactic function, i.e. the OBJ. That is why the OBJ TOP is termed ‘internal topics’, which is different from the NP TOPs (the external topics) in the left-dislocation structure. Bresnan (2001) points out that the difference between the external and internal TOPs is that “when dislocated topics (in the left-dislocation structure) are anaphorically linked to a pronominal element within the clause, what is identified is not the f-structure value of the DF (discourse function) and clause-internal function (which would cause a functional uniqueness violation), but the referential index of the two functions” (p. 68).

Pienemann, Di Biase, and Kawaguchi (2005) also refer to information exchange in the case of Wh-questions, where FOC is linked to OBJ as in ‘*what did he buy*’. The link is shown in the reproduced Figure 2-13. Pienemann, Di Biase, and Kawaguchi (2005) point out, “information about the link between FOCUS and OBJ needs to be exchanged between the two grammatical functions, and this information exchange constitutes one aspect of non-linearity that is present in Wh-questions” (p. 236).

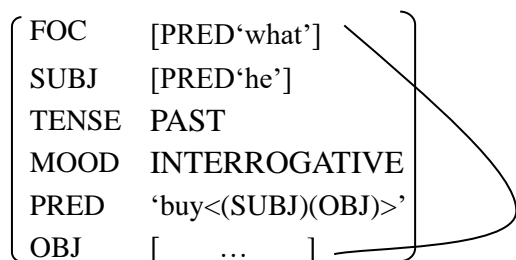


Figure 2-13. The f-structure of ‘*What did he buy?*’

Under the same category of OBJ topicalization, the OV structure with SUBJ ellipsis should also be included (see sentence 3.21). Li & Thompson (1981) states, “when the direct object is the topic, the subject may be unexpressed if it is unimportant, unknown, or understood” (p. 160). The f-structure of the OV structure is presented in Figure 3-6, which shows the SUBJ ellipsis as the ‘pro’ (zero pronoun) value and the TOP *pingguo* ‘*the apple*’ identifies the OBJ.

3.21 苹果 (他) 切 了
pingguo (ta) qie le
apple (he) cut PF
 ‘The apple, (he) cut.’

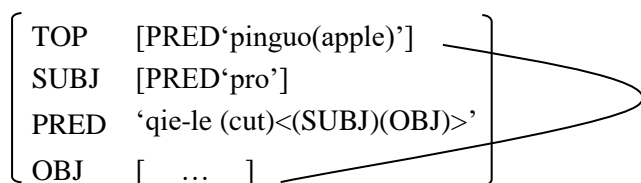


Figure 3-6. The f-structure of OV

3.2.3.2 The SOV structure

As has been discussed, the preverbal OBJ in the SOV structure is a TOP (as *zuiye* 'homework' in sentence 3.19). Because the preverbal OBJ TOP is not in the initial position, it is treated as a secondary TOP to distinguish it from the initial OBJ TOP in the OSV structure. The f-structure of the SOV structure is presented in Figure 3-7, which shows that the secondary TOP *zuoye* 'homework' binds the OBJ, the same as the initial OBJ TOP in the OSV structure.

3.19 我 作业 做 了
 wo zuoye zuo le
 I homework do PF
 'The homework I've done.'

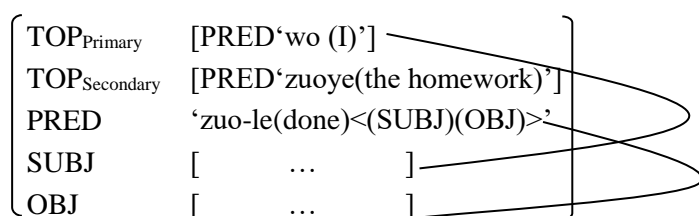


Figure 3-7. The f-structure of SOV

In terms of c- to f-structure mapping, it is the same with the Chinese canonical SVO structure, because the mapping of the three levels of structure follows the strict one-to-one mapping according to their hierarchically ordered prominence, as proposed in the Unmarked Alignment Hypothesis (as shown in Figure 3-8).

Agent	Patient	...	a-structure
↓	↓		↓ Default mapping
SUBJ _{TOP(primary)}	OBJ _{TOP(secondary)}	...	f-structure
↑	↑		↑ Default mapping
NP _{SUBJ}	NP _{OBJ}	...	c-structure

Figure 3-8. The unmarked alignment of SOV

In terms of information exchange, it does the same as the OSV structure does, indicated by the link between the discourse function of TOP and the syntactic function of OBJ in Figure 3-7. Without the link, the f-structure is incomplete and functional uncertainty (in

LFG terms) arises. The link between the TOP function and the OBJ function makes it distinct from the Chinese canonical SVO structure. The reproduced f-structure of Chinese canonical SVO in Figure 3-1 shows that there is no such link between the TOP and the OBJ. The ‘shortcut’ link between the TOP and the SUBJ is by default, indicating the universal default that optionally identifies SUBJ and TOP.

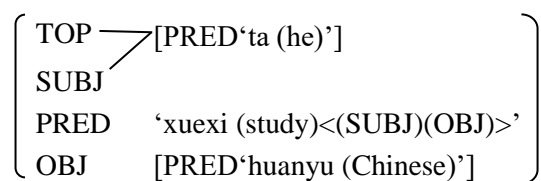


Figure 3-1. The f-structure of canonical SVO

The Chinese SOV structure also shares a structural similarity with the Japanese SOV structure. However, because canonical word order is language specific, the SOV structure is the canonical word order in Japanese, which involves no exchange of information. Therefore the non-canonical nature of the Chinese SOV structure can be explained by the functional link between the discourse function of TOP and the syntactic function of OBJ, which makes it resemble the Chinese non-canonical OSV structure, but distinct from the Chinese canonical SVO structure and the Japanese canonical SOV structure.

3.2.3.3 The SO_{BA}V structure

The third type of non-canonical word order investigated in this thesis is the SO_{BA}V structure. The BA in this structure was originally used as a verb meaning ‘to hold/to take’ in Middle Chinese. In modern Chinese it has changed into a preposition-like element that has some co-occurrence constraints on the following noun and predicate and has a ‘disposal’ meaning. In the BA sentence (3.22), the emphasis is placed on the result of verb on the NP after BA (BA NP hereafter), ‘*nage pingguo*’. The BA-sentence (3.22), is different from its canonical SVO counterpart (see 3.23) in two aspect. In semantic terms, the canonical sentence simply states a fact, while the BA-sentence has a disposal meaning and stresses the result of the verb. With respect to structure, the OBJ

in the canonical structure is in its default postverbal position, while the OBJ (the BA NP) in the BA-structure is fronted to the preverbal position and inserted after BA. This makes the BA-sentence resemble the SOV structure. They both have a fronted OBJ.

3.22 我 把 那 个 苹 果 吃 了
wo ba na ge pingguo chi le
I BA that CL apple eat PF
'I ate that apple.'

3.23 我 吃 了 那 个 苹 果
wo chi le na ge pingguo
I eat PF that CL apple
'I ate that apple.'

An issue arises concerning whether the BA NP, the fronted OBJ. Tsao (1990) reviewed the work by Mei (1978), Chu (1979) and Li et al. (1984) and found that their studies suggest that the BA NP should be treated as a TOP of some sort, but none of them gives much evidence in support of the claim. Tsao treats the SUBJ in the BA-structure as the primary TOP and the NP after BA as the secondary TOP. He argues that the BA NP has most of the semantic and syntactic properties of Chinese TOPs, as the secondary TOP in the SOV structure does. First, a secondary TOP is definite or generic in reference. If the definite OBJ NP, *fangzi* 'that house' in (3.24), is replaced by an indefinite OBJ NP *yi ge fangzi* 'one house', the sentence will be ungrammatical. Second, a secondary TOP extends its semantic domain to more than one clause, as evident in *i* in sentence (3.24). Third, a secondary TOP controls the coreferential NP deletion and pronominalisation when it extends its semantic domain to more than one clause, evident in the English translation of sentence (3.24).

3.24 李四 把 房子_i 整修 了一下, ____i 砌 了 漆, 然后 ____i 卖 出去
Lisi ba fangzi_i zhengxiu le yi xia, ____i qi le qi, ranhou ____i mai chuqu
Lee BA house_i repair PF a little, ____i paint PF paint, then ____i sell out
'Lee had painted the house, repaired it and then sold it.'

Therefore, the BA NP possesses the same TOP properties as the preverbal OBJ in the

SOV structure does. Its f-structure can be presented in a similar manner as the SOV structure. In Figure 3-9 (after the reproduced example sentence 3.20), BA is treated as the case marker of the direct OBJ of the main verb, the SUBJ of the Ba-structure is the primary TOP (TOP1) and the BA NP is the secondary TOP (TOP2). The same as its OSV and SOV counterparts, the TOP identifies the OBJ.

3.20 我 把 那 所 房子 卖 了
 wo ba na suo fangzi mai le
 I BA that CL house sell PF
 'I have sold that house.'

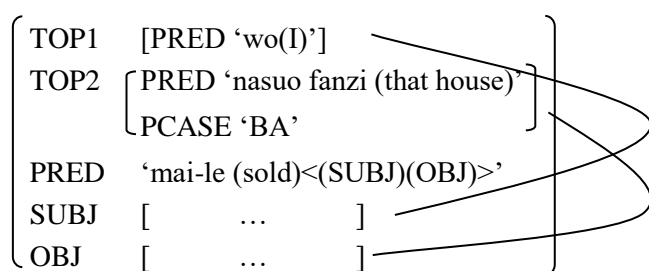


Figure 3-9. The f-structure of SO_{BA}V

3.2.4 Complex structures

According to the Lexical Mapping Hypothesis, the non-default mapping of a- to f-structure involves the mapping of thematic roles to less prominent thematic roles on the thematic hierarchy to the SUBJ function or assigning more thematic roles to one syntactic function. Three Chinese syntactic structures involve such a non-default mapping process. They are the passive structure, the existential structure and the causative structure. Because the non-default mapping of a- to f-structure does not concern the c-structure, information exchange is irrelevant.

3.2.4.1 The passive structure

The Chinese passive structure (see 3.25) has a patient subject and a passive marker BEI/RANG/JIAO, which introduces the agent of the action. The agent, marked by BEI, is optional if the agent is not mentioned or unimportant. The agent, marked by other markers (i.e. RANG/JIAO), is obligatory. The Chinese passive often implies a sense of

adversity or misfortune.

3.25 SUBJ_{PATIENT}+ Passive Marker_{BEI/RANG/JIAO/GEI/YOU} + Agent+Verb

The mapping of a-structure to f-structure in the passive structure is non-default, because the patient, a less prominent role on the thematic hierarchy, is mapped onto the most prominent syntactic function of SUBJ. This disrupts the unmarked alignment of AGENT-to-SUBJ and PATIENT-to-OBJ. The mapping of a- to f-structure in the example passive sentence (see 3.26) is presented in Figure 3-10. As the figure shows, the patient *ta* ‘he’ is mapped to the SUBJ and the agent *ren* ‘someone’ is embedded in the BEI phrase as a part of the OBL_θ.

3.26 他 被 人 打 了
 ta bei ren da le
 he Bei someone hit PF
 ‘He was hit by someone.’

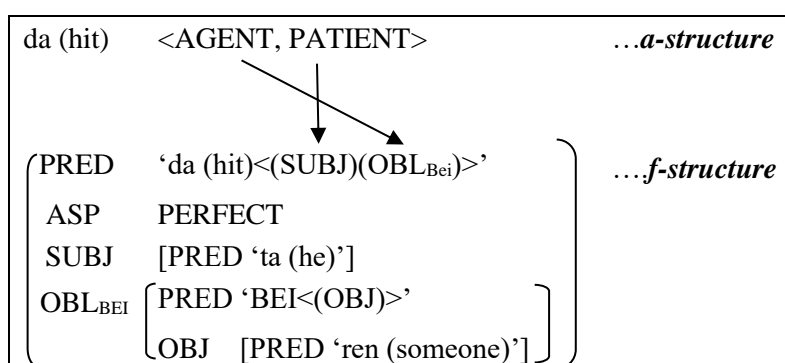


Figure 3-10. Non-default a- to f-structure mapping of passive structures

3.2.4.2 The existential structure

Li and Thompson (1981) put the existential structure under the category of the presentative structure, which is used to introduce new information. The structural feature of the existential structure is demonstrated in (3.27), where there is a topical locative phrase with an optional prepositional *zai* ‘at’, followed by an existential verb and a presented noun phrase (new information) with an optional verb phrase. Sentence 3.28 is an example of the existential structure.

3.27 (zai ‘at’) + locus + existential verb + presented noun phrase + (verb phrase) (C. N. Li & Thompson, 1981, p. 510)

3.28 (在) 图 里 有 三 个 人 (打 篮球)
(zai) tu li you san ge ren (wan lanqiu)
(PREP) picture inside have/has three CL person (play basketball)
‘There are three people in the picture playing the basketball.’

Three types of existential structures are investigated in this thesis: type (1) with the verb *you* (see the above sentence 3.28); type (2) with the copula verb *shi* (see 3.29); type (3) with other lexical verbs (see 3.30).

3.29 后面 是 我 的 学校
houmian shi wo de xuexiao
behind is I GEN school
‘Behind is my school.’

3.30 她的 梦乡 里 出现 她 喜欢 的 人
tade mengxiang li chuxian ta xihan de ren
her dream in appear she like RC ren
‘In her dream appeared the person she likes.’ (Mitsu, T5)

According to Bresnan and Kanerva (1989, p. 25), a locative role has an intrinsic value of [-o], which means that a locative role cannot be encoded as OBJ, but it can be SUBJ or OBL. Tan (1991), based on Keenan’s (1976) definition on SUBJ, developed a subjecthood test, including such SUBJ properties as reflexive binding, adjunct control, questionability and possessor relativizing. Tan applied the test to the existential structure to show the SUBJ status of the locative NP. I’ll quote the first three (reflexive binding, adjunct control and questionability) to illustrate her point.

(1) Reflexive binding:

Reflexive binding is not applicable to test locative, because it is [+human]. However, the test shows that the postverbal NP cannot control the reflexive binding. The verb *diaojin* ‘fall-into’ may have its theme argument ‘hunter’ preverbal (see 3.31) or

postverbal as in (see 3.32). If *'hunter'* were the subject in both sentences, it should be able to bind the reflexive possessor *'self's (trap)'* in both sentences. However, only in (3.31) does the *'hunter'* bind the reflexive. The reflexive in (3.32) is unacceptable due to the lack of a binder.

3.31 猎人 掉进了自己的陷阱里
lieren diao jin le ziji de xianjing li
hunter fall into PF self GEN trap inside
 'The hunter fell into his own trap.'

3.32 (*自己的) 陷阱里 掉进了 猎人
 (*ziji de) xianjing li diao jin le lieren
 (*self GEN) trap inside fall into PF hunter
 'Into the/*his own trap fell a hunter.'

(2) Adjunct control

Tan chose two ADJs: *jinzhangde* 'nervously' and *manmande* 'to its full capacity'. The former selects an animate SUBJ and the latter selects a locative SUBJ. If *'ten people'* were SUBJ in both (see 3.33, preverbal) and (3.34, postverbal), *'nervously'* would be a suitable ADJ for both. However when the *'ten people'* is postverbal, it is not acceptable, indicating the postverbal *'ten people'* is not SUBJ. In comparison, if *'room inside'* were not the SUBJ in either (3.35, postverbal) or (3.36, preverbal), the ADJ *'to its full capacity'* would not be acceptable in either. However, when the *'room inside'* is preverbal, it is acceptable, indicating the preverbal *'room inside'* is the SUBJ.

3.33 十个人 (紧张地) 站在屋里
 shi ge ren (jin zhangde) zhan zai wu li
 ten CL people (nervously) stand PREP room inside
 'Ten people (nervously) stand in the room.'

3.34 屋里 (*紧张地) 站着十个人
 wu li (*jin zhang de) zhan zhe shi ge ren
 room inside (*nervously) stand DUR ten CL people
 'In the room, (*nervously), stand ten people.'

3.35 十 个 人 (*满 满 地) 站 在 屋 里
 shi ge ren (*man man de) zhang zai wu li
 ten CL people (*full-and-full) stand PREP room inside
 ‘Ten people, (*to its full capacity), stand in the room.’

3.36 屋 里 (满 满 地) 站 着 十 个 人
 wu li (man man de) zhan zhe shi ge ren
 room inside (full-and-full) stand DUR ten CL people
 ‘In the room, (to its full capacity), stand ten people.’

(3) Questionability

The sentence (3.37) shows that any of the constituents in the existential sentence could be questioned.

3.37 哪 儿 坐 着 谁?
 where sit DUR who?
 ‘Who sits where?’

Tan used the subjecthood test to show that locative NP has the SUBJ property. This thesis follows Tan’s view to treat the locative in the existential structure as SUBJ. According to the Lexical Mapping Hypothesis, non-default a- to f-structure mapping involves the mapping of the most prominent syntactic function of SUBJ to non-agent thematic roles or less prominent roles on the prominent thematic hierarchy of prominence, i.e. agent > beneficiary > experiencer/goal > instrument > patient/theme > locative (Bresnan, 2001, p. 307). Locative is the least prominent thematic role on the hierarchy, indicating the least possibility of locative to be SUBJ. Therefore, the mapping of locative to SUBJ gives rise to non-default mapping, as shown in Figure 3-11.

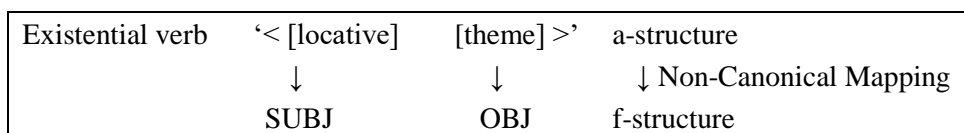


Figure 3-11. The non-default mapping of existential structures

3.2.4.3 The causative structure

The Chinese causative sentence is formed as a result of the juxtaposition of a verb meaning ‘cause’ and a clausal direct OBJ (C. N. Li & Thompson, 1981). Its structural pattern is illustrated in (3.38). The first verb has a causative meaning and its OBJ assumes two thematic roles, the patient of the first causative verb and the agent of the second verb. Common Chinese causative verbs are *rang* ‘let’, *jiao* ‘made’, *yao* ‘want’, and *qing* ‘invite’. The sentence (3.39) is an example of Chinese causative structure. The f-structure of the causative sentence (3.39) is shown in Figure 3-12, where the OBJ of the causative verb *rang* ‘let’ is linked to the SUBJ of the XCOMP.

3.38 SUBJ_{AGENT}+Causative verb_{RANG/JIAO/YAO/QING}+OBJ_{PATIENT/AGENT}+Verb+(OBJ)

3.39 妈妈 让 迈克 学习 汉语
 mama rang maike xuexi hanyu
 mom let Mike study Chinese
 ‘Mom lets Mike study Chinese.’

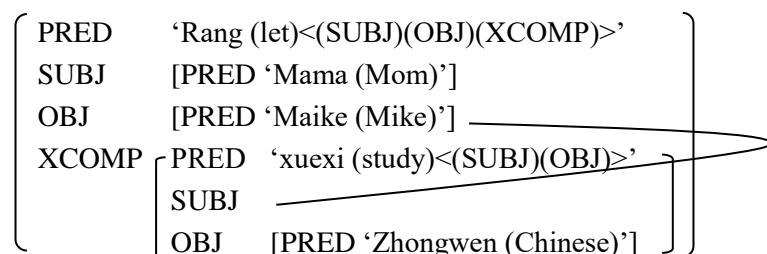


Figure 3-12. The f-structure of causative structures

Sun (2006) points out that the causative verb indicates “the NP between two verbs functioning simultaneously as the undergoer (or affected) of the initial verb and the doer (or agent) of the second verb” (p. 205). As shown in Figure 3-13, the OBJ ‘Mike’ assumes two thematic roles, one being the patient of the causative verb ‘rang’ and the other being the agent of the base verb *xuexi* ‘study’. According to the Lexical Mapping Hypothesis, “this mapping process deviates from the default canonical mapping specified in the Unmarked Alignment Hypothesis because two thematic roles are fused in the Event and subevent” (Pienemann, Di Biase, & Kawaguchi, 2005, p. 244).

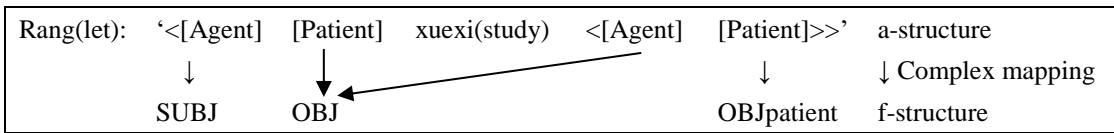


Figure 3-13. Complex mapping of causative structure (after Pienemann, Di Biase, & Kawaguchi, 2005, p. 244)

3.3 Empirical studies on L2 Chinese syntax from a processing perspective

In this subsection, four empirical studies on L2 Chinese syntax from a processing perspective are reviewed. These studies are: Xu (1988); Wen (2006); Gao (2005); Zhang (2007).

Motivated by the psycholinguistic processing strategies developed by a group of German researchers in the ZISA project to account for German L2 word order development (Clahsen, 1984a; Meisel et al., 1981), Xu (1988) and Wen (2006) investigated the L2 acquisition of adverb placement and two word order variations respectively.

Gao (2005) and Zhang (2007) conducted their empirical studies within the framework of Processability Theory to investigate the L2 acquisition of Chinese syntax. Gao (2005) utilized the processing principles of information exchange and saliency in PT (Pienemann, 1998b). Zhang (2007) employed the mapping principle of c- to f-structure in the Topic Hypothesis (Pienemann, Di Biase, & Kawaguchi, 2005).

Xu (1988) investigated the position of the adverb in Chinese foreign language acquisition and aimed to test whether L2 Chinese adverb acquisition followed the developmental sequence of L2 German word order acquisition proposed in the ZISA project. To extract the adverb-related stages gives rise to the following stages of L2 German adverb acquisition:

Stage 1: SVO + Adv (Adv final)

Stage 2: Adv + SVO (Adv initial)

Stage 3: S + Adv + VO or SV + Adv + O (Adv insertion)

Xu summed up two key principles from this staged development:

- (1) Sentence external placement of Adv is psychologically simpler than sentence internal placement.
- (2) Breaking an SVO string would be more difficult than to keep SVO as an uninterrupted sequence.

To test the applicability of these principles to L2 Chinese adverb acquisition, Xu observed two groups of L1 English adult learners of Chinese. He was the tutor for the two groups. One group consisted of three learners with 30 hours previous Chinese instruction before data collection. Data were collected during group study two hours a week over a period of one year. The other group consisted of six learners with 40 hours previous Chinese training. The informants were given sentence composition tasks to make sentences out of randomly ordered sentence elements.

After the analysis of these two sets of data, Xu found that adverbial insertion occurred earlier than initialization and finalization, which seemed to contradict with Clashes's (1984) claim that insertion of elements into the basic string is more psycholinguistically difficult. Xu attributed the differences to the typological differences between Chinese and German. A lack of morphological complexity in Chinese may be the cause.

Xu's study shows an effort to adopt an existing theory to explore word order acquisition from a processing perspective. However, he did not explain the observed stages based on the theoretical framework he adopted. Instead, he simply attributed the differences to typological differences.

One possible source of the adverbial insertion in early L2 interlanguage may be explained by PT-based processing principle of information exchange. As has been discussed earlier, according to Bresnan (2001), "the ADJ function binds to a PRED rather than to one of its arguments: an ADJ satisfies completeness and coherence by occurring in the same f-structure as the PRED it modifies" (p. 97). In other words, ADJs

have their own PRED; therefore they do not need to exchange information with other constituents. Due to its low processing demands, as soon as the L2 learner acquired the category procedure to identify different phrases, they are able to place adverbial ADJs according to the default position in L2 input. In Chinese, the preverbal position is the default position for adverbial ADJs.

Wen (2006) investigated the acquisition sequence of three Chinese constructions of two word order variations SVO and SOV. These three Chinese structures are:

(1) The verb complement: SVOVC (OBJ and C=complement, underlined)

3.40 我 弟弟 下 象棋 下 得 很 好
wo didi xia xiangqi xia de hen hao
my brother play chess play DE very well (DE: verbal complement particle)
'My brother plays chess very well.'

(2) Question words as indefinite pronouns functioning as the object: SOV

3.41 我 什么 运动 都 喜欢
wo shenme yundong dou xihuan
I whatever sports all like
'I like all sports.'

(3) The BA-structure: SO_{BA}V (OBJ underlined)

3.42 小孩子 把 书 都 整理 好了
xiaohaizi ba shu dou zhengli hao le
children BA books all tidy well PF
'Children have tidied up all the books.'

Wen's (2006) rationale of choosing these three structures is that, in addition to their different syntactic features, these structures demonstrate shared and varied semantic and pragmatic properties. For example, both the verb complement and the BA-structure stress the result of the verb. Both the structure of non-interrogative question words and the BA-structure involve a VO inversion. The OBJ in the former conveys a notion of inclusiveness and totality; while the OBJ in the latter has to be definite or generic, showing the affectedness of the OBJ. These features allow her to capture and examine

the interactions of word order, meaning and function.

Her research questions are: (1) whether there is a sequence in acquiring the three constructions? ; (2) if there is one, what is it? To address the research questions, she conducted a cross-sectional study on 50 L1 English learners of three proficiency levels (beginners, intermediate and advanced learners) during a nine-week Chinese training program at a USA college. Data collection started in week seven through individual interviews. Two methods were used to elicit the target structures: one was answering questions and another was picture-based talking and answering questions. The recorded speech data were transcribed and the rate of accuracy for each structure was calculated.

Her results showed that the verb complement was acquired at the earliest stage and the BA-structure at the latest stage. Based on the results, Wen hypothesized that there may be three stages of Chinese word order acquisition:

Stage 1: an SVO word order

Stage 2: a verb-object interruption and restructuring stage

Stage 3: the rearrangement of the order of verb-object and the whole sentence.

She then explained this staged development of word order acquisition according to psycholinguistic constraints. Four sources of constraints were identified: (1) word order variation constraint; (2) the formal complexity constraint; (3) the functional complexity constraint; (4) the transparency of form-meaning connections. The word order constraint derives from canonical order strategy (Clahsen1984), which proposes that the earliest and dominant appearance SVO structures, because this structure corresponds to a direct mapping of the underlying relations to surface strings. It does not take much mental capacity to process the form and function of the material. Any deviation from this canonical order poses processing constraint. The formal complexity constraint involves the operational processes in assembling a sentence. For example, the operation of the type (1) verb complement structure (SVOVC) calls for a duplication of the verb

in order for the OBJ and the complement to follow the verb immediately. In comparison, the type (3) SO_{BA}V structure involves more operational elements, i.e., the insertion of the marker BA into the preverbal position and attachment of aspect and sentence final particles and preposition phrases.

Wen's study reveals the fact that non-canonical word order acquisition is a complex process. Different aspects of psycholinguistic constraints are at work and play important roles in the word order acquisition. However, there is not a unified principle under her proposed constraints on the word order acquisition.

Three researchers examined L2 Chinese grammar from a Processability processing perspective (Pienemann, 1998b, 2005a). These studies are Zhang (2001, 2007), Gao (2005) and Charters (2005). I will review Gao (2005) and Zhang (2007), whose research focus is on Chinese syntax.

In her PhD research, Gao (2005) followed Zhang's (2001) PhD study to examine five noun phrase morphemes in interlanguage Chinese. Moreover, Gao is the first study to investigate the Chinese TOP structures within the framework of PT. Based on two PT principles (Pienemann, 1998b), the information exchange and saliency principle, Gao proposed a five-stage hierarchy of NP and topic development for L2 Chinese:

Stage 1: single words

Stage 2: *-de* (GEN), *-de* (ATT), *-de* (ADJ) and canonical order

Stage 3: classifiers and adjunct-fronting

Stage 4: *-de* (RC) and topicalisation

Stage 5: the BA-structure

Table 3-2 shows Gao's PT-based predictions of the development of Chinese TOP structures. Processing demands increase as the level of information exchange increases, thus defining the progressive sequence of L2 Chinese TOP development.

Table 3-2: Predictions of Topic development (adopted³ from Gao, 2005, p. 174)

Stages	Procedures	L2 processes	Syntax
5	S-procedure	Info exchange between two internal constituents	Embedded topic: the <i>ba</i> -structure
4	Simplified S-procedure	Info exchange between internal and salient constituents	Topic + SV(O)
3	Phrasal procedure	Phrasal info exchange Recognition of salient positions	Adjunct fronting
2	Category procedure	No info exchange Canonical order	SVO
1	Lemma access	None	Words

The first two stages involve no information exchange. At stage one, lemma access requires no processing procedure. At stage two, the category procedure enables learners to recognize nouns and verbs and string them together strictly following the canonical word order.

At stage three, the phrasal procedure allows learners to recognize sentence salient initial and final positions. Therefore, they are able to map ADJs directly onto such salient boundary positions. The canonical word order is intact with only ADJ attached to clause initial and final positions.

At stage four, the simplified S-procedure comes into force, which allows learners to recognize grammatical functions, such as SUBJ, PRED and OBJ. Therefore, learners are able to distinguish the SUBJ NP from other NPs such as OBJ or TOP and they are ready to topicalize non-SUBJ argument, which requires information exchange between an internal function (e.g. SUBJ or OBJ) and a function at a salient position (e.g. TOP).

At the last stage, learners are able to produce the BA-structure. Gao does not treat BA as a preposition or a co-verb. Instead, she follows Bender's (2000) view to treat BA as a

³ The original order of stages (from the lowest stage 1 to the highest stage 5) and corresponding procedures/L2 processes/syntax are reversed to the current presentation from the highest stage 5 to the lowest stage 1 to be consistent with current thesis. The contents in the table remain unchanged.

verb, the OBJ of BA as an embedded TOP, and the remaining elements as the complement of BA. As a result, information exchange takes place between two internal constituents, i.e., between embedded TOP and the BA complement.

To test her PT-based prediction, Gao collected the data in two language settings: one from five L1 English learners during a seven-month longitudinal study in New Zealand, a foreign language setting, and the other one from five L1 Japanese learners and five L1 German learners during a cross-sectional study in China, a second language setting. In her longitudinal study, the Chinese proficiency levels of the five informants were determined by the length of their Chinese study at the university. There were: one absolute beginner from the year-one program, two informants from the year-two program, and another two informants from the year-three and year-four programs respectively.

Findings confirmed the sequence predicted based on PT for the TOP development. The year-one informant eventually achieved the third stage at T5&6 (Week 22-26), ADJ-fronting. The two year-twos were already at stage 3 at T1&T2 (Week 4-8); however, there were not enough tokens to prove the stage 4 had been achieved. The year-three informant achieved stage 4 from T3&T4 (Week 12-18). The year-four informant was the only learner who produced the BA-structure and had achieved all the five stages from T1&T2.

Gao (2005) is the first study that investigated the L2 acquisition of Chinese TOP-related syntactic structures within the framework of PT. She not only documented the staged L2 Chinese topic development, but also explained why such a sequence was observed by using two principles of PT, information exchange and saliency.

However, one limitation in Gao's study is related to the limitation in the original PT itself, i.e. the adoption of a general cognitive principle of saliency. Pienemann (2005b) points out that the areas where this principle is utilized can be either explained by

relying solely on information exchange itself (e.g. split verb in German) or by the mapping principles in the extended PT (e.g. the ADJ fronting). The Chinese TOP structures at stage 3 (i.e. the ADJ fronting) and at stage 4 (i.e. TOP+SVO) can be distinguished by information exchange without using salience. As discussed, ADJs have their own PREDs and do not need to exchange information with other constituents. Other TOP structures at stage 4 require information exchange between TOPs and other constituents, such as SUBJ and OBJ. Therefore, they are placed on a higher stage on the developmental hierarchy. However, only information exchange without using the salience principle does not seem to be able to distinguish TOP structures at stage 4 and the BA-structure at stage 5, because the latter involves an embedded TOP at a non-salient position exchanging information with another constituent.

Another problem in Gao's study concerns the TOP structures at stage 4. She distinguished two major types of TOP structures. One type is the 'SUBJ reference' category, which includes those initial noun phrases that have a correlation with the SUBJs. The correlation could either be the SUBJ pronoun referring to the noun phrase, or the two possessing a whole-part conceptual relation. In sentence (3.17, reproduced), the TOP *zhege xiaohai* 'this kid' refers to the SUBJ pronoun *ta* 'he' as the same entity. In sentence (3.43), the SUBJ *yezi* 'leaf' is the part of the TOP *nage shu* 'that tree'. The other type covers the cases of referential relation with the OBJ, where the initial NP identifies with the absent OBJ (see sentence 3.44).

3.17 这个小孩 他 吃 了 一 个 苹果
zhe ge xiaohai ta chi le yi ge pingguo
this CL kid he eat PF one CL apple
 'This kid, he ate an apple.'

3.43 那棵树 叶子 很 大
na ke shu yezi hen da
that CL tree leaf very big
 'Speaking of that tree, its leaves are very big.'

3.44 那 只 狗 我 已经 看 过 了
 na zhi gou wo yijing kan guo le
 that CL dog I already see EXP PF
 ‘The dog, I have seen already.’

Both types of TOPs, pointed out by Gao, exchange information with an internal constituent. However, as discussed in section 3.2.2 and 3.2.3.1, the TOP structure in Gao’s ‘SUBJ reference’ category is the left-dislocation structure with external TOPs, while the TOPs in her ‘OBJ reference’ category belong to internal TOPs. The difference between these two types of TOPs is that “when dislocated topics are anaphorically linked to a pronominal element within the clause, what is identified is not the f-structure value of the DF (discourse function) and clause-internal function (which would cause a functional uniqueness violation), but the referential index of the two functions” (Bresnan, 2001, p. 68). The reproduced Figure 3-3 and Figure 3-14 demonstrate these two kind of TOPs. With respect to the surface structure, the deletion of the external TOPs does not affect the completeness and coherence of the remaining sentence, while this is not the case with the internal TOPs. This issue concerns which principle, the information exchange or the mapping principle, offers a more plausible explanation for L2 Chinese syntactic development and will be further discussed in the discussion Chapter 6.

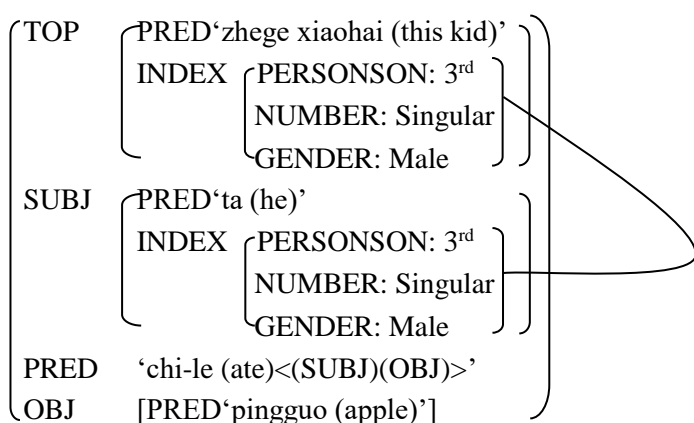


Figure 3-3. The f-structure of NP TOPs

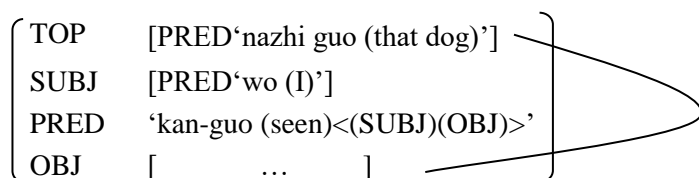


Figure 3-14. The f-structure of OSV

Zhang (2007) applied the Topic Hypothesis to the investigation of L2 Chinese syntactic development. Following the mapping principle of c- to f-structure, Zhang predicted a four-stage hierarchy for L2 Chinese syntactic development and the mapping is linked to the processing procedures in PT (Pienemann, 1998b), as shown in Table 3-3.

Table 3-3. Processing Hierarchy of L2 Chinese syntax (Zhang 2007, p154)

Processing procedures	L2 processes	Topic Hypothesis	Chinese syntax
4.S-procedure/ WO Rules	Inter-phrasal information	TOP=OBJ (TOPobj VO)	OSV, SOV
3.Phrasal procedure	Phrasal information	TOP=ADJ (TOPadj SVO)	XP SV(O): adverbial subordinate clause <i>wh-</i> adverbial
2.Category procedure	None	TOP=SUBJ (TOPSUBJVO)	Canoical SV(O): declarative interrogative(<i>y/n,wh-,intonation</i>)
1.Word/Lemma	None		words, single constituents formulaic expressions

Following the stage-one word/lemma access, the stage-two learners with category procedure are not able to differentiate the SUBJ and TOP. The mapping between c-structure and f-structure is default, where the most prominent syntactic function, SUBJ, is mapped onto the most prominent sentence initial position. The syntactic outcome is canonical word order. Chinese declaratives and interrogatives are arranged according to this canonical mapping of c- to f-structure. Then learners with increasing processing resources gradually learn to differentiate SUBJ and TOP by exploring the initial position of a sentence. The stage-three learners with phrasal procedure are able to differentiate the functions of SUBJ and TOP by initializing non-core argument like ADJ, such elements as adverbial, subordinate clause and Wh-adverbial in Chinese. The rest of the

sentence remains canonical. After this stage, the stage-4 learners with sentence-procedure are able to assign the TOP function to core-arguments, such as OBJ, where the canonical word order is disrupted, resulting in non-default mapping between c-structure to f-structure. Chinese OSV and SOV structures belong to this category.

To test the proposed processing hierarchy, Zhang conducted a year-long observation on the interlanguage of three L1 English learners of L2 Chinese at an Australian university. The findings supported the Topic Hypothesis (see Table 3-4), showing an orderly developmental sequence as predicted by the hypothesis—the successive acquisition of L2 syntactic structures from a canonical order to a non-canonical.

Table 3-4. Development of L2 Chinese syntax (Zhang 2007, p.164)

Topic Hypothesis	Structure	T1	T2	T3	T4	T5	T6	T7	T8	T9
3.TOP=OBJ	OSV/SOV						+	+	+	+
2.TOP=ADJ	ADJ		+	+	+	+	+	+	+	+
1.TOP=SUBJ	SV(O)	+	+	+	+	+	+	+	+	+

The SV(O) structures (e.g. 3.45), where TOP and SUBJ are not distinguished, were acquired at T1, five weeks or 50 hours of study. ADJ fronting (see 3.46), which activates the separation of TOP and SUBJ was acquired at T2. OBJ fronting (see 3.47), which disrupts the strict default mapping and activates the functional assignment of TOP to core-argument, was acquired at T6.

3.45 王 吃 苹果 吗?
 wang chi pinguo ma?
 wang eat apple QUE?
 ‘Does Wang eat apples?’ (y/n question)

3.46 明天 你 做 什么?
mingtian ni zuo shenme?
tomorrow you do what?
 ‘What do you do tomorrow?’

3.47 这个练习 你们 学 完 了 吗?
zhe ge lianxi nimen xue wan le ma?
this CL exercise you learn finish PF QUE?
'This exercise, have you finished?/Have you finished this exercise?'

Zhang (2007) is the first empirical study to test the applicability of the Topic Hypothesis to Chinese syntax and provides empirical evidence for the consistency of observed sequence with the Topic-Hypothesis-based hierarchy. Zhang also links the c- to f-mapping to the processing procedures. In particular, she makes clear that the OBJ topicalization/fronting requires sentence-procedure. Zhang states, "the grammatical functions must be identified syntactically rather than positionally because the mapping process between semantic function and the grammatical function of the OBJ-topicalization sentence is non-linear" (p. 150). As a result, the one-to-one mapping without functional analysis is not sufficient and sentence procedure is needed. The functional analysis or the functional assignment of the discourse function of TOP to syntactic function explains why the SOV structure requires the sentence procedure, the same as the OSV structure does.

Zhang acknowledged that "the Topic Hypothesis is not to be taken as the theoretical solution to the second language acquisition of syntax, hence, the syntactic structures being investigated in this study are by no means exhaustive, neither in terms of teaching and learning objectives, or in terms of Chinese grammar as a whole" (p. 146). The current study will extend Zhang's study by investigating more structures which utilize the c- to f-structure mapping.

3.4 Processing hierarchies for L2 Chinese syntax and research questions

Based on the above discussion of Chinese syntax from a processability perspective, it is now possible to hypothesize two PT-based processing hierarchies for Chinese L2 syntax. The first hierarchy utilizes both information exchange and mapping principles to propose a three-staged developmental sequence for the acquisition of Chinese word order, as summarized in Table 3-5.

Table 3-5. Processing Hierarchy of L2 Chinese word order

Stage	Information exchange	c- to f-structure mapping	Word orders
3	Functional information	Non-default mapping	OSV
	Functional information	Default mapping	SOV; SO _{BA} V
2	Referential information	XP + default mapping	NP _{TOP} +SVO
	No information exchange	XP + default mapping	ADJ _{TOP} +SVO
1	No information exchange	Default mapping	Canonical SV(O)

At stage 1, L2 beginners are constrained by the unmarked alignment, and three levels of structure are mapped one to each other in a strictly one-to-one manner. The first and most prominent position in c-structure is occupied by the most prominent syntactic function (i.e. the SUBJ) as the default TOP. No information exchange is involved.

At stage 2, when the first position is occupied by non-SUBJ constituents, such as ADJs, the mapping between c- to f-structure becomes non-default. This breaks the default link between the first sentential position and the SUBJ, a deviation from the unmarked alignment. The remaining constituents of the sentence remain canonical. ADJs do not exchange information with other constituents, because they have their own PREDs. NP TOPs (external TOPs) in left-dislocation structures are also hypothesized to emerge at this stage. Unlike ADJ TOPs, NP TOPs exchange information (referential index value) with one of the sentence arguments, i.e. either with the SUBJ or OBJ. However, without the NP TOPs or in other words, without NP TOPs which exchange referential index value with one of the sentence arguments, the remaining constituents of the sentence still remain canonical and it is complete and coherent on its own.

At stage 3, OBJ TOPs (internal TOPs) in the non-canonical OSV, SOV and SOV structures are processable. These structures all involve an information exchange of the f-structure value of the discourse function of TOP and the clause-internal grammatical function of OBJ. An exclusion of the OBJ TOP will lead to an incompleteness of the f-structure and give rise to functional uncertainty.

The second hierarchy utilizes the mapping principle of a- to f-structure in the Lexical

Mapping Hypothesis to propose a three-staged developmental sequence for the L2 Chinese complex structures, as summarized in Table 3-6.

Table 3-6. Processing Hierarchy of L2 Chinese complex structures

Stage	A- to f-structure Mapping	The Lexical Mapping Hypothesis	Chinese Syntax
3	Complex Mapping	OBJ=Agent&Patient	Causative
2	Non-default mapping	SUBJ=Patient SUBJ=Locative	Passive Existential
1	Default mapping	SUBJ=Agent	Active

At stage 1, L2 learners initially are constrained by one-to-one mapping and follow the default AGENT-to-SUBJ mapping, where the most prominent semantic role, i.e. agent, is mapped onto the most prominent syntactic function, i.e. the SUBJ. This is a shared stage with the canonical SVO structure based on the Unmarked Alignment Hypothesis.

At stage 2, when non-agent argument, i.e. a less prominent role such as patient or locative, is mapped onto the SUBJ, the one-to-one correspondence of AGENT-to-SUBJ and PATIENT-to-THEME is disrupted and the mapping is non-default.

At stage 3, after the stage of un-default mapping, learners are able to do complex mapping, as in the causative structure, where the OBJ assumes two argument roles: one is the patient of the main verb and the other is the agent of the verb in complement.

The aim of the current study is to document the acquisition process of six word order patterns and three structures with complex lexical operations under the guidance of Processability Theory. The research addresses the following two questions:

(Q1) What are the observed sequences for the acquisition of word order and complex structures?

(Q2) Whether the observed sequences are consistent with the two proposed PT-based processing hierarchies?

Chapter 4 Research methodology

4.1 Research design

The aim of the current study is to document and explain the acquisition sequence of a few key L2 Chinese syntactic structures. To reach this objective, a combined longitudinal design in a target language setting was employed to investigate the acquisition sequence of L2 Chinese syntactic structures by learners of different proficiency levels enrolled in a Chinese language program in a Chinese university over an academic year. The rationale of the research design is as follows.

Given the focus of this study on language development, the optimal research design is to conduct a longitudinal or/and cross-sectional study to collect spontaneous or elicited speech data and to form the research corpus (Pienemann, 2007). The year-long longitudinal observation of the current study made it possible to obtain a systematic and detailed picture of the progression of learners' interlanguage throughout. The cross-sectional design made it possible to obtain speech data from learners of different proficiency levels. The two designs combined made it possible to obtain a more comprehensive picture of learners' interlanguage development. As far as the language setting is concerned, this investigation was carried out in the target language setting. Compared to a foreign-language setting, learning a language in a target language environment enjoys more natural input and more opportunities to practise language skills; therefore it is more likely to yield more naturalistic production and make it possible to observe and capture more phenomena of language development.

4.2 Informants

Informants were recruited from students enrolled in the Chinese language training program at the College of International Education at Shandong University, China. The recruitment started from week one when all enrolled students had completed their placement test and had been allocated to classes of different proficiency levels based on

their placement test scores.

The target informants were:

(1) monolingual L1 English speakers learning Chinese as an L2.

This selection criterion was, on the one hand, to control the L1 variable and on the other was due to the fact that English was the only foreign language that the researcher (I) spoke. Therefore, English could facilitate the communication between the informants and the researcher, especially during the initial stage of learning when the beginning L2 Chinese learners were not able to understand Chinese and conduct a basic conversation in Chinese.

(2) enrolled for at least one academic year, because of the longitudinal design of the current study.

In order to locate the potential informants, a list of enrolled students from the college administration office was obtained. The list included the nationalities of the students and the length of their language programs. Out of 266 students, 13 were L1 English learners and four of them enrolled in a one-year program. These four informants included one beginner, two intermediate learners and one advanced learner. Given such a small number of L1 English learners, beginners in particular, and the possibility of their dropping out of the research, a decision was made to include students of other language backgrounds, who enrolled for at least one academic year and the beginners were to be able to understand and conduct basic conversations in English.

With the permission of the college director, the researcher (I) audited a few classes. During class breaks the researcher spoke with over twenty potential informants either in English (with beginners) or in Chinese (with intermediate or advanced learners). The researcher briefed them on the research, including the research expectations, the benefits that they might get and the voluntary nature of the research. The researcher gave them each a copy of detailed information on the research to read later and decide whether they wanted to participate or not. Eleven students, who were enrolled at least

for one year and able to conduct basic English conversations, decided to participate in the research. A first session with each of them was arranged. In this session, the researcher restated their rights to withdraw from the research at any time they wanted and addressed their concerns. They signed the consent form. After semester one, three informants terminated their language study and went back to their home countries. Another two informants started their own major in other colleges at the university. The data of these five students are not included in the current study. The remaining six informants were enrolled as full-time language students until the end of the academic year. The six informants included:

- (1) three beginners: two male informants (Ross and Leo⁴) and one female informant (Aiko)

Ross was a monolingual speaker of English. Leo was a L1 Spanish speaker of L2 English. Aiko was a L1 Japanese speaker of L2 English.

- (2) two intermediate learners: one male informant (Bret) and one female (Mitsu)

Bret was an English monolingual and had studied Chinese for two years at an Australian university. Mitsu was a speaker of L1 Japanese and L2 Korean. Her family emigrated from Korea to Japan when she was two years old and she only spoke Korean at home. She could not read Korean. She was an exchange student from a Japanese university, where she had studied Chinese for two years in Japan as a Chinese major.

- (3) one advanced learner: one male informant (Chris).

Chris was an advanced learner. He was an English monolingual. He had just graduated from high school and came to Shandong University to study Chinese for one year on a scholarship from the Chinese government. He had studied Chinese for four years in Australia from year nine to year twelve before he came to study in

⁴The names of the informants are all fictitious.

China.

The three beginners received 24 hours' classroom instructions in semester one and 20 hours' in semester two. The three non-beginners received 20 hours' classroom instructions during the entire academic year. Their background information is summarized in Table 4-1.

Table 4-1. Informants' background-information

Chinese Proficiency Level	Informant Name	Age Group	Gender	Language Background	Weekly hours of class instruction
Beginner	Ross	26-30	Male	L1: English	Semester 1: 24 hours Semester 2: 20 hours
	Leo	21-25	Male	L1: Spanish L2: English	
	Aiko	21-25	Female	L1: Japanese L2: English	
Intermediate	Bret	26-30	Male	L1: English	20 hours
	Mitsu	21-25	Female	L1: Japanese L2: Korean L3: English	
Advanced	Chris	15-20	Male	L1: English	

4.3 Data collection

4.3.1 Data collection schedule

All informants met the researcher individually on a regular basis throughout the whole academic year. Considering the fact that language acquisition may proceed faster in a target language setting and beginners proceed faster at the initial stage of learning, the following interview schedule was set up, except for the ten-week summer break. For the three beginners, interviews were conducted once every two weeks in semester one and once every three weeks in semester two. Ross attended all interview sessions. Leo missed two sessions (T5 and T10⁵). Aiko missed one session (T5). For the two

⁵T1, T2...Tn indicate the interview sessions.

intermediate and one advanced learners, interviews were conducted once every three weeks in semester one and four weeks in semester two. They attended all ten sessions. Table 4-2 and Table 4-3 outline the interview information.

Table 4-2. Interview schedule: beginners

Semester	Interview sessions	Week
1	T1	2
	T2	4
	T3	6
	T4	8
	T5 (No Data: Leo&Aiko)	10
	T6	12
	T7	14
	T8	16
	T9	18
	Summer break	19-29
2	T10 (No Data: Leo)	30
	T11	33
	T12	36
	T13	39
	T14	42
	T15	46

Table 4-3: interview schedule: non-beginners

Semester	Interview sessions	Week
1	T1	3
	T2	6
	T3	9
	T4	12
	T5	15
	T6	18
	Summer break	19-29
2	T7	30
	T8	35
	T9	40
	T10	46

4.3.2 Data elicitation procedures

To examine the interlanguage development, spontaneous speech data from conversation-based, unstructured oral interviews are most suitable, because these data “offer a window into ability for use in real time and across communicative contexts, and such a focus is particularly useful when investigating development” (Ortega, 2009b, p. 111). With an aim to elicit as much spontaneous speech data as possible, the following interview procedures were followed throughout the entire data collection.

Each interview was 50 minutes in length on average to ensure enough data were collected. Interviews started with a free and unstructured conversation. Topics varied, ranging from language study, overseas living, travelling, cultural differences and so on. These naturalistic speech data were the least artificial and best represented the learners’ language use. Free conversation helped to build up a bond with informants as well. Sharing their views with the researcher on topics that they were interested in and familiar with or on issues that concerned them not only gave them a good opportunity to practice their Chinese, but also helped them to find possible solutions to problems encountered in their study and living in China. These benefits helped to sustain their interest in the research and reduce the possibility of their dropping out of the research due to a loss of interest. As a result, none of the informants withdrew from the research and they maintained a friendly relationship with the researcher during and after the research.

Unstructured free conversation took the dominant role in each interview to ensure as much naturalistic data as possible. However, unstructured interviews in themselves cannot ensure the production of certain structures. Therefore, communicative tasks were also used to complement the free conversations. Two major types of tasks were used: (1) picture-based question-answer (Q&A) tasks and (2) non-picture-based Q&A tasks.

(1) Picture-based Q&A tasks

These tasks were used to provide the functional contexts where a certain structure may occur. For example, the $SO_{BA}V$ structure is likely to appear in a ‘disposal’ context. The question in (4.1) was provided under such a ‘disposal’ context as in Picture 4-1.

4.1 Researcher: the room is messy, what would you do?

Chris: 把它收拾一下/书放好/垃圾扔掉
 ba ta shoushi yixia/shu fanghao/laji reng diao
 BA it clean once/book put well/rubbish throw away

‘(I’ll) clean it, put up the book properly and throw away the rubbish.’ (Chris, advanced learner, T2)

Picture 4-1. The ‘disposal’ context



These tasks were also used to draw informants’ attention to a certain item in a picture that may be given prominence in their responses. The OBJ-topicalization and passive structures were targeted. For example, the questions based on Picture 4-2 and Picture 4-3 were used to draw informant’s attention to patient roles, i.e. ‘the apple’ in Picture 4-2 and the ‘the lamppost’ in Picture 4-3. An OBJ-topicalization (see 4.2, the OBJ TOP pingguo ‘apple’) and a passive structure (see 4.3) were elicited from Aiko and Chris respectively.

Picture 4-2



4.2 Researcher: what's happened to this apple?

Aiko: 苹果 他 吃 了

pinguo ta chi le

apple he eat PF

'He ate the apple'. (Aiko, beginner, T5)

Picture 4-3



4.3 Researcher: what's happened to this lamppost?

Chris: 它 被 汽车 撞 弯 了

ta bei qiche zhuang wan le

it BEI car hit bended PF

'It (the lamppost) was hit bended.' (Chris, advanced learner, T1)

(2) Non-picture-based Q&A tasks

These tasks were aimed for informants to give their responses to the situations in question. For example, the informants were asked what they would do if they were

running out of drinks in a middle of party they were hosting and their guests were not happy. Serial verbs structures (see 4.4) and causative structures (see 4.5) were targeted.

4.4 Researcher: if you host a party, but you find that you are running out of drinks, what would you do?

Chris: 出 去 再 买 啤 酒
chu qu zai mai piju
out go again buy beer
'(I'll) go out again to buy beer.' (Chris, T1)

4.5 Researcher: if you can't leave, what would you do?

Chris: 让 另 外 一 个 人 去 买
rang lingwai yi ge ren qu mai
let other one CL person go buy
'(I'll) let another person go and buy (the beer).' (Chris, T1)

To ensure the effectiveness of the tasks, most of them were trialed on an intermediate L2 Chinese learner of L1 English speaker and two native Chinese speakers. The tasks proved effective in eliciting the target structures.

4.4 Data analysis

Each session of data collection was recorded with a digital audio-recorder and uploaded to a security-coded computer for data processing. To prepare for data analysis, all recorded data were transcribed and clauses were segmented for analysis.

Tao (1996) defines a clause as “a non-modifying verbal expression (including copular expressions), with or without zero-marking arguments, but excluding single nominals” (p. 17). According to this definition, the clauses in this thesis consist of the following types:

(1) Clauses with overt arguments

4.6 她 学习 英语
ta xuexi yingyu
she study English
'She studies English.' (Mitsu, T11)

(2) Clauses with argument(s) ellipsis. This type often occurs in answers to questions, as in sentence (4.7), one or both of the two arguments (i.e. *wo* 'I' and *fan* 'meal' shown in parenthesis) of the verb *chi* 'eat' in the answer can be omitted because they are understood from the context.

4.7 Question: 你 吃 饭 了 吗?
ni chi fan le ma?
you eat meal PF QUE?
'Have you eaten your meal?'
Answer: (我) 吃 (饭) 了
(wo)chi (fan) le
(I) eat (meal) PF
'I've eaten my meal.'

(3) Clauses with time adjuncts (e.g. *jintian* 'today' in 4.8) and location adjuncts (e.g. *zai shanghai* 'in shanghai' in 4.9)

4.8 今天 我 去 超市
jintian wo qu chaoshi
today I go supermarket
'Today I will go to the supermarket.'

4.9 在 上海 我们 见面 了
zai shanghai women jianmian le
in shanghai we meet PF
'We met in Shanghai.'

(4) Clauses with nominal topics (e.g. *henduo ren* 'many people' underlined in 4.10)

4.10 很多 人 他们 让 啤酒 控制 他们的 生活
henduo ren tamen rangpijiu kongzhi tamende shenghuo
many people they let beer control their life
'Many people let beer control their lives.' (Bret, T10)

The following two types of clauses were excluded from analysis.

(1) Non-Chinese clauses were excluded except if they are part of Chinese syntactic structures, as example (4.11) shows.

4.11 你 是 acupuncturist
ni shi acupuncturist
you are acupuncturist
'You are an acupuncturist.' (Bret, T10)

(2) Non-productive clauses such as copied speech from the researcher or produced after the researcher's guidance (see 4.12) or scaffolding (see 4.13) were excluded.

4.12 Bret: 现在 我 要 我的 字典 你 可能 拿 起来
xianzai wo yao wode zidian ni keneng na qilai
now I want my dictionary you might bring up
'Now I need my dictionary you might bring it up.'

Researcher: 拿 过来
na guolai
bring over
'bring it over.'

Bret: 拿 过来
na guolai
bring over
'bring it over.' (Bret, T10)

4.13 Researcher: How about these cats? What are you going to do with them?

Leo: 猫 er out of the room
mao er out of the room
cat er out of the room

Researcher: you mean you don't want them? 扔
you mean you don't want them? reng
You mean you don't want them? throw

Leo: 扔 房间
reng fangjian
throw room

Researcher: okay can you say it again?

Leo: 猫 扔 房间
mao reng fangjian
cat throw room

'Cats are thrown out of the room/Cats (I) throw out of the room.' (Leo, T08)

4.5 Acquisition criteria

Acquisition criteria are essential to determine the acquisition point of the target sentence structures. Following PT, an emergence criterion was adopted. “Emergence” was defined as “a point in time corresponding to the first systematic and productive use of a structure” (Pallotti, 2007, p. 366).

As far as the minimum amount of evidence based on which a structure is judged to have emerged, one spontaneous, productive token at a given stage is sufficient to consider a stage as acquired (Pienemann, 1998b). In the current study, a structure was considered to have emerged if there were two tokens with two lexically varied verbs. For example, to decide whether the OSV structure has emerged, the structure has to appear with varied verbs (see 4.14 with verb *wang* ‘forget’ and 4.15 with verb *xue* ‘learn’).

4.14 这 个 字 我 忘 了
zhe ge zi wo wang le
this CL word I forget PF
‘This word, I forget.’

4.15 这 个 字 我 学 过
zhe ge zi wo xue guo
this CL word I learn EXP
‘This word, I learnt.’

Chapter 5 The acquisition process of L2 Chinese syntax: a description

The previous chapter presented the methods that the current study employs to address the research questions. This chapter aims to address the first research question: what are the observed sequences for the acquisition of word order and complex structures by the six L2 Chinese learners. In section 5.1, an overview of the observed sequences of the targeted structures by each of the three learner groups is presented. They are the three beginners, the two intermediate learners and the one advanced learner. The observed sequences are presented with a reference to the two hypothesized L2 Chinese processing hierarchies. One hierarchy utilizes the processing principles of information exchange and mapping of c-structure to f-structure. The other utilizes the mapping principle of a-structure to f-structure. Following the overview, a detailed description of the acquisition process and features of word order and complex structures on the two hypothesized hierarchies are presented.

5.1 An overview of the observed sequences

5.1.1 Acquisition sequence of word order

In Chapter 3, six types of word order patterns were presented from a processability perspective. They are the canonical SVO structure, the ADJ_{TOP}+SVO structure, the NP_{TOP}+SVO structure, and three non-canonical OSV, SOV and SO_{BA}V structures. According to the principles of information exchange and mapping of c- to f-structure, a three-staged developmental sequence is hypothesized for the acquisition of word order, as summarized in Table 3-5 (reproduced from Chapter 3).

Table 3-5. Processing Hierarchy of L2 Chinese word order

Stage	Information exchange	c- to f-structure mapping	Word orders
3	Functional information	Non-default mapping	OSV
	Functional information	Default mapping	SOV; SO _{BA} V
2	Referential information	XP + default mapping	NP _{TOP} +SVO
	No information exchange	XP + default mapping	ADJ _{TOP} +SVO
1	No information exchange	Default mapping	Canonical SV(O)

The six word order patterns are hypothesized to emerge according to the above three-staged development sequence, from canonical structures to ADJ and NP TOP structures and finally to the OBJ TOP structures. The observed sequence in the three beginners' data is summarized in Table 5-1. The first column shows the three hypothesized stages for the six targeted structures, which are in the second column. The top row 'T1, T2...T15' indicates each of the data collection sessions. The second row 'W2, W4...W46' indicates the instructional weeks when the corresponding sessions of data collection were conducted. The plus sign '+' in cells indicates the emergence criterion of two tokens is satisfied. The capital letters 'R', 'L' and 'A' beside some '+' signs in cells are the initial letters of the three beginners, 'Ross', 'Leo' and 'Aiko', indicating the emergence point of a structure for each informants. The plus sign with parentheses '(+)' indicates one token. Empty cells mean no occurrences of the corresponding structures. The vertical bold lines indicate the emergence time of each stage. The bold horizontal line indicates the time gaps between the two sequentially emerged structures. The table represents the emergence status of each structure for the three individual beginners as a group. If at least one learner satisfied the emergence criterion of two tokens for a structure, the corresponding cell shows the '+' sign. Otherwise the cell shows the '(+)' sign if at least one learner produced one token or the cell is empty if none of them produced a token. Therefore, the table is not based on a simple sum of tokens produced by the three learners together. If two learners produced one token each for a structure, the cell still shows '(+)', indicating a non-emergence status of the structure for the group.

Table 5-1. Observed sequence of word order: beginner group

Stage	Structure	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	
	Week	W2	W4	W6	W8	W10	W12	W14	W16	W18	W30	W33	W36	W39	W42	W46	
3	SO _{BA} V															+R	(+)
	SOV											+A	+				(+)
	OSV						(+)	(+)	+A	(+)	+R	+L	+	+	+	+	+
2	NP _{TOP}						(+)	(+)	(+)	+A	+	+	+	+L	+	+R	
	ADJ _{TOP}		+L/A	+	+R	+	+	+	+	+	+	+	+	+	+	+	+
1	SVO	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 5-1 reveals a clear staged-development of the six word order patterns. The stage-1 was achieved the earliest when the canonical SVO structures emerged in all the three beginners' data two weeks after semester one started. Shortly after in Week 4, the stage-2 was achieved when time and location ADJ TOPs emerged first in Leo's and Aiko's data. ADJ TOPs emerged in Ross' data in Week 8. The stage-3 was reached the latest when the OSV structure emerged first in Aiko's data in Week 16, followed by Ross in Week 30 and Leo in Week 33. Within each stage, developmental gaps are identified. Within stage 2, NP TOPs emerged later than ADJ TOPs. Within stage-3, the OSV structure emerged the earliest, followed by the SOV structure in Week 33. The SO_{BA}V structure emerged the latest in Week 42.

Table 5-2 presents the observed emergence sequence of word order in the two intermediate learners' data. A total of 10 sessions of data collection were conducted. The capital letters 'B' and 'M' beside '+' signs in cells are the initial letters of the two learners, Bret and Mitsu. Stage-1 and stage-2 had been achieved when the SVO, ADJ and NP TOPs had all emerged three weeks after semester one started. The stage-3 was reached in Week 6 when the OSV structure emerged. Within stage-3, developmental gaps are identified. The three non-canonical structures, i.e. OSV, SOV, SO_{BA}V, emerged in Week 6, Week 9 and Week 12, showing a similar developmental sequence as the beginner group.

Table 5-2. Observed sequence of word order: intermediate group

Stage	structure	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
		W3	W6	W9	W12	W15	W18	W30	W35	W40	W46
3	SO _{BA} V		(+)		+ B		(+)	+ M	+	(+)	+
	SOV	(+)	(+)	+ M	+	+	+	+	+	+	+ B
	OSV	(+)	+ M	+ B	+	+	+	+	+	+	+
2	NP _{TOP}	+ M	(+)	+	+	+ B	+	(+)	+	+	+
	ADJ _{TOP}	+	+	+	+	+	+	+	+	+	+
1	SVO	+	+	+	+	+	+	+	+	+	+

Table 5-3 shows that no developmental sequence is observed in the advanced learner's data. The six structures had all emerged in Week 3.

Table 5-3. Acquisition of word order: the advanced learner

Stage	structure	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
		W3	W6	W9	W12	W15	W18	W30	W35	W40	W46
3	SO _{BA} V	+	+	+	+	+	+	+	+	+	+
	SOV	+	(+)			(+)	(+)	+		(+)	(+)
	OSV	+	+	+	+	+	+	+	+	+	+
2	NP _{TOP}	+	+	+	+	+	+	+	+	+	+
	ADJ _{TOP}	+	+	+	+	+	+	+	+	+	+
1	SVO	+	+	+	+	+	+	+	+	+	+

5.1.2 Acquisition sequence of complex structures

In Chapter 3, three complex structures that involve the non-default mapping of a- to f-structure were presented from a processability perspective. They are: the existential, passive and causative structures. According to the mapping principle of c- to f-structure, a three-staged developmental sequence (see the reproduced Table 3-6 from Chapter 3) is hypothesized for the three complex structures and one active structure, which is overlapped with the canonical SVO structure.

Table 3-6. Processing Hierarchy of L2 Chinese complex structures

Stage	A- to f-structure Mapping	The Lexical Mapping Hypothesis	Chinese Syntax
3	Complex Mapping	OBJ=Agent&Patient	Causative
2	Non-default mapping	SUBJ=Patient SUBJ=Locative	Passive Existential
1	Default mapping	SUBJ=Agent	Active

L2 Chinese complex structures are hypothesized to emerge according the above three-staged development sequence, from default mapping of a- to f-structure to non-default mapping and finally to complex mapping. The observed sequence in the beginners' data is summarized in Table 5-4. The stage-1 was achieved first, when the active structure emerged in Week 2 in all the three learners' data. The stage-2 was achieved in Week 12, when the existential structure emerged in Ross' and Aiko's data. The stage-3 was achieved the latest in Week 14 when the causative structure emerged in Aiko's data. For the other stage-2 passive structure, only Aiko and Ross produced one taken each in Week 42 and Week 46.

Table 5-4. Observed sequence of complex structures: beginner group

Stage	structure	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
		W2	W4	W6	W8	W10	W12	W14	W16	W18	W30	W33	W36	W39	W42	W46
3	CAUS							+A	+	+	+	+	+L	+R	+	+
2	PASS														(+)A	(+)R
	EXIS						+R/A	+L	+		+	+	+	+	+	+
1	ACTIVE	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 5-5 and Table 5-6 show no developmental sequences are observed in the intermediate and advanced learners' groups. All the three stages had emerged in Week 3. Only the existential structure did not emerge in the intermediate learner group. The structure first emerged in Mitsu's data in Week 9 and in Bret's data in Week 15.

Table 5-5. Observed sequence of complex structures: intermediate group

Stage	structure	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
		W3	W6	W9	W12	W15	W18	W30	W35	W40	W46
3	CAUS	+	+	+	(+)	+	+	+	+	+	(+)
2	PASS	+B	+	+	+	+	(+)	+	+M	+	+
	EXIS		(+)	+M	(+)	+B	+	+	+	+	+
1	SVO	+	+	+	+	+	+	+	+	+	+

Table 5-6. Observed sequence of complex structures: advanced learner

Stage	structure	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
		W3	W6	W9	W12	W15	W18	W30	W35	W40	W46
3	CAUS	+	+	+	+	+	+	+	+	+	+
2	PASS	+	+	+	+	+	+	+	+	+	+
	EXIS	+	+	(+)	+	+	+	+	+	+	+
1	ACTIVE	+	+	+	+	+	+	+	+	+	+

5.1.3 Summary

The above overview of the observed sequences of the investigated structures by each of the three groups as a whole reveals the following preliminary findings.

The beginner group exhibits a clear staged development in their acquisition of L2 Chinese word order and complex structures. As L2 beginners, they were expected to develop their L2 processing skills stage by stage from basic word order to word order variations and complex structures. The intermediate learner group had acquired the basic structures on lower stages at the time of data collection. Both of the two intermediate learners had studied Chinese for two years in their home countries. The previous learning enabled them to develop their L2 processing skills and therefore, they did not exhibit a full staged development as the beginners did. However, their processing skills were still developing and that accounts for the later emergence of stage-3 structures. The three stage-3 structures, as in the beginners' data, also demonstrate a sequential emergence from OSV to SOV and finally to SO_{BA}V. The advanced learner, Chris, had reached the highest stage 3 for both word order and complex structures at the time of data collection. He had studied Chinese for four years

in his home country before he came to study in China. The four years learning had equipped Chris with all the L2 processing skills for the production of word order and complex structures under investigation. The three learner groups piece up a full picture of the acquisition process of L2 Chinese syntax.

The following sections give a detailed description of their L2 acquisition process of word order and complex structures by three beginners and three non-beginners. The advanced learner joins the two intermediate learners as a non-beginner group for two reasons: (1) a balanced number of informants for each group; (2) the same data collection schedule for better presentation and comparison.

5.2 Acquisition process of word order: beginners

5.2.1 Acquisition of Canonical structures

The Chinese canonical word order is SVO. Three types of SVO structures are under this word order: declaratives, Wh- questions and Y/N questions. The mapping of c-structure to f-structure in these structures is default and no information exchange is involved. They are hypothesized to emerge the earliest at stage 1.

Table 5-7 presents the occurrences of the canonical structures. The plus sign '+' in cells indicates that the emergence criterion of two tokens is satisfied. The slash '/' indicates the missing sessions, in which no interview took place. Leo missed T5 and T10. Aiko missed T5. The table shows that the canonical structures started to appear in the three beginners' data from T1, Week 2. Ross produced three tokens, Leo produced twelve and Aiko produced seventeen. According to the emergence criterion, the canonical structures emerged at T1 in the three beginners' data. The number of the canonical structures increases tremendously at T2. There are abundant occurrences of the canonical structures in the following sessions, therefore the '+' sign is used to indicate their emergence status.

Table 5-7: Occurrences of canonical structures: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross	3	18	+	+	+	+	+	+	+	+	+	+	+	+	+
Leo	12	31	+	+	/	+	+	+	+	/	+	+	+	+	+
Aiko	17	60	+	+	/	+	+	+	+	+	+	+	+	+	+

A statistical analysis of three representative sessions, T2, T10 and T15 (representing their interlanguage in the initial/middle/late sessions of data collection), reveals that the canonical structures account for around 80% of occurrences of the total utterances. Both the early emergence and the high frequency of the canonical structures suggest that they are among the easiest forms to be acquired in early interlanguage.

5.2.2 Acquisition of XP + Canonical structures

5.2.2.1 ADJ_{TOP} + SVO

XP+ canonical structures are those canonical SVO structures with XP TOPs. Two types of XP TOPs belong to this category: time/location ADJ TOPs and NP TOPs (the external TOPs). ADJ TOPs have their own PREDs and these do not exchange information with other constituents. ADJ TOPs are hypothesized to emerge at stage 2 after the canonical structures.

Table 5-8 presents the occurrences of the time and location ADJ TOPs. The table shows these TOPs started to appear in the three beginners' data from T2 (Week 4) onward. A distributional analysis of the positions of time and location ADJs reveals that ADJs were placed variably in sentence initial, preverbal and final positions (see Table 5-9).

Table 5-8. Occurrences of ADJ TOPs: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross		1	1	2	3	5	1	8	3	10	4	2	7	13	9
Leo		3	3	1	/	6	5	1	8	/	8	3	11	4	12
Aiko		5	11	6	/	7	10	14	7	16	9	12	8	10	37

Table 5-9. Distribution of time and location ADJs: beginners

Learner	Position	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross	Initial	0	1	1	2	3	5	1	8	3	10	4	2	7	13	9
	Preverbal	0	13	3	12	3	2	0	1	0	2	5	4	4	7	2
	Postverbal	0	0	4	2	1	0	0	0	0	2	0	0	0	1	5
Leo	Initial	0	3	3	1	/	6	5	1	8	/	8	3	11	4	12
	Preverbal	0	2	3	5	/	6	2	0	1	/	4	6	7	3	10
	Postverbal	0	5	0	1	/	6	3	3	0	/	2	2	4	1	8
Aiko	Initial	0	5	11	6	/	7	10	14	7	16	9	12	8	10	37
	Preverbal	0	6	1	1	/	3	2	14	2	9	6	18	5	7	12
	Postverbal	0	1	3	4	/	1	4	7	1	6	1	0	1	1	6

The three beginners were asked to describe their daily activities at T2. Ross produced one time ADJ TOP (see *youshihou* 'sometimes', underlined in sentence 5.1), and the other 13 ADJs he produced are all situated in the preverbal positions (e.g. see *meitian badian* 'at 8 o'clock everyday', underlined in sentence 5.2). In contrast, Leo and Aiko, adhering to the preverbal position, placed ADJs variably at three different positions: the initial, preverbal and the postverbal position.

5.1 Researcher: do you go there (Starbucks) by yourself or with your friends?

Ross: 有时候 我去星巴克 with a friend
youshihou wo qu xingbake with a friend
sometimes I go Starbucks with a friend.
 'Sometimes I go to Starbucks with a friend.' (Ross, T2)

5.2 我 每天 八点 去上课。

wo meitian ba dian qu shangke
 I everyday 8 o'clock go to class.
 'I go to class everyday at 8 o'clock.' (Ross, T2)

A statistical analysis of all sessions for the three learners (see Table 5-10) reveals that the initial position was the most favoured position for learners to place ADJs, followed by the preverbal position. The postverbal position was the least favoured position. The statistics suggest that Chinese time and location ADJs are processable at the three positions in early interlanguage. As for which position the ADJs appear in, this seems to be an individual choice. The default position for Chinese time and location ADJs is

preverbal. Ross might be less willing, compared with Leo and Aiko, to explore other non-default positions in the initial sessions. An increasing number of ADJ TOPs in later sessions in Ross' data indicates that he grew more flexible with the placement of ADJs. To apply the emergence criterion (see Table 5-11), ADJ TOPs emerged in Ross' data at T4, in Leo's and Aiko's at T2.

Table 5-10. The number and percentage of ADJ placement: beginners

Informant	Position	Number	Percentage
Ross	Initial	69	47.59%
	Preverbal	59	40.69%
	Postverbal	17	11.72%
	total	145	
Leo	Initial	65	43.62%
	Preverbal	49	32.89%
	Postverbal	35	23.49%
	total	149	
Aiko	Initial	152	55.47%
	Preverbal	86	31.39%
	Postverbal	36	13.14%
	total	274	

Table 5-11. Emergence of ADJ TOPs: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross		(+)	(+)	+	+	+	(+)	+	+	+	+	+	+	+	+
Leo		+	+	(+)	/	+	+	(+)	+	/	+	+	+	+	+
Aiko		+	+	+	/	+	+	+	+	+	+	+	+	+	+

5.2.2.2 NP_{TOP} + SVO

NP TOPs exchange referential information (either semantic information or index information) with one of the sentence arguments, i.e. SUBJ or OBJ or with the whole sentence they precede. Three subtypes of NP TOPs are investigated: (1) sentential reference, (2) semantic reference and (3) index reference. Subtype (1) indicates the NP TOPs refer to the whole sentence they proceed. Subtype (2) indicates the NP TOPs bear semantic relationships with the SUBJ or OBJ they refer to. Subtype (3) indicates the NP TOPs co-index the SUBJ or OBJ.

Table 5-12 presents the occurrences of NP TOPs. Compared to ADJ TOPs, NP TOPs appeared later and were less robust in the data. Ross produced a total of five tokens, one at T12, one at T14 and three at T15. Leo started to produce NP TOPs at T12 (one token) and in the following three sessions, six tokens were produced (two tokens per session). Aiko initially produced one token at T6 and 18 tokens were found in her data. Table 5-13 shows the occurrences of three types of NP TOP structures.

Table 5-12. Occurrences of NP TOPs: beginner

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross												1		1	3
Leo					/					/		1	2	2	2
Aiko					/	1	1	1	2	2	2	2	3	2	2

Table 5-13. Occurrences of three types of NP TOPs: beginners

Learner	Structure	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross	Sentential															
	Semantic												1		1	
	Index															3
Leo	Sentential					/					/					
	Semantic					/					/		1	1	1	2
	Index					/					/			1	1	
Aiko	Sentential					/										
	Semantic					/		1		2	1	2	1	2	2	
	Index					/	1		1		1		1	1		2

The first NP TOP structure (see sentence 5.3) produced by Ross (T12) shows a possessive relationship between the NP TOP, *wo baba* 'my father' (double underlined), and the SUBJ, *diyì yǔ* 'first language' (single underlined). The same possessive relationship can be found in the second NP TOP structure (see 5.4) that Ross produced at T14. At T15, Ross produced three tokens, where the NP TOPs all exchange index information with the SUBJs (see sentence 5.5). No sentential reference was found in Ross' data.

- 5.3 我爸爸 第一 语 是 西班牙语
wo baba diyi yu shi xibanyayu
I father first language is Spanish
 ‘My father’s first language is Spanish.’ (Ross, T12)
- 5.4 这个人 家 有 几 口 人
zhe ge ren jia you ji kou ren
this CL man family have how many CL people
 ‘How many people are there in this man’s family?’ (Ross, T14)
- 5.5 你 别的 学生 他们的 进步 怎么样?
ni beide xuesheng tamende jinbu zenmeyang?
you other student their progress how?
 ‘As for other students of yours, how is their progress?’ (Ross, T15)

Like in Ross’ data, no sentential reference was found in Leo’s and Aiko’s data. Leo produced the first token at T12. In sentence (5.6), the NP TOP *tamen* ‘they’ semantically refers to *liangge ren* ‘two people’ as the same entity. In sentence (5.7), which he produced at T13, the NP TOP *zhege liangge zhinu* ‘these two nieces’ co-indexes the SUBJ *tamen* ‘they’.

- 5.6 他们 两 个 人 聊天
tamen liang ge ren liaotian
they two CL people chat
 ‘The two of them are chatting.’ (Leo, T12)
- 5.7 这个 两 个 侄女 他们 现在 是 小 孩子
zhege liang ge zhinu tamen xianzai shi xiao haizi
this two CL niece they now is little kid
 ‘These two nieces they are now child.’ (Leo, T13)

Aiko produced the first token at T6. In sentence (5.8), the NP TOP ‘Leo’ co-indexes the SUBJ *he*. At T7, Aiko also produced a token as in sentence (5.9), where *women* ‘we’ refers to the SUBJ *liangge ren* ‘two people’ as the same entity.

- 5.8 Leo 他 病 了
Leo ta bing le
Leo he ill PF
 ‘Leo he is ill.’ (Aiko, T6)

5.9 我们 两 个 人 一 瓶 啤酒
women liang ge ren yi ping pijiu
we two CL people one CL beer
‘Two of us have a bottle of beer.’ (Aiko, T7)

Applying the emergence criterion, the NP TOPs emerged in Ross’ data at T15, in Leo’s at T13 and in Aiko’s at T9.

Table 5-14. Emergence of NP TOPs: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross												(+)		(+)	+
Leo					/					/		(+)	+	+	+
Aiko					/	(+)	(+)	(+)	+	+	+	+	+	+	+

5.2.3 Acquisition of non-canonical structures

Three types of Chinese non-canonical structures are investigated in the current study. They are the OSV, SOV and SO_{BA}V structures. These structures all have an OBJ TOP. In the OSV structure, the OBJ is the primary TOP; in the SOV structure, the OBJ is the secondary TOP; in SO_{BA}V, the OBJ is the secondary TOP, marked by BA and denoting a disposal meaning. The three non-canonical structures all involve an information exchange of the f-structure value of the discourse function TOP and the clause-internal syntactic function OBJ. They are hypothesized to emerge the latest at stage 3.

5.2.3.1 The OSV structure

Table 5-15 presents the occurrences of OBJ TOPs. OBJ TOPs started to appear in Ross’ data at T7, in Leo’s and Aiko’s at T6. Ross produced the first token of OBJ TOP at T7 (see sentence 5.10). In this instance, Ross picked up the known OBJ *pingguo* ‘the apple’ from the researcher’s question from Picture 5-1, and topicalized it in his answer. In comparison, one session earlier in T6, Ross did not do so even though presented with the same OBJ prompt (see sentence 5.11). He still placed it in its canonical postverbal

position.

Table 5-15. Occurrences of OSV: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross							1			2	1		1		2
Leo					/	1			1	/	5	3	11	2	2
Aiko					/	1	1	7	1	12	10	16	18	18	27

5.10 Researcher: what's happened to this apple?

Ross: 这个苹果 有人 吃了
zhe ge pingguo youren chi le
this CL apple someone eat PF
'This apple, someone ate it.' (Ross, T7)

Picture 5-1



5.11 Resercher: what's happened to this apple?

Ross: 他 吃了 苹果
ta chi le pingguo
he eat PF pingguo
'He ate the apple.' (Ross, T6)

Picture 5-2



At 10, Ross produced two OBJ TOPs in two consecutive utterances. In (5.12), the two OBJ TOPs are underlined, *shengzi* ‘new words’ and *yige zi* ‘one word’. The first TOP is initiated by the researcher and the second one is initiated by Ross himself.

5.12 Researcher: 生 字 或者是 生 词
 sheng zi huozhe sheng ci
 new word or new phrase
 ‘New words or new phrases.’
 Ross: 生字 我 需要 学/但是 如果 一个字 我 认识/我 remember
shengci wo xuyao xue/danshi ruguo yigeci wo renshi/wo remember
new word I need learn/but if one word I know/I remember
 ‘New words I need to learn. But if a word I know, I remember.’ (Ross, T10)

The different contexts where Ross produced the OBJ TOPs seem to render an increasing productivity of the structure. At T6, Ross did not give prominence to a patient OBJ, which appeared in a prompt. At T7, Ross was able to pick up a prompt of a patient OBJ and made it the TOP. At T10, he was able to produce OBJ TOPs under self-initiated contexts, without prompts.

Leo and Aiko also exhibited the same tendency of initial production with prompts and later production in self-initiated contexts. For Leo, he was given two prompts of patient OBJs at T6. One prompt was given using Picture 5-2 and the following one using Picture 5-1. In (5.13), he did not pick up the first OBJ prompt and gave it prominence. However, he picked up the following one and made it the TOP. At T13, Leo was asked to make a short story based on a picture. He produced (5.14) during his narration of a picture-based story without being given any prompt.

5.13 Researcher: What happened to this apple?

Leo: 他 喜欢 吃 苹果
ta xiehuan chi pingguo
'He likes eating apples.'

Researcher: 很好 这个 苹果 呢?
hen hao zhe ge pingguo ne
very good this CL apple NE (NE: question marker)
'Very good, how about this apple?'

Leo: 这个 苹果 也 er 吃
zhe ge pingguo ye er chi
this CL apple also er eat
'This apple, (someone) ate it.' (Leo, T6)

5.14 这个 我 看 不 懂
zhege wo kan bu dong
this I see not understand
'This I can't read.' (Leo, T13)

For Aiko, she produced the first OBJ TOP at T6 with a given prompt (see 5.15). At T8, she produced a self-initiated token (see 5.16) when she was talking about her future plan.

5.15 Researcher: what's happened to this apple?

Aiko: 他 吃了/苹果 他 吃了
ta chi le/pingguo ta chi le
he eat PF/apple he eat PF
'Apple, he ate.' (Aiko, T6)

5.16 如果 我去 masters/我的工作 不 能/空姐 不 能
ruguo wo qu masters/wode gongzuo bu neng/kongjie bu neng
if I go masters/my work not can/air hostess not can
'If I go for a Masters' program, I cannot be an air hostess.' (Aiko, T8)

Applying the emergence criterion (see Table 5-16), the OSV structure emerged in Ross' data at T10, in Leo' at T11 and in Aiko's at T8.

Table 5-16. Emergence of OSV: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross							(+)	(+)		+	(+)		(+)		+
Leo					/	(+)			(+)	/	+	+	+	+	+
Aiko					/	(+)	(+)	+	(+)	+	+	+	+	+	+

5.2.3.2 The SOV structure

Among the three beginners, only Aiko produced the SOV structure. She produced two tokens at T11 and T13 respectively and one token at T15. In the three example sentences (5.17), (5.18) and (5.19), the underlined OBJs, *kaoshi* ‘exam’, *riyu* ‘Japanese’, and *xingli* ‘luggage’, were in the preverbal position as a secondary TOP.

Table 5-17. Occurrences of SOV: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross															
Leo					/					/					
Aiko					/						2	2			1

5.17 我 考试 准备 了
 wo kaoshi zhunbei le
 I exam prepare PF
 ‘I prepared the exam.’ (Aiko T11)

5.18 我 日语 忘 了
 wo riyu wang le
 I Japanese forget PF
 ‘I’ve forgot the Japanese expression.’ (Aiko T12)

5.19 他 行李 放 在 车 里边
 ta xingli fangzai che libian
 he luggage put zai car inside
 ‘He put the luggage inside the car.’ (Aiko T12)

In Aiko’s data, the verb *wang* ‘forget’ as in (5.18) and *fang* ‘put’ as in (5.19) also appeared in the OSV structure, shown in sentences (5.20) and (5.21). This may indicate that Aiko was able to use the SOV structure as an alternative form of the OSV structure.

Applying the emergence criterion, SOV only emerged in Aiko’s data At T11.

5.20 ‘take’ 我 忘 了
 ‘take’ wo wang le
 ‘take’ I forget PF
 “ ‘take’ I forget.” (Aiko, T08)

5.21 这 个 电 视 我 要 放 在 living room
zhe ge dianshi wo yao fang zai living room
this CL television I want put in living room
 ‘This television I want to put in the living room.’ (Aiko T10)

Table 5-18. Emergence of SOV: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross															
Leo					/					/					
Aiko					/						+	+			(+)

5.2.3.3 The SO_{BAV} structure

The SO_{BAV} structure only appeared in Ross’ and Aiko’s data (see Table 5-19). No instances were found in Leo’s data. Ross produced a total of four tokens towards the end of the data collection, two tokens at T14 and one token at T15. In sentence (5.22) for example, he used the SO_{BAV} structure in response to the researcher’s question from Picture 5-3.

Table 5-19. Occurrences of SO_{BAV}: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross														2	1
Leo					/					/					
Aiko					/										1

5.22 Researcher: 他 在 做 什么?
 ta zai zuo shenme?
 he PROG do what? (PROG: progressive marker)
 ‘what is he doing?’

Ross: 他 把 banana 放 在 垃 圾 箱 里
 ta bA banana fang zai laji xiang li
 he BA banana put at rubbish bin inside
 ‘He put the banana in the rubbish bin.’ (Ross, T14)

Picture 5-3



Aiko attempted to produce the SO_{BA}V structure at T13 (see sentence 5.23). However the BA OBJ, *shuiguo* ‘fruit’, was not put correctly in its preverbal position and it is still at the canonical postverbal position. She produced one token (see sentence 5.24) at T15 in response to the researcher’s question as in sentence (5.22) from Picture 5-3. It should be noted that Aiko produced the token after a self-correction from a SVO structure, indicating that the production was not a spontaneous one.

5.23 *家人 把 吃 都 水果
 *jiaren ba chi dou shuiguo
 *family BA eat all fruit
 *‘Family ate all the fruit.’ (Aiko, T13)

5.24 Researcher: 他 在 做 什么?
 ta zai zuo shenme?
 he PROG do what? (PROG: progressive marker)
 ‘what is he doing?’

Aiko: 他 放 香蕉 在 垃 圾 桶 啊 他 把 香蕉 放 在 垃 圾 桶
 ta fang xiangjiaozai laji tong ah ta ba xiangjiao fang zai laji tong
 he put banana at rubbish bin ah he BA banana put at rubbish bin
 ‘He put the banana into the rubbish bin.’ (Aiko, T15)

Applying the emergence criterion (see Table 5-20), the SO_{BAV} structure emerged in Ross' data at T14 and it did not emerge in Leo's and Aiko's data. To bring the other two non-canonical OSV and SOV structures into comparison (see Table 5-21), the OSV structure emerged the earliest in the three learners' data and the SOV and SO_{BAV} structures either emerged very late or did not emerge at all. It may suggest that the SOV and SO_{BAV} structures involve more processing cost than the OSV structure. This issue is to be further discussed in Chapter 6.

Table 5-20. Occurrences of SO_{BAV}: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross														+	(+)
Leo					/					/					
Aiko					/										(+)

Table 5-21. Emergence of OSV: beginners

Learner	Structure	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross	SO _{BAV}														+	(+)
	SOV															
	OSV							(+)	(+)		+	(+)		(+)		+
Leo	SO _{BAV}					/					/					
	SOV					/					/					
	OSV					/	(+)			(+)	/	+	+	+	+	+
Aiko	SO _{BAV}					/										(+)
	SOV					/						+	+			(+)
	OSV					/	(+)	(+)	+	(+)	+	+	+	+	+	+

5.3 Acquisition process of word order: non-beginners

5.3.1 Acquisition of canonical structures

Table 5-22 presents the occurrences of the canonical structures in the three non-beginners' data. The plus sign '+' in cells indicates that the emergence criterion of two tokens is satisfied. The table shows that the canonical structures were abundant in the three non-beginners' data at T1, three weeks after semester one started. There were abundant occurrences of the canonical structures in the following sessions, therefore the

‘+’ sign is used to indicate their emergence status. A statistical analysis of two representative sessions, T2 and T10, reveals that the canonical structures account for around 75% of the total utterances (vs. 80% for beginners).

Table 5-22: occurrences of canonical structures: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret	89	+	+	+	+	+	+	+	+	+
Mitsu	61	+	+	+	+	+	+	+	+	+
Chris	111	+	+	+	+	+	+	+	+	+

5.3.2 Acquisition of XP + Canonical structures

Table 5-23 shows the occurrences of the time and location ADJ TOPs in the three non-beginners’ data. They all produced ADJ TOPs at above-emergence rates (two tokens) from T1.

Table 5-23. Occurrences of ADJ TOPs: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret	9	+	+	+	+	+	+	+	+	25
Mitsu	9	+	+	+	+	+	+	+	+	11
Chris	7	+	+	+	+	+	+	+	+	36

Three types of NP TOPs are investigated: (1) sentential reference, (2) semantic reference and (3) index reference. Type (1) indicates the NP TOPs refer to the whole sentence they precede. Type (2) indicates the NP TOPs bear semantic relationships with the SUBJ and OBJ they refer to. Type (3) indicates the NP TOPs co-index the SUBJ and OBJ. Table 5-24 presents the occurrences of NP TOPs in the three non-beginners’ data. They all produced the NP TOPs from T1. Bret produced a total of 26 tokens, Mitsu produced 24 and Chris produced 131. Table 5-25 shows the occurrences of the three types of NP TOPs.

Table 5-24. Occurrences of NP TOPs: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret	1		1	1	2	1	1	2	1	16
Mitsu	2	1	2	3	1	3		2	3	7
Chris	2	3	4	15	8	10	27	16	22	24

Table 5-25. Occurrences of the three types of NP TOPs: non-beginners

Learner	Structure	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	total
Bret	Sentential									1	2	3
	Semantic					1					5	6
	Index	1		1	1	1	1	1	2		9	17
Mitsu	Sentential				2					1		3
	Semantic			2	1	1	2	1	1	1	6	15
	Index	2	1		1		1	1	1	1	1	9
Chris	Sentential					2		3	3	7	6	19
	Semantic	1	2		6	5	5	17	3	6	1	46
	Index	1	1	4	9	1	5	7	10	9	16	63

Compared with the semantic and index reference, the sentential reference has the least tokens in the data. Bret and Mitsu produced three tokens respectively in total and Chris produced 19. The sentential reference not only has the least tokens, but also appeared later in the three non-beginners' data. It first appeared in Bret's data at T9 (see sentence 5.25), in Mitsu' at T4 (see sentence 5.26) and in Chris' at T5 (see sentence 5.27). The NP TOPs in the sentential reference does not refer to a specific constituent in the sentences they precede. Rather the sentential NP TOPs refer to the sentences as a whole. The other two types, however, have either semantic or index reference to another element in the sentences they precede. In another words, a link could be established. Moreover, the index reference, the left-dislocation structure in linguistic terms, is a common linguistic phenomenon in most languages. However, the sentential reference, based-generated TOPs in Chinese linguistic terms, is a particular feature of Chinese topics. Unlike English (see the English translation of sentences 5.25, 5.26 and 5.27), the sentential reference does not require prepositions or markers to make its TOP function explicit. Therefore, the late emergence and small occurrences do not necessarily mean more processing cost involved than the other two types.

5.25 中国 婚礼 你 看到 一 个 人
zhongguo hunli ni kandao yi ge ren
Chinese wedding you see one CL person
 ‘Speaking of Chinese wedding, you only see one person (refers to host of the wedding ceremony)’ (Bret, T09)

5.26 语法 我们 有 问题 的 时候 问 他
yufa women you wenti de shihou wen ta
grammar we have question DE time ask him
 ‘Speaking of grammar, when we have questions, we ask him.’ (Mitsu, T04)

5.27 这个 盐 你 不 超过 六 克
zhe ge yan ni bu chaoguo liu ke
this CL salt you not exceed six gram
 ‘Speaking of salt, your intake shouldn’t exceed six grams.’ (Chris, T05)

One feature of the NP TOP structures that sets Chris, the advanced learner, apart from the three beginners and the two intermediate learners is that the NP TOPs not only appeared in canonical structures but also in other non-canonical structures. In sentence (5.28) for example, a SO_{BA}V structure, the NP TOP, *naxieshu* ‘those books’ exchanges index information with the BA OBJ, *tamen* ‘they’. In sentence (5.29), a passive structure, the NP TOP *zhge haizi* ‘this child’ exchanges index information with the patient SUBJ *ta* ‘he’. Applying the acquisition criterion, the NP TOPs emerged in Mitsu’s and Chris’ data at T1 and in Bret’s at T5.

5.28 那些 书 我 会 把 他们 放 在 内 个 柜 上
naxieshu wo hui ba tamen fangzai na ge gui shang
those books I will BA they put at that CL cupboardtop
 ‘Those books I will put them on the cupboard.’ (Chris, T03)

5.29 这个 孩子 他 被 这 个 吸 引 了
zhe ge haizi ta bei zhe ge xiyin le
this CL child he BEI this CL attract PF
 ‘This child he is attracted by this.’ (Chris, T09)

Table 5-26. Emergence of NP TOPs: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret	(+)		(+)	(+)	+	(+)	(+)	+	(+)	+
Mitsu	+	(+)	+	+	(+)	+		+	+	+
Chris	+	+	+	+	+	+	+	+	+	+

5.3.3 Acquisition of non-canonical structures

5.3.3.1 The OSV structure

Table 5-27 shows the occurrences of OSV in the three non-beginners' data. Bret started to produce the structure from T2 and Mitsu and Chris from T1. Compared with the three beginners who initially produced OBJ TOPs with prompts and gradually were able to produce OBJ TOPs without prompts in self-initiated contexts, the three non-beginners also show a similar acquisition characteristic of OBJ TOPs.

Table 5-27: Occurrences of OSV: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret		1	2	5	3	1	6	7	5	4
Mitsu	1	2	9	16	23	13	4	13	22	13
Chris	6	11	4	17	22	18	22	7	44	32

For example, at T2 Bret produced the first OSV token (see sentence 5.30) with a prompt from the researcher's question, but at T8 he produced a self-initiated token (see sentence 5.31) when he narrated his experience of attending a Chinese wedding ceremony.

5.30 那个 书 你 看 完 了 吗
nage shu ni kan wan le ma
that book you read finish PF QUE
 'That book, did you finish reading?' (Bret, T2)

5.31 那个 新郎 父母亲 你 应该 听 一 听
nage xinlang fumuqin ni yinggai ting yi ting
that groom parents you should listen one listen
 'The parents of the groom you should listen to.' (Bret, T8)

Mitsu and Chris were able to produce self-initiated OBJ TOPs in earlier sessions. Mitsu produced the first token at T1 (see sentence 5.32) under a prompt. At T2, she was able to produce a self-initiated token (see 5.33), when she was asked how to deal with the items in a picture. Chris was able to produce self-initiated OBJ TOPs from T1 (see 5.34), when he was asked to make an office story based on a serial of pictures.

5.32 一个苹果 切半了
 yi ge pingguo qie ban le
 one CL apple cut half PF
 ‘The apple (someone) cut into halves.’ (Mitsu, T1)

5.33 你的 袜子 很脏/我 觉得 这个 不要
 nide wazi hen zang/wo juede zhege bu yao
 your sock very dirty/I think this not want
 ‘Your socks are very dirty. I think these (I) don’t want.’ (Mitsu, T2)

5.34 Office worker A: 请 你 给 老板 把 这个 合同 打 出来
 qing ni gei laoban ba zhege hetong da chulai
 please you for boss BA this contract print out
 ‘Please print the contract out for the boss.’
 Office worker B: 可以 er 这个 合同 我 打 不 出来
 keyi er zhege hetong wo da bu chulai
 ok er this contract I print not out
 ‘Ok, er this contract, I can print out.’ (Chris T01)

Applying the emergence criterion (see Table 5-28), the OSV structure emerged in Bret’s data at T3, in Mitsu’s at T2 and in Chris’ at T1.

Table 5-28: Emergence of OSV: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret		(+)	+	+	+	(+)	+	+	+	+
Mitsu	(+)	+	+	+	+	+	+	+	+	+
Chris	+	+	+	+	+	+	+	+	+	+

5.3.3.2 The SOV structure

Table 5-29 presents the occurrences of SOV in the three non-beginners' data. The table shows a clear contrast of the number of occurrences of SOV among the three learners. Bret only produced one token at the last session T10. Both Mitsu and Chris started to produce SOV from T1. Mitsu produced a total of 45 tokens and Chris produced 12.

Table 5-29. Occurrences of SOV: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	Total
Bret		(?)								1	1
Mitsu	1	1	7	9	4	3	5	4	3	8	45
Chris	2	1			1	1	5		1	1	12

Bret tried to produce one token at T2 (see sentence 5.35). However, this production was followed immediately by his enquiry on the researcher whether it was a correct form. The researcher did not answer his question directly. Instead, the researcher asked Bret to make the sentence again. Bret might have taken this as a signal of a negative answer, so he changed SOV into SVO. In the following sessions, he only produced one token at T10 (see sentence 5.36). Bret might be able to produce the SOV form. However, he might not take it as a correct form and avoid using it.

- 5.35 Bret: 你 er 厨房 扫 完 了 吗?
 ni er chufang dao wan le ma?
 you er kitchen clean finish PF QUE?
 'The kitchen have you finished clearing?'
- Researcher: yes good
- Bret: so '厨房' comes after '扫'?
 so 'shufang' comes after 'sao'?
 so 'kitchen' comes after 'clean'?
- Researcher: er again? can you make this sentence again?
- Bret: 你 er 扫 完 了 厨房?
 ni er sao wan le chufang?
 you er clean wan PF chufang?
 'Have you finished clearing the kitchen?' (Bret, T02)

5.36 我 这个 学 完 了
 wo zhege xue wan le
 I this xue finish PF
 'I have finished learning it.' (Bret, T10)

The structural features of SOV produced by Mitsu are summarized as follows.

- (1) The preverbal object is a question word which functions as an indefinite pronoun and conveys a notion of inclusiveness and totality.

5.37 我 什么 都 喜欢
 wo shenme dou xihuan
 I whatever all like
 'I like all sports.' (Mitsu, T1)

- (2) The preverbal object is either definite or indefinite, while the latter case is unnatural in mature Chinese grammar.

5.38 我 一个喜欢的人 介绍 一下
 wo yi ge xihuan de ren jieshao yixia
 I one CL like RC person introducebriefly
 'I'd like to introduce briefly a person that I like.' (Mitsu, T3)

5.39 他 一个钱 放在 存钱罐儿 的 里面
 ta yi ge qian fang zai cunqianguan de limian
 he one CL money put at piggy-bank GEN inside
 'He puts a coin into a piggybank.' (Mitsu, T5)

- (3) Mitsu seemed to be aware of the unnaturalness of SOV, evident in her self-correction.

5.40 他 鱼 的 菜 做 er 他 做 鱼 的 菜
 ta yu de cai zuo er ta zuo yu de cai
 he fish GEN dish make er he make fish GEN dish
 'He makes a fish dish.' (Mitsu, T5)

- (3) SOV appeared not only in declaratives but also in questions.

5.41 你 哪一个 更 喜欢?
 ni na yi ge geng xihuan
 you which one CL more like
 'Which one do you like more?' (Mitsu, T10)

(4) SOV appeared in different structural types: existential structure (5.42), which is unnatural in mature grammar; causative structure (5.43)

5.42 在 韩国 差不多 一样的 样子 的 毽子 有
 zai hanguo chabuduo yiyangde yangzi de jianzi you
 at Korea almost same look GEN shuttlecock exist
 ‘There is almost the same kind of shuttlecock in Korea.’ (Mitsu, T04)

5.43 桌子 上 不 干净/ 她 让 他 这里 也 要 打扫
 zuozi shang bu ganjing/ ta rangta zheli ye yao dasao
 table top not clean/ she let he here also needclean
 ‘The table is not clear, she lets her clean here as well.’ (Mitsu, T9)

Chris produced the SOV structure from T1. He produced a total of 12 tokens and none at T3, T4, T8. A closer examination of the structure features of Chris’ production of SOV reveals that he produced two tokens of bare preverbal OBJ (e.g *yao ‘pill’* in 5.44), one token in the verb complement *de* structure (see 5.45) and the other nine tokens all with the adverb *dou ‘all’*. It indicates that Chris’ production of SOV is mainly restricted to the structure with the adverb *dou ‘all’*.

Table 5-30: Occurrences of SOV: Chris

Structure	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
BARE	2					1				
Dou		1			1		5		1	
De										1

5.44 你 药 吃 了 吗?
 ni yao chi le ma?
 you pill eat PF QUE?
 ‘Have you taken your pill?’ (Chris, T01)

5.45 他 英文 说 得 比较 好
 ta yingwen shuode bijiao hao
 he English say DE relativelygood
 ‘He speaks English fairly well.’ (Chris, T10)

5.46 我 什么 都 可以 吃
 wo shenme dou keyi chi
 wo whatever dou keyi eat
 'I may eat whatever available.' (Chris, T02)

5.47 你 一 分 钱 都 没 有
 ni yi fen qian dou mei you
 you one cent money dou not have
 'You haven't even one cent.' (Chris, T7)

In comparison, Mitsu only produced four tokens of SOV with *duo* 'all' (see Table 5-31). The other tokens all have bare preverbal OBJs under a variety of contexts, as summarized earlier. Some of her SOV structures were unnatural in mature grammar, which may indicate that her use of SOV is more arbitrary compared with Chris. One possibility for her frequent and arbitrary use of SOV is due to an influence from her L1 Japanese. In Japanese language, the OBJ is placed preverbally by default and Mitsu might transfer the default Japanese SOV form to Chinese L2. This issue will be further discussed in the next chapter. Applying the emergence criterion (see Table 5-32), the SOV structure emerged in Mitsu's data at T3 and in Chris' at T1. This structure did not emerge in Bret's data.

Table 5-31. Occurrences of SOV: Mitsu

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
BARE		1	4	9	3	3	4	4	3	9
Dou	1		2				1			

Table 5-32. Emergence of SOV: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret										(+)
Mitsu	(+)	(+)	+	+	+	+	+	+	+	+
Chris	+	(+)			(+)	(+)	+		(+)	(+)

5.3.3.3 The SO_{BAV}

Table 5-33 presents the occurrences of the SO_{BAV} structure. Bret started to produce the

structure at T2, Mitsu at T6 and Chris at T1. At T2, Bret produced three instances of the SO_{BA}V structure (see 5.48, 5.49 and 5.50). The ‘/’ sign with two numbers in the cell under T2 indicates that out of the three instances, only one is well-formed. The Chinese SO_{BA}V structure requires the placement of OBJ in the preverbal position after BA and denotes a disposal meaning. In (5.48), the OBJ TOP *naben shu* ‘that book’ was in its preverbal position after the BA. In comparison, the sentences (5.49) and (5.50) are ill-formed. The OBJ *baozhi* ‘newspaper’ in (5.49) was still in its canonical postverbal position and the OBJ ‘socks’ was omitted in (5.50), which is not allowed in the SO_{BA}V structure.

Table 5-33. Occurrences of SO_{BA}V: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret		1/3		4		1	1	3	2	1
Mitsu						1	2	2	1	3
Chris	6	13	9	20	11	13	12	8	29	10

5.48 我 把 那本书 放在 shelf
 wo ba na ben shu fang zai shelf
 I BA that CL book put on shelf
 ‘I put that book on the shelf.’ (Bret, T2)

5.49 *我 把 放在报纸 上 电视机
 *wo ba fang zai baoshi shang dianshiji
 *wo BA put newspaper up dianshiji
 ‘I put the newspaper on the TV.’ (Bret, T2)

5.50 *我 把 带着 衣橱
 *wo ba dai zhe yichu
 *wo BA bring DUR closet
 ‘I put (socks) in the closet.’ (Bret, T2)

Mitsu produced the SO_{BA}V structure (see 5.51) for the first time at T6. In (5.51), the OBJ TOP *lingdai* ‘tie’ was placed preverbally before the verb *fang* ‘put’ and after BA. In comparison, at earlier sessions in the similar disposal context with the same verb *fang* ‘put’, she placed the OBJ invariably in its canonical postverbal position after the verb *fang* ‘put’. At an earlier session (T5), Mitsu produced a sentence with ‘put’ (see 5.52),

where the OBJ *yige beizi* 'a glass' is in its canonical postverbal position after the verb *fang* 'put'.

5.51 我 把 领带 放 在 椅子 的 上面
wo ba lingdai fang zai yizi de shangmian
I BA tie put at chair DE top
'I put the tie on the chair.' (Mitsu, T6)

5.52 他 放 在 一 个 杯子 桌子 上面
ta fang zai yi ge beizi zuozi shangmian
he put at one CL glass table top
'He put a glass on the table.' (Mitsu T5)

Bret and Mitsu only produced the SO_{BA}V structure when a disposal context was provided by the researcher through picture-based elicitation tasks. They did not produce any self-initiated tokens. In comparison, Chris was able to produce the SO_{BA}V structure under self-initiated contexts from T1. In sentence 5.53, Chris produced the structure when he narrated how he received an order from a parcel delivery. This was a self-initiated context. Moreover, he was also able to produce the SO_{BA}V structure embedded in other syntactic structures. The sentence 5.54 is a combination of causative structure (the causative verb *rang* 'let' underlined) and the SO_{BA}V structure (BA underlined). Applying the emergence criterion, the SO_{BA}V structure emerged in Bret's data at T4, in Mitsu' at T7 and in Chris' at T1 (see Table 5-34).

5.53 你 可以 把 那 个 单子 给 司机
ni keyi ba na ge danzi gei siji
you may BA that CL receipt give driver
'You may give the receipt to the driver.' (Chris, T1)

5.54 他 让 我 把 作业 给 他
ta rang wo ba zuoye gei ta
he let I BA homework give he
'He asks me to give him the homework.' (Chris, T5)

Table 5-34. Occurrences of SO_{BA}V: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret		(+)		+		(+)	(+)	+	+	(+)
Mitsu						(+)	+	+	(+)	+
Chris	+	+	+	+	+	+	+	+	+	+

5.4 Acquisition process of complex structures: beginners

5.4.1 The existential structure

The structural feature of the existential structure is demonstrated in (5.55), where there is a topical locative phrase with an optional prepositional *zai* 'at', followed by an existential verb and a presented noun phrase (new information) with an optional verb phrase.

5.55 (*zai* 'at') + locus + existential verb + presented noun phrase + (verb phrase) (C. N. Li & Thompson, 1981, p. 510)

Three types of existential structures are investigated in this thesis, one type with the verb *you* 'exist', one with the copula verb *shi* 'is' and one with other lexical verbs. The existential structure involves a non-default mapping of a-structure to f-structure, because the locative, a less prominent role on the thematic hierarchy, is mapped onto the most prominent syntactic function SUBJ.

Table 5-35 presents the occurrences of the existential structures. The three beginners all started to produce the structures from T6. Ross produced a total of 10 tokens, Leo produced 9 and Aiko produced 24. The existential verbs in their productions were almost exclusively *you* 'exist' (see sentence 5.56 for example), i.e., the type 1 structure. Only three tokens with lexical verbs were found, produced by each of the three beginners (see sentences *xie* 'write' in 5.57, *zhu* 'live' in 5.58 and *hua* 'draw' in 5.59).

Table 5-35. Occurrences of existential structures: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross						2	3			2		1			2
Leo					/	1	2	1		/	2		2		1
Aiko					/	3	2	3		2	3	3	2	2	4

5.56 在 B 图 冰箱 里 有 一 盒 鸡蛋
 zai B tu bingxiang li you yi he jidan
 in B picture fridge inside exist one box egg
 ‘There is a box of egg in the fridge in picture B.’ (Aiko T7)

5.57 黑板 写 着 他的 名字
 heiban xie zhe tade mingzi
 blackboard write DUR his name
 ‘On the blackboard writes his name.’ (Ross T12)

5.58 现在 这个 屋子 住 两 个 人
 xianzai zhege wuzi zu liang ge ren
 now this room live two CL people
 ‘Now there are two people living in this room.’ (Leo, T07)

5.59 这里 米饭 画 一 个 人
 zheli mifan hua yi ge ren
 here rice draw one CL people
 ‘There paints a person on the rice here.’ (Aiko, T15)

The results of data analysis seem to suggest that the existential structures with the existential verb *you* are easier to acquire, compared with other existential types. This is probably due to the dual functions of the verb *you*. When *you* appears with a locative SUBJ, it denotes an existential meaning. When it appears with a non-locative SUBJ, it denotes a possessive meaning (see sentence 5.60). In this case, the possessor role is mapped onto the SUBJ and the mapping of a- to f-structure is default. This link of *you* with a possessive meaning may help the L2 learners to extend the SUBJ of the verb *you* from non-locative to locative. When the locative SUBJ is established in the L2 learners’ interlanguage, they start to use other existential verbs to denote existential meanings. Despite the possible link of *you* with a possessive meaning, the existential structure did not emerge in early interlanguage.

5.60 我 有 一 个 弟 弟
 wo you yi ge didi
 I have one CL little brother
 'I have a little brother.' (Ross T3)

Applying the emergence criterion, the existential structure emerged in Ross' and Aiko' data at T6 and in Leo's at T7 (see Table 5-36). Compared with the earlier emergence of the active structures at T1, the late emergence of the existential structure lends an empirical support to more processing cost involved in mapping the locative, a less prominent role on the thematic hierarchy, onto the SUBJ.

Table 5-36. Emergence of the existential structure: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross						+	+			+		(+)			+
Leo					/	(+)	+	(+)		/	+		+		(+)
Aiko					/	+	+	+		+	+	+	+	+	+

5.4.2 The passive structure

The Chinese passive structure (see 5.61) has a patient SUBJ and a passive marker BEI/RANG/JIAO, which introduces the agent of the action. The agent, marked by BEI, is optional if the agent is not mentioned or unimportant. The agent, marked by other markers (i.e. RANG/JIAO), is obligatory. The Chinese passive structure often implies a sense of adversity or misfortune.

5.61 SUBJ_{PATIENT}+ Passive Marker_{BEI/RANG/JIAO} +Agent+ Verb

The mapping of a-structure to f-structure is non-default, because the patient, a less prominent role on the thematic hierarchy, is mapped onto the most prominent syntactic function SUBJ. This disrupts the unmarked alignment of AGENT-to-SUBJ and PATIENT-to-OBJ. The passive structure is hypothesized to emerge after the active structure at stage 2.

Table 5-37 presents the occurrences of the passive structures. The passive structures appeared in Ross and Aiko's data in the last two sessions, T14 and T15. No instances were found in Leo's data. Ross attempted to use the passive structure at T13 (see sentence 5.62). However, the agent, *bieren* 'someone' (underlined), was not placed at its preverbal position after the passive marker BEI. It was placed at the postverbal position. At T15, Ross was able to produce one token with the agent suppressed (see sentence 5.63).

Table 5-37. Occurrences of passive structures: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross													1*		1
Leo					/					/					
Aiko					/									1	1

5.62 *橙子 被 切 别人
 *chengzi bei qie bieren
 *orange BEI cut someone
 'The orange was cut by someone.' (Ross, T13)

5.63 苹果 被 吃 完 了
 pinguo bei chi wan le
 apple BEI eat finish PF
 'The apple was eaten (by someone).'

Aiko produced one token each at T14 and T15. At 14, she produced the structure for the first time with a passive marker RANG (see 5.64). At T15, she produced another token with a passive marker BEI (see sentence 5.65). In comparison, at T7 Aiko was asked the same question 'what happened to this green car?' as in sentence (5.65) from the same Picture 5-4, Aiko gave prominence to the patient role *lüche* 'the green car'; however no passive marker in the sentence indicates the passive meaning. What she intended to say was the opposite of what she actually meant.

5.64 梨 和 苹果 是 让 孩子 咬 的
 li he pingguo shi RANG haizi yao de
 pear and apple SHI RANG kid eat DE (SHI...DE: emphasis structure)
 ‘The pear and apple was bitten by the kid.’ (Aiko, T14)

5.65 Researcher: 这 个 绿 车 怎 么 了?
 zhe ge lü che zenme le?
 this CL green car how PF?
 ‘what happened to this green car?’

Aiko: 绿 车 被 红 车 碰 了
 lü che bei hong che peng le
 green car BEI red car hit PF
 ‘The green car was hit by the red car.’ (Aiko, T15)

Picture 5-4



5.66 Researcher: 这 个 绿 车 怎 么 了?
 zhege lü che zenme le
 this green car how PF
 ‘What’s happened to this green car?’

Aiko: 绿 色 的 车 撞 红 色 的 车
 lüside che zhuang hongside che
 green car hit red car
 ‘The green car hit the red car. (the green car was hit by the red car)’ (Aiko, T7)

Leo did not produce any passive structures. At 14, Leo was asked the same question in (5.65) and (5.66), he did not pick up the patient prompt, *lüside che* ‘the green car’, from the researcher’s question and give it prominence. Instead, he followed the unmarked alignment of AGENT-to-SUBJ and PATIENT-to-OBJ and produced a canonical SVO structure (see 5.67).

5.67 Researcher: what’s happened to this green car?

Leo: 红 车 的 车 撞 了 绿 色 的 车
 hongside che zhuang le lüside che
 red car hit PF green car
 ‘The red car hit the green car.’ (Leo, T14)

Applying the emergence criterion, the passive structure did not emerge in the beginners' data.

Table 5-38. Emergence of the passive structures: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross															(+)
Leo					/					/					
Aiko					/									(+)	(+)

5.4.3 The causative structure

The Chinese causative structure is a subtype of the serial verb structure. Its structural pattern is illustrated in (5.68). The first verb has a causative meaning and its OBJ assumes two thematic roles, the patient of the first causative verb and the agent of the second verb. Common Chinese causative verbs are *rang* 'let', *jiao* 'made', *yao* 'want', and *qing* 'invite'. The mapping of a- to f-structure is complex, because one syntactic function OBJ assumes two thematic roles.

5.68 SUBJ_{AGENT}+Causative verb_{RANG/JIAO/YAO/QING}+OBJ_{PATIENT/AGENT}+Verb+(OBJ)

Table 5-39 summarizes the occurrences of the causative structures. The table shows that Aiko was the first beginner to produce the structure at T7, followed by Leo at T8. Ross was the last to produce the structure at T9. At T9 and T10, Ross produced one token respectively with the same causative verb *yao/xiangyao* 'want' (see sentence 5.69 and 5.70). At 11, Ross used a different verb *xuyao* 'need' (see sentence 5.71).

Table 5-39. Occurrences of causative structures: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross									1	1	1	1	2	1	3
Leo					/			1		/		2	5	1	4
Aiko					/		2	3	2	5	2	6	3	3	4

5.69 他 要 一 个 狗 去 左 边
 ta yao yi ge gou qu zuo bian
 he want one CL dog go left side
 'He wants the dog to go left.' (Ross, T9)

5.70 他 想要 他的 老婆 打 电话 他们的 医生
 ta xiangyao tade laopo da dianhua tamende yisheng
 he want his wife make phonecall their doctor
 'He wants his wife to call their doctor.' (Ross, T10)

5.71 我的 车 坏 了 所以 我 需要 你 送
 wode che huai le suoyi wo xuyao ni song
 my car bad PF so I need you send
 'My car is broken, so I need you to give (me) a lift.' (Ross, T11)

An examination of the causative verbs that the three learners chose to use reveals that *xiang/yao/xiangyao* 'want', *wen* 'ask', *gaoshu* 'told' were the favourite causative verbs. In comparison, the typical Chinese causative verbs are *rang* 'let', *jiao* 'made', *yao* 'want', and *qing* 'invite'. The typical causative verb *rang* 'let' only appeared in Aiko in the last session T15 (see 5.73). Applying the emergence criterion (see Table 5-40), the causative structure emerged in Ross' data at T13, in Leo's at T12 and Aiko's at T7.

5.72 我 问 我的 朋友 买 啤酒
 wo wen wode pengyou mai pijiu
 I ask my friend buy beer
 'I ask my friend to buy beer.' (Aiko, T7)

5.73 我 让 他 想 吃
 wo rangta xiang chi
 I let he want eat
 'I want him to want eat.' (Aiko, T15)

Table 5-40. Emergence of causative structures: beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross									(+)	(+)	(+)	(+)	+	(+)	+
Leo					/			(+)		/		+	+	(+)	+
Aiko					/		+	+	+	+	+	+	+	+	+

To bring in the passive and existential structures in comparison (see Table 5-41), the three learners followed the same acquisition sequence. The existential structure emerged the earliest, followed by the causative structure. Although the passive structure appeared in Ross' and Aiko's data in the last two sessions, the emergence criterion is not satisfied.

Table 5-41. Emergence of non-canonical complex structures: beginners

Learner	Structure	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Ross	PASS															(+)
	CAUS									(+)	(+)	(+)	(+)	+	(+)	+
	EXIS						+	+			+		(+)			+
Leo	PASS				/						/					
	CAUS				/				(+)		/		+	+	(+)	+
	EXIS				/	(+)	+	(+)			/	+		+		(+)
Aiko	PASS				/										(+)	(+)
	CAUS				/			+	+	+	+	+	+	+	+	+
	EXIS				/	+	+	+			+	+	+	+	+	+

5.5 Acquisition process of complex structures: non-beginners

5.5.1 The existential structure

Table 5-42 presents the occurrences of existential structures in the three non-beginners' data. Bret started to produce the structure at T4, Mitsu at T2 and Chris at T1. Bret produced a total of 15 tokens and the existential verbs he used were restricted to *you exist* only (see sentences 5.74, and 5.75 for example).

Table 5-42. Occurrences of existential structures: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret				1	4		2	3	2	3
Mitsu		1	2	1	4	3	3	7	7	3
Chris	3	5	1	8	8	3	13	3	9	8

5.74 在 A 图 有 两 只 狗
 zai A tu you liang zhi gou
 at A Picture exist two CL dog
 'There are two dogs in picture A.' (Bret, T4)

5.75 这 个 学 期 我 的 班 上 有 比 较 好 的 学 生
zhe ge xueqi wode ban shang you bijiao haode xuesheng
this CL semeseter my class top exist relative good student
‘In this semester there are relatively good students in my class.’ (Bret, T10)

Compared with the restriction to the existential verb *you* ‘exist’ in Bret’s data, there are a few other existential verbs produced by Mitsu and Chris. Mitsu produced such verbs as *fang* ‘put’, *jian* ‘cut’, *chuxian* ‘appear’ (see 5.76 for example) and *lai* ‘come’ (see 5.77 for example). Chris produced such verbs as *xie* ‘write’, *shangchuan* ‘upload’, *fasheng* ‘occur’ (see 5.78), *tie* ‘stick’ (see 5.79) and *shi* ‘is’ (see 5.80).

5.76 她 的 梦 乡 里 出 现 她 喜 欢 的 人
tade mengxiang li chuxian ta xihan de ren
her dream in appear she like RC ren
‘In her dream appeared the person she likes.’ (Mitsu, T5)

5.77 他 的 后 面 来 熊
tade hougian lai xiong
his behind come bear
‘But from the behind of him came a bear.’ (Mitsu, T9)

5.78 这 里 发 生 了 一 个 事 故
zheli fasheng le yi ge shigu
here occurs PF one CL accident
‘Here occurred an accident.’ (Chris, T3)

5.79 墙 上 面 帖 着 一 个 鱼
qiang shangmian tie zhe yi ge yu
wall top stick DUR one CL fish
‘There is a fish (picture) stuck on the wall.’ (Chris, T7)

In addition to the concrete locative notion of the initial preverbal NP, abstract locative notions were also found in these two learners’ data (5.76 with *mengxiang li* ‘in her dream’ and 5.81 with *falvshang* ‘in the law’). In terms of the second postverbal NP, it almost invariably bears a theme role to the existential verbs. However, the postverbal NPs, *ta xiehuan de ren* ‘the person she likes’ in (5.76) and *xiong* ‘a bear’ in (5.77), could be interpreted as agents, because the two postverbal NPs could initiate the action

chuxian ‘appear’ and *lai* ‘come’. In comparison, the postverbal NP *yige yu* ‘a fish (picture)’ in (5.79) cannot initiate the action *tie* ‘stick’.

5.80 后面 是 什么 小区
 houmian shi shenme xiaoqu
 behind is what district
 ‘What district is behind (it)?’ (Chris, T10)

5.81 法律 上 没 有 规定 吗?
 falü shang mei you guiding ma?
 law top not exist regulation QUE?
 ‘Aren’t there any regulations in the law?’ (Chris, T4)

Applying the emergence criterion (see Table 5-43), the existential structures emerged in Bret’s data at T5, Mitsu’s at T3 and Chris’ at T1. Bret, like the three beginners, relied on the verb *you* to denote a concrete existential meaning. Mitsu and Chris were able to use other existential verbs to denote an existential meaning. Moreover, the initial locative NP could be an abstract locative notion and the second postverbal NP could bear an agent role to the existential verbs.

Table 5-43. Emergence of the existential structures: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret				(+)	+		+	+	+	+
Mitsu		(+)	+	(+)	+	+	+	+	+	+
Chris	+	+	(+)	+	+	+	+	+	+	+

5.5.2 The passive structure

Table 5-44 presents the occurrences of passive structures in the three non-beginners’ data. Bret and Chris started to produce the passive structures from T1 and Mitsu from T7.

Table 5-44: Occurrences of passive structures: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret	4	3	7	4	3	1	2	7	3	1
Mitsu							1	3	2	2
Chris	5	2	7	10	6	5	7	5	9	7

At T1, Bret produced four tokens of passive structures and Chris produced five. In contrast, Mitsu did not produce the passive structures in the same context where Bret and Chris did. In (5.82) for example, Chris picked up the known patient ‘*the lamppost*’ from the researcher’s question from Picture 5-5, and realized it as a patient SUBJ in the passive structure. In the same context, Mitsu did not do so. Instead, she placed it in its canonical postverbal position (see sentence 5.83 in comparison).

5.82 Researcher: 这个 路灯 怎么 了?
zhege ludeng zenme le?
this lamppost how PF?
‘What’s happened to this lamppost?’

Chris: 它 被 汽车 撞 弯 了
ta bei qiche zhuang wan le
it BEI car hit bended PF
‘It (the lamppost) was hit bended.’ (Chris, T1)

Picture 5-5



5.83 Researcher: 这个 路灯 怎么 了?
 zhege ludeng zenme le?
 this lamppost how PF?
 ‘What’s happened to this lamppost?’

Mitsu: 一 辆 车 撞 一 个 路 灯
 yi liang che zhuang yi ge ludeng
 one CL car hit one CL lamppost
 ‘A car crashed in a lamppost.’ (Mitsu, T1)

At T2, Bret and Mitsu were both presented Picture 5-6 (1) and Picture 5-7 (2) in a consecutive manner and were requested to answer the researchers’ question ‘*what happened to the green fish*’. Bret produced a passive structure (see sentence 5.84), whereas Mitsu still used the canonical structure (see sentence 5.85) as she did at T1.

Picture 5-6 (1)



Picture 5-7 (2)



5.84 Researcher: what’s happened to this green fish

Bret: 绿 鱼 被 粉 鱼 吃 了
 lü yu bei fen yu chi le
 green fish BEI pink fish eat PF
 ‘The green fish was eaten by the pink fish.’ (Bret, T2)

5.85 Researcher: what’s happened to this green fish

Mitsu: 粉 鱼 吃 绿 鱼
 fen yu chi lü yu
 pink fish eat green fish
 ‘The pink fish ate the green fish.’ (Mitsu, T2)

At T3, Bret and Mitsu were both presented with Picture 5-8. Bret used a passive structure (see 5.86). Mitsu did not use the canonical structure this time. Rather, she used the OSV structure (see 5.87). She started to produce the passive structure at T7 when she produced the first token (see sentence 5.88).

Picture 5-8



5.86 Researcher: 这个猫怎么了?
zhe ge mao zenme le?
this CL cat how PF?
'What's happened to this cat?'

Bret: 猫被小孩踩尾巴
mao bei xiaohai cai weiba
cat BEI kid step weiba
'The cat's tail was stepped on by the little kid.' (Bret, T3)

5.87 Researcher: 这个猫怎么了?
zhe ge mao zenme le?
this CL cat how PF?
'what's happened to this cat?'

Mitsu: 猫的尾巴他踩了
mao de weiba ta cai le
cat GEN tail he step PF
'He stepped on the cat's tail.' (Mitsu, T3)

5.88 白人 被 红 人 打
bai ren bei hong ren da
white person BEI red person hit
'The person in white was hit by the person in red.' (Mitsu, T7)

Both Bret and Mitsu produced the passive structures only in the contexts where patient prompts were presented by the researcher via picture-based elicitation tasks. Chris was able to produce the passive structures in free conversation without any prompt. In sentence (5.89), he produced a self-initiated token when he recounted the last debate he participated in. Applying the emergence criterion (see Table 5-45), the passive structure emerged in Bret's and Chris' data at T1 and in Mitsu's at T8.

5.89 我们 输 了/但是 我 被 选 最 精彩 了
 women shu le/danshi wo bei xuan zui jingcai le
 we lose PF/but I BEI select most excellent PF
 'We lost, but I was selected as the best debator.' (Chris, T08)

Table 5-45: Emergence of passive structures: Non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret	+	+	+	+	+	(+)	+	+	+	(+)
Mitsu							(+)	+	+	+
Chris	+	+	+	+	+	+	+	+	+	+

5.5.3 The causative structure

Table 5-46 presents the occurrences of the causative structures. These structures began to appear in Bret's data from T2 and Mitsu' and Chris' from T1. Like the three beginners, Bret seemed to borrow the causative verbs from English. At T2, he produced a token with verb *xiang* 'want'. At T3 he produced two tokens, one with verb *gaoshu* 'tell' and the other with verb *wen* 'ask'. In sentence (5.90) for example, a native Chinese speaker would not use verb *wen* 'ask' as a causative verb. At T5, he started to use the typical Chinese causative verbs, such as *rang* 'let' (see sentence 5.91). Mitsu and Chris were able to use typical Chinese causative verbs from T1. To apply the emergence criterion (see Table 5-47), the causative structures emerged in Bret's data at T3, in Mitsu's and Chris' data at T1.

Table 5-46. Occurrences of causative structures: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret		1	2	1	3	3	1	4	2	2
Mitsu	2	1	4		3	2	2	3	3	1
Chris	9	6	6	28	9	7	15	4	9	8

5.90 我 问 行人 帮助 我
 wo wen xingren bangzhu wo
 I ask passer-by help me
 'I ask the passers-by to help me.' (Bret, T3)

5.91 老师 让 学生 打开 书
 laoshi rang xuesheng dakai shu
 teacher let student open book
 'The teacher asks the students to open their books.' (Bret, T5)

Table 5-47. Emergence of causative structures: non-beginners

Learner	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Bret		(+)	+	(+)	+	+	(+)	+	+	+
Mitsu	+	+	+		+	+	+	+	+	(+)
Chris	+	+	+	+	+	+	+	+	+	+

5.6 Conclusion

This chapter first gave an overview of the observed sequences of the investigated structures by each group as a whole and then unfolded in detail a full picture of the acquisition characteristics of the investigated structures.

The three beginners exhibit a clear staged-development in their acquisition of L2 Chinese syntax. The observed acquisition sequences are consistent with the two hypothesized processing hierarchies for the acquisition of word order and complex structures. The three beginners first acquired the default mapping of a- and c- to f-structure to process the basic word order and went on to acquire non-default mappings of a- and c- to f-structure to process word order variations and complex structures.

The intermediate learners did not exhibit a full progression as the beginners did, because

they had acquired some L2 processing skills through previous learning. The advanced learner did not show a staged-development, because all the L2 processing skills had acquired through previous learning. Compared with beginners and intermediate learners, the advanced learner produced almost all structures were consistently at or above the emergence-level (two tokens) in more self-initiated contexts with more structural complexity and variations.

Chapter 6 The acquisition of L2 syntax and Processability Theory: A

discussion

The previous chapter gave a descriptive account of the developmental profiles of the L2 Chinese syntax by the six L2 learners. This chapter discusses the observed acquisition sequences and phenomena within and beyond the framework of Processability Theory. Specifically, two key issues in the acquisition of L2 Chinese syntax are discussed.

The first issue concerns the applicability of PT-based processing principles (Pienemann, 1998b; Pienemann, Di Biase, & Kawaguchi, 2005) to the acquisition of L2 Chinese word order (i.e., the canonical SVO structure, the XP+SVO structures, and the OSV, SOV and SO_{BA}V structures). The results from two other Processability Theory-based empirical studies on L2 Chinese syntax, Gao (2005) and Zhang (2007), are examined in comparison with the results of the current study. These two studies are the only PT-based studies to date that examine the applicability of PT to Chinese syntax. The purpose of the comparison is two-fold: one is to find out whether the results from the three studies (Gao 2005, Zhang 2007 and the current study) are consistent in terms of developmental profiles of L2 Chinese syntax; the other is to find out which principles are more applicable to L2 Chinese word orders, the principles of information exchange between sentence constituents and salience based on PT (Pienemann, 1998b) (employed in Gao 2005) or the principle of mapping between c-structure and to f-structure based on the Unmarked Alignment and the Topic Hypothesis (Pienemann, Di Biase, & Kawaguchi, 2005) (employed in Zhang 2007 and the current study).

The second issue concerns the applicability of the Lexical Mapping Hypothesis (Pienemann, Di Biase, & Kawaguchi, 2005) to the acquisition of L2 Chinese complex structures (i.e., the existential structure, the passive structure and the causative structure). Empirical evidence for the Lexical Mapping Hypothesis, compared to the Topic Hypothesis, is not as robust. So far, no empirical study on L2 Chinese has been

conducted to apply the Lexical Mapping Hypothesis. Therefore the results of the L2 Chinese complex structures in the current study are compared with PT-based empirical studies, including Kawaguchi's studies on L2 Japanese passive and causative structures (Kawaguchi, 2005, 2009, 2010) and two studies on L2 English passive structures (Keatinge & Kessler, 2009; K. Wang, 2010), and two non-PT-based empirical studies on Chinese existential structures (Wen, 1995; S. Yang, Huang, Gao, & Cui, 2007). During the discussion, an attempt will be made to explore the interface of the c- to f-structure mapping and a- to f-structure mapping via the processing procedures in the original PT (Pienemann, 1998b).

6.1 Acquisition of word order

Pienemann (1998b) proposes a staged morpho-syntactic development based on the processing principle of information exchange and salience. Processing complexity is measured by the syntactic level of information exchange (e.g. the phrase level or interphrasal level) and whether the salience principle (i.e., sentence initial and final positions are perceptually more salient than sentence internal position) is utilized, thus defining the progressive sequence of L2 morpho-syntactic development.

Gao (2005) is the first study to utilize the information exchange and saliency to investigate the L2 Chinese syntax. Gao proposes a five-stage hierarchy of TOP development in L2 Chinese syntax (see the Table 3-2, reproduced from Chapter 3). At stage one and two, no information exchange is involved. At stage one, lemma access requires no processing procedure. At stage two, category procedure enables learners to recognize nouns and verbs and string them together strictly following the canonical word order. At stage three, phrasal procedure allows learners to recognize sentence salient initial and final positions and enables them to map ADJs directly onto such salient boundary positions. The canonical word order is intact with only ADJ attached to clause initial and final positions. At stage four, the simplified sentence procedure allows learners to recognize grammatical functions, such as SUBJ, PRED and OBJ and enables

learners to distinguish the SUBJ NP from other NPs such as OBJ or TOP. As a result learners are able to topicalize non-SUBJ elements, which requires information exchange between an internal function (e.g. SUBJ or OBJ) and a function at a salient position (e.g. TOP). At stage five, the sentence procedure allows learners to produce the SO_{BA}V. Gao follows Bender's (2000) view and treats BA as a verb, the OBJ of BA as an embedded TOP, and remaining elements as the complement of BA. As a result, information exchange takes place between two internal constituents, i.e., between embedded TOP and the BA complement.

Table 3-2: Predictions of topic development (adopted from Gao, 2005, p. 174)

Stages	Procedures	L2 processes	Syntax
5	S-procedure	Info exchange between two internal constituents	Embedded topic: the <i>ba</i> -structure
4	Simplified S-procedure	Info exchange between internal and salient constituents	Topic + SV(O)
3	Phrasal procedure	Phrasal info exchange Recognition of salient positions	Adjunct fronting
2	Category procedure	No info exchange Canonical order	SVO
1	Lemma access	None	Words

Pienemann, Di Biase, and Kawaguchi (2005) incorporate two elements in the revised architecture of LFG (Bresnan, 2001; Bresnan & Mchombo, 1987) into the extended PT. One is that the discourse roles (e.g. TOP and FOC) are regarded as syntacticised functions and are represented in f-structure. The second is the Lexical Mapping Theory, which puts forward the guiding principles in the mapping of argument structure to functional structure. These two elements enable PT to extend to capture other sources of linguistic non-linearity at the syntactic level, which are beyond the transfer of grammatical information within c-structure and can be mapped onto the processability hierarchy. The non-linearity can be modelled by different kinds of mapping among the three levels of structure: argument structure (a-structure), constituent structure (c-structure) and functional structure (f-structure). In terms of c- to f-structure mapping, this revision of LFG architecture enables PT to add a pragmatic-discourse dimension to

its processing hierarchy and capture one source of non-linearity of mapping c-structure onto f-structure, which is “created by the addition of adjuncts to canonical structure and the assignment of discourse functions (FOC and TOP) to dislocated elements in c-structure” (Pienemann, Di Biase, & Kawaguchi, 2005, p. 223).

Zhang (2007) is the first study to apply the Topic Hypothesis to the investigation of L2 Chinese syntactic development. Following the mapping principle of c- to f-structure, Zhang predicted a four-stage hierarchy for L2 Chinese syntactic development (see Table 3-3, reproduced from Chapter 3). Following the stage-one word/lemma access, the stage-two learners with category procedure are not able to differentiate the SUBJ and TOP. The mapping between c-structure and f-structure is default, where the most prominent syntactic function, SUBJ, is mapping onto the most prominent sentence initial position. The syntactic outcome is canonical word order. Chinese declaratives and interrogatives are arranged according to this default mapping of c- to f-structure. Then learners with increasing processing resources gradually learn to differentiate the SUBJ and TOP by exploring the initial position of the sentence. The stage-three learners with phrasal procedure are able to differentiate the functions of SUBJ and TOP by initializing non-core argument ADJ, such as adverbial, subordinate clause and Wh-adverbial in Chinese. The rest of the sentence remains canonical. After this stage, the stage-4 learners with sentence-procedure are able to assign the TOP function to core-arguments, such as OBJ, where the canonical word order is disrupted, resulting in non-default mapping between c-structure to f-structure. Chinese OSV and SOV structures belong to this category.

Table 3-3. Processing Hierarchy of L2 Chinese syntax (Zhang 2007, p154)

Processing procedures	L2 processes	Topic Hypothesis	Chinese syntax
4.S-procedure/ WO Rules	Inter-phrasal information	TOP=OBJ (TOPobj VO)	OSV, SOV
3.Phrasal procedure	Phrasal information	TOP=ADJ (TOPadj SVO)	XP SV(O): adverbial subordinate clause <i>wh</i> - adverbial
2.Category procedure	None	TOP=SUBJ (TOPSUBJVO)	Canoical SV(O): declarative interrogative(<i>y/n,wh-,intonation</i>)
1.Word/Lemma	None		words, single constituents formulaic expressions

The current study follows Zhang's (2007) prediction and includes two other structures under investigation within the framework of the Topic Hypothesis, i.e. the NP TOPs and the SO_{BAV} structure. The NP TOPs, like ADJ TOPs, are hypothesized to emerge after stage-two canonical word order, because the most prominent initial position is occupied by a non-SUBJ element and the remaining sentence is still canonical and complete. The SO_{BAV} structure, like the OSV and SOV structures, is hypothesized to emerge the latest, because the OBJ is assigned the discourse function of TOP, which requires sentence-procedure to process.

The following three sections compare and discuss the results from the three studies (Gao 2005, Zhang 2007 and the current study). In section 6.1.1, the results of the SVO, ADJ topic and SO_{BAV} are compared first, because these structures are hypothesized to utilize the same processing procedures in the three studies. In section 6.1.2, the results of the NP TOP structure and the OSV structure are compared and discussed, because they are hypothesized to utilize different processing procedures in Gao (2005) and the current study. In section 6.1.3, the differential acquisition of the OSV, SOV structures are discussed.

6.1.1 The SVO, ADJ TOP and SO_{BAV} structures

The Chinese canonical word order is SVO. The canonical SVO structures are

hypothesized in the three studies (Gao 2005, Zhang 2007 and the current study) to emerge the earliest at T1, because they only require the category procedure. The mapping of a- and c- to f-structure is unmarked and no information exchange is involved. The results from the three studies confirm the prediction. The SVO structures emerged all from T1. The statistical results in the current study from three representative sessions from the beginners and two sessions from the three non-beginners show that the SVO structures account for around 75%-80% of the total utterances. Both the early emergence and the high frequency of the canonical structures suggest that they are among the easiest forms to be acquired in early interlanguage. The language-specific canonical word order is also found in other PT-based studies to emerge the earliest, such as SVO in L2 Italian (Di Biase, 2007) and L2 English (Yamaguchi, 2010) and SOV in L2 Japanese (Kawaguchi, 2005).

ADJ TOPs are hypothesized to emerge after the canonical SVO structures, because it requires the phrasal procedure. The results of the three studies also confirm the prediction. Evidence from other studies does suggest that XP+SVO form a distinctive stage in interlanguage development. In the L2 acquisition of verb 2nd languages, such as German and Swedish, XP+SVO is an unskippable stage before the verb second is processable, even though this interlanguage form is not grammatical in both languages (Pienemann, Di Biase, Kawaguchi, et al., 2005). In Italian Wh-questions, the SUBJ and Verb inversion is required. The structure is Wh+VS. However, in the L2 acquisition of Italian Wh-questions, WH+SV is an unskippable stage before WH+VS is processable (Bettoni & Di Biase, 2011).

The SO_{BA}V structure is investigated in Gao (2005) and the current study. The structure is hypothesized in both studies to emerge last, because it requires the sentence procedure. The results from both studies are consistent with the prediction. In Gao's study, only the year-four and year-five informants in her longitudinal study produced the SO_{BA}V structure. In the current study, the SO_{BA}V structure emerged in only one beginner' data. In the two intermediate learners' data, the SO_{BA}V structure emerged late,

at T4 for Bret and at T7 for Mitsu. The SO_{BA}V structure emerged later than the OSV and SOV structures in both Gao and the current study. All of the three structures are predicted to require the sentence procedure. In Wen's (2006) study, the SO_{BA}V structure was also observed to emerge the latest in comparison with other SVO, OSV and SOV structures under investigation.

Form and function complexity involved in the SO_{BA}V structure may delay its emergence. Wen (2006) follows the Clahsen's (1987) remarks that language specific features require a considerable amount of mental processing to reorder the underlying units, and to associate the appropriate function to the accurate grammatical form. Wen attributes the difficulty in acquiring the SO_{BA}V structure to its language specific features:

(1) The formal complexity

The grammatical BA is inserted between the SUBJ and verb, and the complexity of the verb complement form often involves aspect and sentence final particles and preposition phrases.

(2) The functional complexity

The notion of "affectedness of the object" and "disposition of the verb" are linguistic conceptualizations, abstract, and cognitively less transparent. Furthermore these notions are frequently contextually specific. There is not a reliable or concrete rule on when to use the SO_{BA}V structure since it depends on a number of contextual factors.

(3) Transparency of form-meaning connections

The form and meaning connection of the SO_{BA}V structure is opaque. The form of verb complement in the BA-structure can be as short as a particle LE that is already sufficient under many contexts, whereas in other situations, the form is long yet the function is the same.

Therefore, in addition to its high processing cost, the specific form-function complexity

involved in the SO_{BA}V structure account for its late or non-emergence.

The results of the SVO, ADJ topic and SO_{BA}V in the current study are consistent with those in Gao (2005) and Zhang (2007), among other PT-based studies. The consistency implies both the principles of information exchange and c- to f-mapping are applicable to the acquisition of L2 Chinese word order and the two principles can be bridged through the processing procedures.

6.1.2 The NP TOP and OSV structures

The NP TOP structure and the OSV structure are hypothesized to utilize different processing procedures in the three studies.

Based on the information exchange and salience, Gao (2005) proposes that both structures call for the simplified S-procedure, which allows learners to recognize grammatical functions, such as SUBJ, PRED and OBJ. Therefore, learners are able to distinguish the SUBJ NP from other NPs such as OBJ or TOP and they are able to topicalize non-SUBJ argument, which requires information exchange between an internal function (e.g. SUBJ or OBJ) and a function at a salient position (e.g. TOP). In the example 6.1, the TOP *nake shu* 'that tree' exchanges information with the SUBJ *yezi* 'leaf', as illustrated in Figure 6-1. In the example 6.2, the TOP *zhege xiaohai* 'this kid' and the SUBJ *ta* 'he' exchange information, as illustrated in Figure 6-2. In both examples, the TOPs exchange information with the SUBJs. The different is that the former exchanges semantic information. The SUBJ *yezi* 'leaf' is part of the TOP *nake shu* 'that tree'. The latter exchanges index information. The referential index (i.e. PERSON, NUM and GENDER) of the external TOP *zhege xiaohai* 'this kid' need to exchange the referential index (i.e. PERSON and NUM) of the SUBJ, *ta* 'he'.

- 6.1 那 棵 树 叶子 很 大
na ke shu yezi hen da
that CL tree leaf very big
'Speaking of that tree, its leaves are very big.'

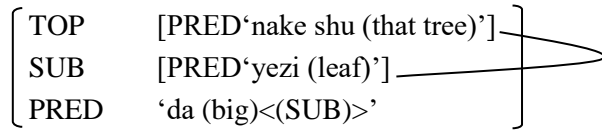


Figure 6-1. The f-structure of the external TOPs

6.2 这个小孩 他 吃 了 一 个 苹果
zhe ge xiaohai ta chi le yi ge pingguo
this CL kid he eat PF one CL apple.
 ‘This kid, he ate an apple.’

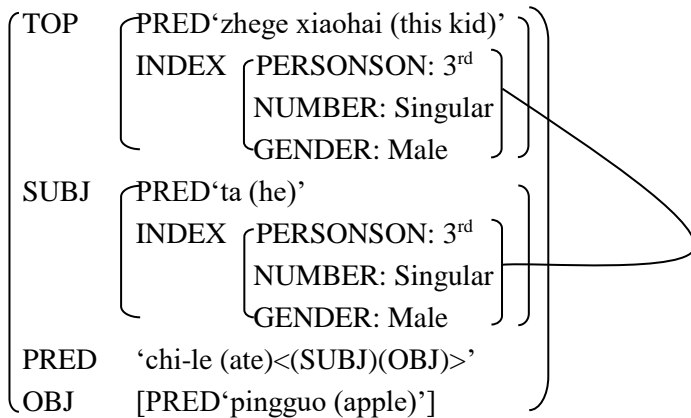


Figure 6-2. The f-structure of the external TOPs

In the OSV structure (Figure 6-3), the TOP *nazhi gou* ‘that dog’ exchanges the f-structure value of the discourse function and clause-internal function of the OBJ.

6.3 那只狗 我 已经 看 过 了
na zhi gou wo yijing kan guo le
that CL dog I already see EXP PF
 ‘The dog, I have seen already.’

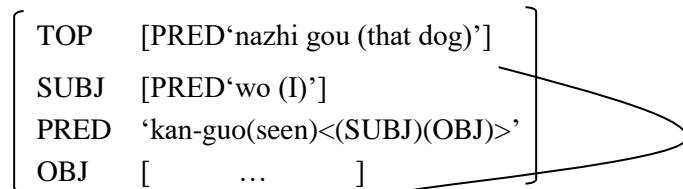


Figure 6-3. The f-structure of OSV

According to LFG, the difference between the OSV structure and the NP (external) TOP structure is that the former involves functional information exchange and without the functional information exchange, functional uncertainty arises and the sentence is

incomplete. In contrast, the NP TOP structure only involves semantic/index information exchange and without the NP TOPs, the sentence remains complete and coherent.

Besides, the semantic/index information exchange is sometimes optional in Chinese. If we put a GENERIC marker *de* between the TOP *nage shu* 'that tree' and the SUBJ *yezi* 'leaf' in (6.1) and omit the SUBJ *ta* 'he' in (6.2), they are acceptable in Chinese and the TOP and SUBJ are identical (see the corresponding alternative sentences 6.4 and 6.5).

6.4 那 棵 树 的 叶子 很 大
na ke shu de yezi hen da
that CL tree GEN leaf very big
'The leaves of this tree are very big.'

6.5 这 个 小孩 (他) 吃 了 一 个 苹果
zhe ge xiaohai (ta) chi le yi ge pingguo
this CL kid (he) eat PF one CL apple.
'This kid ate an apple.'

In Chinese, there are other NP TOPs that do not exchange information with a SUBJ or an OBJ, but with the whole sentence that follows the TOP, as in the often-quoted example (see 6.6) from C. N. Li and Thompson (1981). This type of NP TOP is more like ADJ TOPs. They simply set a frame for the sentences they precede and do not exchange information with any constituents in the sentence.

6.6 那 场 火 幸亏 消防员 来 得 快
nei chang huo xingkuai xiaofangdui lai de kua
that CL fire fortunate fire-brigade come DE quick
'That fire fortunately the fire-brigade came quickly.' (C. N. Li & Thompson, 1981, p. 96)

As far as the c- to f-structure mapping is concerned, the NP TOPs and the OSV structure are also different. Like ADJ TOPs, NP TOPs breaks the default link between the most prominent syntactic function SUBJ and the most prominent initial position in c-structure. However, the rest of c-structure is mapped canonically onto the universal hierarchy of grammatical core functions. For instance, Figure 6-4 shows that in 'Today I study English', the adverbial ADJ 'today' is the TOP, indicated by the link. Figure 6-5

shows that the initial position is occupied by the ADJ TOP *'today'*, with the rest of sentence constituents mapped canonically onto the universal hierarchy of grammatical core functions, i.e. the SUBJ *'I'* precedes the OBJ *'English'*.

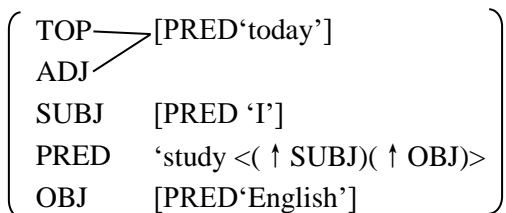


Figure 6-4. The f-structure of ADJ TOPs

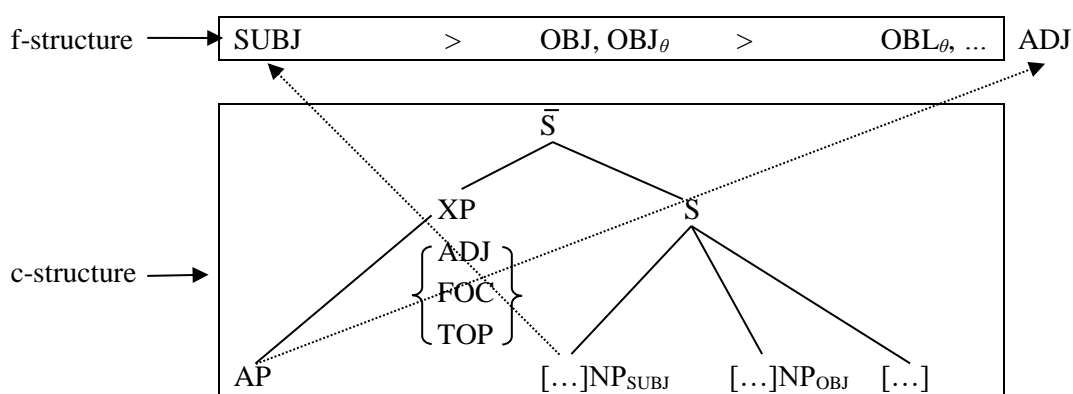


Figure 6-5. XP-adjunction in interlanguage (after Pienemann, Di Biase, & Kawaguchi, 2005, p. 234)

As far as the c- to f-structure mapping in OSV is concerned, according to the Topic Hypothesis, when the TOP position is occupied by a core-argument, OBJ or OBJ_θ, the canonical string that SUBJ precedes OBJ is broken, as shown in Figure 2-12 (reproduced from Chapter 2).

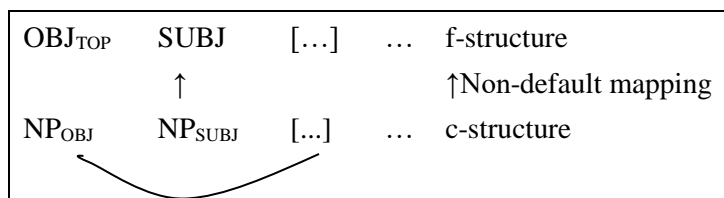


Figure 2-12. Non-default mapping of OSV

Given the above discussion, the NP TOPs and the OSV structure are different with respect to both information exchange and c- to f-structure mapping. Gao's (2005) longitudinal study on the L1 English group provided a source of evidence that the OSV

structure may involve more processing demands than the NP TOPs (see Table 6-1). Among the five informants, only informant T, the year-four learner, produced a total of eight tokens of OBJ TOPs. The year-one and year-two informants A and G did not produce either NP TOPs or the OSV structure. Another year-two informant N and the year-three informant R only produced NP TOPs, but not the OSV structure. These results show that only the advanced learner was able to produce object topics, which could serve as a piece of evidence that the OSV structure with an OBJ TOP requires higher processing procedure.

Table 6-1. Distributional analysis of topics in the data of the L1 English learner group (Gao, 2005, p. 201)

Informant	NP _{TOP} +SVO	OSV
Year1: A	/	/
Year2: G	/	/
Year2: N	1	/
Year3: R	4	/
Year4: T	9	8

When analysing her cross-sectional data from the L1 Japanese group and L2 German group, Gao indicated that there might be a sub-stage of topicalization development and the NP TOPs may represent the initial stage. This claim was based on two stipulations. One is that information exchange in such structure is limited. That is to say, Gao also identified the fact that the ways of information exchange involved in the NP TOPs and the OSV structure are different, with the former involving limited information exchange (semantic/index vs. functional). The second one is based on the statistical evidence that more NP TOPs were produced than the SOV structure. The argument is weak, because number alone cannot make a strong case. On the contrary, it was observed in the current study that the occurrences of NP TOPs are fewer than the OSV structure and they emerged at the same time or later than the OSV structure. One possible cause may be the optionality of the external topic structures, as pointed out in example sentences 3.43 and 6.2. If we put a GENERIC marker *DE* between the TOP and the SUBJ in 3.43 and omit the SUBJ in 6.2, they are acceptable in Chinese and the TOP and the SUBJ are the

same. The other possible cause is related to L1 backgrounds (restricted to L1 English beginners only).

It was found in the current study that in the three beginners' data, the NP TOPs emerged later in Ross's data (the L1 English) at T15, compared with Leo (the L1 Spanish) at T13 and Aiko (the L1 Japanese) at T9. In the two intermediate learners' data, NP TOPs merged later in Bret's data (the L1 English) at T5, compared with Mitsu (the L1 Japanese) at T1. Other empirical studies also found the difficulty of L1 English learners in acquiring NP TOPs (e.g. Cao, Yang, Huang, Gao, & Cui, 2006; Yuan, 1995).

Yuan (1995) investigated the acquisition of base-generated TOPs (NP TOPs in the current study) in Mandarin Chinese by 102 L1 English university students of L2 Chinese. He conducted an acceptability judgment test to test the acquisition of the base-generated TOP in Chinese by L1 English speakers. He found that even as the learners' Chinese proficiency increases, there is little corresponding increase in the acceptability of the base-generated TOPs in the elementary, intermediate, and even high-intermediate English-speaking learners' IL grammars of Chinese. It is not until the learners have reached the advanced level that they seem to acquire the native-like norms of the base-generated TOPs. Yuan attributes the cause of difficulty in acquiring base-generated TOPs to an incorrect parsing strategy adopted by L1 English learners in processing sentences with base-generated topics. He argues that L1 English speakers tend to encode initial NPs as SUBJ, because this is the usual parsing strategy in processing the initial NP in L1 English, which is a SUBJ-prominent language. This parsing strategy conforms to the principle of Minimal Attachment (Frazier 1978, 1985 and Frazier and Rayner 1988, cited in Yuan 1995), as it postulates the fewest nodes. However, when learners encounter the real SUBJ NP, they have to reanalyse the base-generated TOPs through backtracking strategy, which is against a linear ordering that human parser prefers, thus hindering the rapidity and efficiency of sentence processing (Hawkins, 1990, cited in Yuan 1995).

Levelt (1989) also comments, “the linkage of sentence-initial position and subjecthood is not absolute. A topic or a highly accessible entity can be encoded early in the sentence without becoming a subject. This is harder in English than in languages that have freer word order,” because “in English it is not so easy to disentangle fronting effects from the assignment of Subjecthood ” (p. 263).

Actually Yuan’s argument that L1 parsing strategy may interfere with L2 acquisition can be related to the mapping principle. In English, as a subject-prominent languages, the linking between SUBJ and initial position is strong (the default mapping of c- to f-structure) and if other elements are mapped onto the initial position (non-default mapping of c- to f-structure), difficulty arises.

Cao et al. (2006) conducted a cross-sectional study on the L2 acquisition of Chinese TOP structures, including the NP TOP structures (based-generated) and the OSV structure by learners of L1 English/Japanese/Korean. L1 English learners were also found to have difficulty with the NP TOP structures, compared with the Japanese and Korean L1 learners.

The results of the above studies show that the subject-prominence feature of English has a constraining effect on the L1 English learners acquiring Chinese NP TOPs. Except Gao (2005) and the current study, no other PT-based studies have investigated the NP TOPs so far. However, the OSV structure in other languages is also reported to emerge very late, such as L2 English (Yamaguchi, 2010), L2 Japanese (Kawaguchi, 2010), and L2 Italian (Bettoni & Di Biase, 2011).

6.1.3 The OSV and SOV structures

Both the OSV and SOV structures are hypothesized to emerge at stage 3, because they all involve a functional linking of the discourse function of TOP and the syntactic function of OBJ. This link requires the sentence procedure. The results from the current

study, as well as two other PT-based studies (Kawaguchi, 2015; Zhang, 2007) show that the SOV structure, with the preverbal OBJ assigned a discourse function of TOP/FOC either emerged later than the OSV structure or did not emerge at all.

In the current study, among the three beginners, Ross and Leo did not produce the SOV structure. Aiko produced a total of five tokens. The structure emerged at T11 in Aiko's data, three sessions later than the OSV structure had emerged at T8. As for the two intermediate learners, Bret only produced one token at the last session, T10, in comparison with earlier emergence of the OSV structure at T3. The SOV structure emerged in Mitsu's data at T3, one session later than the OSV structure. In Zhang's (2007) study, among the three informants, Sharon and Dave, produced the SOV structure, one token each. Sharon produced one token at T9, two sessions after the OSV structure had emerged at T7. Dave produced at T7, one session after the OSV structure at T6. Kawaguchi (2015) reanalysed her longitudinal data in her (2010) study on L2 Japanese acquisition of morphology and syntax. She found that the preverbal OBJ marked as the discourse function of FOC in the SOV structure emerged at T10, six sessions later than the OSV structure had emerged at T4.

The question that arises from this observed phenomenon is whether it is a processing matter or other non-processing factors that cause the later or non-emergence of the SOV structure. Both factors may play a role due to the following possible causes.

The first possible cause may be related to the different contextual requirements for the two structures. Huang, Li, and Li (2009) point out that although the SOV and OSV structures share the same property that the OBJs in both structures generally do not allow an indefinite non-specific expression, the two are not identical. The preverbal OBJ in the SOV structure requires a contrastive interpretation, but the one in the OSV structure does not. The contrast meaning is indicated in *Zhang Xiaojie 'Miss Zhang'* (underlined in the answer) in sentence 6.7.

6.7 Question: 他会追张小姐吗?

ta hui zhui Zhang xiaojie ma?
he will court Zhang Miss QUE?
'Will he court Miss Zhang?'

Answer: 他张小姐不想追, 李小姐才会追
ta Zhang xiaojie bu xiang zhui, Li Xiaojie cai hui zhui
he Zhang Miss not want court, Li Miss only will court
'He does not want to court Miss Zhang; (he) only will court Miss Li.'

In other words, the contexts where the OSV structure can be used also apply to the SOV structure, but not the vice versa. The statistical study (Sun & Givón, 1985) shows that the OV structure (including both OSV and SOV) accounts for 10% or lower in the written and spoken texts that they investigated. This extra contextual requirement for the SOV structure will lower its frequency in native speaker's speech. The advanced learner, Chris, had acquired both structures at T1. However, a statistical analysis of the occurrences of the two reveals that Chris only produced a total of 12 tokens of the SOV structure, in comparison with 68 tokens of the OSV structure.

Besides the above non-processing factors of low frequency and extra contextual requirement of the SOV structure, a possible processing factor may be related to the position of the OBJ TOP. According to the Initialization-Finalization Strategy (IFS) (Clahsen, 1984a), in perception and memorization, the first and the final position of a stimulus are more salient than stimulus-internal positions. Therefore the movement of OBJ to the salient initial position is easier than the movement of OBJ to the less salient preverbal position. This may add more processing cost to the SOV structure.

One other possible processing factor is also identified. A comparison of the f-structures of the two structures reveals that in the OSV structure (see 3.18), there is only one functional link between the syntactic function of OBJ *pingguo* 'apple' and the discourse function of TOP, as shown in Figure 3-5.

3.18 苹果 他 切 了
pingguo ta qie le
apple he cut PF
 ‘The apple, he cut.’

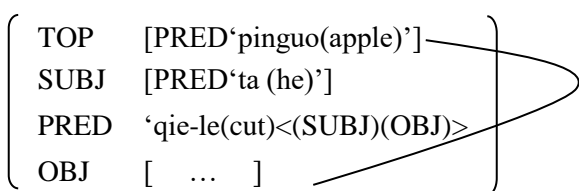


Figure 3-5. The f-structure of OSV

In contrast, in the SOV structure (see 3.19), there are two TOPs, the primary TOP *wo* ‘I’ and the secondary TOP *zuoye* ‘homework’. Therefore, which syntactic function is linked to which TOP needs to be specified in the f-structure. Figure 3-7 demonstrates the double links of the primary TOP with the SUBJ and the secondary TOP with the OBJ. This double functional links, or the double functional assignments may lead to more processing costs in the SOV structure.

3.19 我 作业 做 了
 wo zuoye zuo le
 I homework do PF
 ‘Homework I’ve done.’

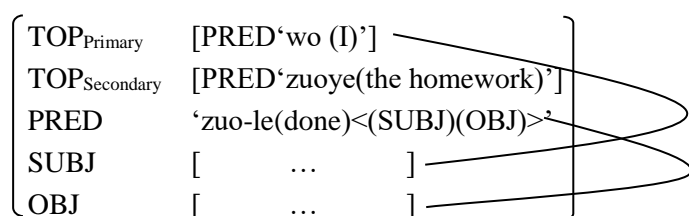


Figure 3-7. The f-structure of SOV

Another noteworthy acquisition features of the SOV structure is that the two L1 Japanese learners, i.e., Aiko, the beginner and Mitsu, the intermediate learner, seem to show an advantage in acquisition the SOV structure. Aiko was the only beginner who produced the structure. Mitsu produced the SOV structure consistently throughout the ten sessions from T1 to T10 and a total of 45 tokens were found in Mitsu’s data. In comparison, the other L1 English intermediate learner only produced one token at the last session. These findings seem to suggest that the structural similarity of the Japanese

canonical SOV structure and the Chinese SOV structure facilitates the L1 Japanese learners' acquisition of this form. However, according to processing procedure, the SOV structure is high on the hierarchy, and only after the previous stages are achieved does the facilitating effect come into play. Aiko produced the SOV structure at T11, three sessions later than the OSV structure had emerged at T8. Mitsu produced both the OSV and SOV structures from T1. These empirical evidence, though limited, lend support to another PT-based hypothesis, the Developmentally Moderated Transfer Hypothesis (Pienemann, Di Biase, Kawaguchi, et al., 2005). The Developmentally Moderated Transfer Hypothesis proposes that when certain grammatical structures are identical in both L1 and L2, the relevant L1 processing procedures cannot be utilized in L2 until relevant processing prerequisites have been required in L2.

The above discussion reveals that the later or non-emergence of the SOV structure in comparison with the OSV structure might be caused by processing factors or non-processing factors. Moreover, the facilitating effect of L1 Japanese on the acquisition of the SOV structure was also constrained by the processability.

6.2 Acquisition of complex structures

The Topic Hypothesis shows that, after the initial one-to-one mapping, c- to f-structure mapping becomes non-default when non-SUBJ constituents are assigned discourse functions. In terms of a- to f-structure mapping, mapping can be non-default as well. "Here non-linearity is caused by exceptional lexical entries with intrinsic non-canonical a-structure (e.g. 'receive' or 'please') and non-default verb forms (e.g. passive, causative structures)" (Pienemann, Di Biase, & Kawaguchi, 2005, p. 223). The Lexical Mapping Hypothesis predicts that learners initially follow the default AGENT-to-SUBJ mapping and later deviate from this default mapping by promoting other argument roles to SUBJ, required by exceptional verbs or passive structures. After the stage of non-default mapping, learners are able to do complex mapping, where the OBJ assumes two argument roles: the PATIENT of the main verb and the AGENT of the second verb.

Based on the Lexical Mapping Hypothesis, the current study proposes a second processing hierarchy for L2 Chinese complex structures (see Table 3-6, reproduced from Chapter 3). The current study puts the Chinese existential structure under investigation and proposes that it involves non-default mapping because a locative role, a less prominent role, is mapped onto the SUBJ, which disrupts the non-default a- to f-structure mapping of the most prominent role (i.e. agent) onto the most prominent grammatical function (i.e. SUBJ).

Table 3-6. Processing Hierarchy of L2 Chinese complex structures

Stage	A- to f-structure Mapping	The Lexical Mapping Hypothesis	Chinese Syntax
3	Complex Mapping	OBJ=Agent&Patient	Causative
2	Non-default mapping	SUBJ=Patient SUBJ=Locative	Passive Existential
1	Default mapping	SUBJ=Agent/Theme	Active

6.2.1 The existential structure

The structural feature of the existential structure is demonstrated in (6.8), where there is a topical locative phrase with an optional prepositional *zai* ‘at’, followed by an existential verb and a presented noun phrase (new information) with an optional verb phrase. Sentence 3.28 is an example of the existential structure.

6.8 (*zai* ‘at’) + locus + existential verb + presented noun phrase + (verb phrase) (C. N. Li & Thompson, 1981, p. 510)

6.9 (在) 图 里 有 三 个 人 (打 篮球)
 (zai) tu li you san ge ren (wan lanqiu)
 (PREP) picture inside have/has three CL ren (play basketball)
 ‘There are three people in the picture playing the basketball.’

With respect to the existential verbs, three types of existential structures are investigated in this thesis, one type with the verb *you*, one with the copula verb *shi* and one with lexical verbs. The existential structure with the existential verb *you* was found to emerge

the earliest, compared with the other two existential types. The results are consistent with two other non-PT-based empirical studies, Wen (1995) and S. Yang et al. (2007). They conducted cross-sectional investigations into the L2 acquisition of the existential structures and they also found that the existential structures with the verb *you* were acquired earlier than the existential structures with lexical verbs.

Wen (1995) conducted a cross-sectional investigation on the L2 acquisition of Chinese existential structures by L1 English speakers at an American university. The focus of Wen's study is to test the findings in the studies by Fuller and Gundel (1987), Givón (1994) and Sasaki (1990), that TOP prominence is an early developmental feature of interlanguage regardless of the typological features of their own languages. Wen argues that the Chinese existential structures are typical topic-comment structures and represent TOP prominence in Chinese. In comparison, in English, a SUBJ prominent language, the existential structure requires a dummy SUBJ '*there*'. In order to test the hypothesis of the common TOP prominence stage in early interlanguage, Wen recruited 76 informants: 24 year-one students, 24 year-two students and 18 year-three students. The informants were asked to make eight sentences with given phrases and each sentence had to include *nage tushuguan* '*that library*'. Wen classified the informants' production of existential structures into five types as follows:

(1) Locative NP+Existential verb_{You}+NP

6.10 那 个 图书馆 有 十 八 本 中 文 书
na ge tushuguan you shiba ben zhongwen shu
that CL library exist eighteen CL Chinese book
'There are eighteen Chinese books in that library.'

(2) Locative NP+Existential Verb_{Other}+NP

6.11 那 个 图书馆 的 墙 上 挂 着 两 张 中 国 地 图
na ge tushuguan de qiang shang gua zhe liang zhang zhongguo ditu
that CL library GEN wall on hang DUR two CL Chinese map
'There are two Chinese maps hanging on the wall.'

(3) Existential Verb_{You}+NP+Locative NP

6.12 有 三十五 本 中文 书 在 那 个 图书馆
you sanshiwu ben zhongwen shu zai na ge tushuguan
exist thirty-five CL Chinese book at that CL library
'There are 35 Chinese books in that library.'

(4) NP+Existential verb_{Zai}+Locative NP

6.13 三 本 法文 词典 在 那 个 图书馆
san ben fanwen cidian zai na ge tushuguan
three CL French dictionary at that CL library
'There are three French dictionaries in that library.'

(5) Other

6.14 在 那 个 图书馆 我 看 了 十 五 本 中文 书
zai na ge tushuguan wo kan le shiwu ben zhongwen shu
at that CL library I see PF fifteen CL Chinese book
'At that library, I've read 15 Chinese books.'

Type (1), the existential structure with the verb *you*, was found to dominate in the production of all three learner groups, 64% for year-one group, 72% for year-two and 76% for year-three. Type (2), the existential structure with other verbs accounted for the least production in year-one (3.1%) and none in year-two. For year-three, the figure was 4.2%. Compared with the year-three group, more type (3) and (4) were produced by year-one group (9.4% for both) and year-two group (5.2% for type 3 and 5.7% for type 4), although the overall frequency was not high.

Wen argues that type (3) and type (4) in the year-one and year-two groups may be subject to L1 influence, because the two types share structural similarity with the English structures. However, the high frequency of the existential structures in all three learner groups is consistent with the hypothesis of the common TOP prominence stage in early interlanguage, regardless of the typological features of their own languages.

S. Yang et al. (2007) investigated the L2 acquisition of the Chinese existential structures by informants of different proficiency levels and of three language groups, L1 English,

L1 Japanese and L1 Korean. Yang et al. used acceptability judgement test, sentence making as used in Wen (1995) and students' written compositions to investigate the L2 acquisition of the Chinese existential structures. Their classification of the existential structures falls into the following four types:

- (1) Locative NP+Existential verb_{You}+NP
- (2) Locative NP+Existential Verb_{Other}+NP
- (3) Locative NP+Existential Verb_{shi}+NP
- (4) NP+Existential verb_{Zai}+Locative NP

The findings also reveal that the type (1) with the existential verb *you* is the easiest to acquire and the type (2) is the hardest for all the informants. S. Yang et al. (2007) do not agree with Wen's argument of the *you* existential structure representing the common TOP prominence stage in early interlanguage. They argue that the existential structure with the verb *you* is not a typical TOP-comment structure, but a simply SVO structure, because both a locative and an animate entity could be regarded as a possessor. In sentence (6.15), the locative entity *zhgee xuexiao* 'this school' could be the possessor of *sanqian xuesheng* 'three thousand students', and the same is true in sentence (6.16), where *wo* 'I' is the possessor of *yiben shu* 'one book'.

6.15 这个 学校 有 三 千 学生
zhege xuexiao you san qian xuesheng
this school have three thousand students
'This school has three thousand students.'

6.16 我 有 一 本 书
wo you yi ben shu
I have a CL book
'I have a book.'

Therefore, Yang et al. propose that *you* existential structure is an unmarked existential structure, because it has both 'possessive' and 'existential' meanings (Duff, 1993; Sasaki, 1990). The locative NP has a selective relationship with the verb *you*. The L2

learner could utilize the canonical SVO word order strategy. Yang et al. treat the type (2) existential structure with other verbs as marked existential structure. This marked existential structure is actually the typical TOP-prominent structure because the locative NP has no selective relationship with the existential verb.

In fact, it makes more sense if we use the mapping of argument structure to functional structure to interpret the results. When *you* appears with a locative SUBJ, it denotes an existential meaning ‘*exist*’. When it appears with a non-locative SUBJ, it denotes a possessive meaning ‘*have/possess/own*’. In the latter case, the most prominent role, the possessor, is mapped onto the SUBJ. The a- to f-structure mapping is default. This link of *you* with a possessive meaning may help the L2 learners to extend the SUBJ of the verb *you* from non-locative to locative. The link, or the selective relationship, between the locative NP and the existential verb *you* is not present in the existential structures with other verbs. Therefore, resorting to the non-default mapping is not possible. This serves as a piece of evidence that when a less prominent thematic role (i.e. the locative) is mapped onto the most prominent grammatical function, processing demands increase.

In fact, ‘NP+Existential verb_{Zai}+Locative NP’, the type (4) existential structure in both Wen (1995) and Yang et al. (2007), involves a default mapping of a- to f-structure. The theme, the most prominent role, is mapped onto the SUBJ. In the current study, this structure emerged earlier at T3 than the *you* existential structure at T6 in both Ross’ and Aiko’s data (see sentence 6.17 and 6.18).

6.17 牛奶 在 桌子
niunai zai zhuozi
milk at table
‘The milk is on the table.’ (Ross, T3)

6.18 面包 在 桌子 上
mianbao zai zhuozi shang
bread at table top
‘The bread is on the table.’ (Aiko, T3)

Despite the possible link of *you* with a possessive meaning, the existential structures did not emerge in early interlanguage. Compared with the earlier emergence of the active structures at T1 in the three beginners' data, the existential structure emerged in Ross' and Aiko' data at T6 and in Leo's at T7.

With regard to the link between the processing procedure and the locative to SUBJ mapping in the existential structure, the location ADJ TOPs may serve as a reference. A locative NP can function as both ADJ TOP and locative SUBJ. Considering the fact that ADJ TOP requires the phrasal procedure, it follows that if locative SUBJ emerged later than ADJ TOP, the phrasal procedure may be the prerequisite for the mapping of locative to SUBJ. An analysis of the three beginners' data reveals that they produced more time ADJ TOPs than location ADJ TOPs. However, location ADJ TOPs did emerge earlier in Aiko's data (at T2, see 6.19) and Leo's data (at T6, see 6.20) than locative SUBJ at T6 for Aiko and at T7 for Leo. In Ross' data, they emerged at the same time (T6 see 6.21). Based on this limited empirical evidence, it is only indicative that the phrasal procedure is the prerequisite for the locative to SUBJ mapping.

6.19 我的 宿舍 我 上 网 打 字
wo de shushe wo shang wang da zi
my dormitory I surf internet type word
'In my dormitory, I surf the internet and type words.' (Aiko, T2)

6.20 B 图 两 个 人 玩 球
B tu liang ge ren wan qiu
B picture two CL people play ball
'In picture B, two people are playing a ball.' (Leo, T6)

6.21 这 个 图 她 有 红 帽子
zhe ge tu ta you hong maozi
this CL picture she have red hat
'In this picture, she has a red hat.' (Ross, T6)

6.2.2 The passive structure

The Chinese passive structure (see 6.22) has a patient SUBJ and a passive marker BEI/RANG/JIAO, which introduces the agent of the action. The agent, marked by BEI, is optional if the agent is not mentioned or unimportant. The agent, marked by other markers (i.e. RANG/JIAO), is obligatory. The Chinese passive structure often implies a sense of adversity or misfortune. Sentence 6.24 is an example of the passive structure.

6.22 SUBJ_{PATIENT}+ Passive Marker_{BEI/RANG/JIAO/GEI/YOU} +Agent+Verb

6.23 他 被 人 打 了
ta bei ren da le
he Bei someone hit PF
'He was hit by someone.'

The mapping of a-structure to f-structure is non-default, because the patient, a less prominent role on the thematic hierarchy, is mapped onto the most prominent syntactic function of SUBJ. This disrupts the unmarked alignment of AGENT-to-SUBJ and PATIENT-to-OBJ. The passive structure is hypothesized to emerge after the active structure at stage 2.

The results of the beginners' data show that Ross produced one token at the last session, T15. Aiko produced one token each at T14 and T15. Leo did not produce any. The intermediate learner, Mitsu, only started to produce at T7. The results are consistent with three other PT-based empirical studies on L2 English passive (Keatinge & Kessler, 2009; K. Wang, 2009, 2010). The two group of researchers conducted cross-sectional investigations into the L2 acquisition of the English passive structures. They found that only the learners of late intermediate level or advanced level could produce the passive structure.

Keatinge and Kessler (2009) investigated the L2 acquisition of English passive structure by 62 learners of different L1 backgrounds at different stages of interlanguage

development. First spontaneous oral speech data were elicited from the informants to establish their current state of interlanguage development within PT's hierarchy, i.e., the category-procedure, phrasal-procedure, sentence-procedure and subordinate clause-procedure. Then three types of tasks were used to elicit the passive structures: (1) The Fish Film (Tomlin 1995&1997); (2) sentence completion; (3) story telling. The results show that the learners who were at the phrasal-procedure level or lower produced the interlanguage forms that violated both the semantic concept and syntactic structure of passive structures. In both 6.24 and 6.25, the semantic concept (a patient role) does not match the syntactic form (use of active form of predicate).

6.24 The book write the woman.

6.25 The car repair the man.

The learners who were at the sentence-procedure level produced what Keatinge and Kessler termed as *Pseudo Passive*. In the following sentences 6.26 and 6.27, the semantic concept (the patient role) is represented in syntax, indicating that the learners were able to map a patient role onto SUBJ. The two instances only violate or omit the target-like forms. In 6.26, the preposition *by* is omitted. In 6.27, the form of *to be* is omitted and the verb morphology of past participle is not correct. Keatinge and Kessler interprets this form of interlanguage as an indication that learners may use the Initialization-Finalization Strategy (IFS) (Clahsen, 1984a) to exchange the two NPs of the sentence in order to place the patient of the sentence in initial position. They also point out that the predicates in the elicitation tasks take two arguments, which may enable the learner to utilize the IFS to exchange two NPs between two salient positions.

6.26 The noticebook is signed the man.

6.27 The blue fish eaten by the green fish.

Only the students who were at the subordinate clause-procedure level were able to produce the target-like passive structure. The results indicate that for the English passive structures, the sentence-procedure seems to be the prerequisite for the mapping of a

patient role to SUBJ. However, the sentence procedure cannot ensure the production of the target-like passive forms.

K. Wang (2009) investigated the L2 acquisition of English passive structures by six native Chinese speakers of different proficiency levels. Three of them were early intermediate, one late intermediate and two advanced. Wang used *The Fish Film* (Tomlin, 1995, 1997) to elicit the passive structures. The results show that the four intermediate learners did not produce any passive structures. The two advanced learners produced 12 and 15 tokens respectively.

It was found that the three early intermediate learners ignored the visually cued patient presented in the fish film and only produced what Wang terms ‘agent-active’ structures. For example, when one early intermediate learner, Mei, was shown the visually cued patient, which is the blue fish, Mei produced ‘*the green eat the blue*’.

The one late intermediate learner, Cindy, also produced the ‘agent-active’ structures, as Mei did. Besides, when Cindy was shown the visually cued patient, she used a compensatory strategy, which Wang terms the ‘patient-active’ strategy. K. Wang (2009) interprets this strategy as that “the learner maps the patient of an event to the subject and at the same time, selects a verb that takes a perspective that corresponds to that of the patient, thus effectively converting the patient of the event into the agent of the same eventuality but as seen from an alternative perspective” (p. 110). For example, when Cindy was shown the visually cued patient, which is the white fish, Cindy produced “*the white goes go to blue*”. Cindy responded to the patient cue, the white fish and gave prominence to the patient cue. However, Cindy chose a verb that could be initiated by the patient role and therefore the mapping of a- to f-structure is still default.

In his PhD research, K. Wang (2010) carried out a cross-sectional investigation into the development of various English passive structures in the interlanguage of 79 Chinese L1 learners of English L2. In addition to the alternative strategies he found in his (2009)

study (i.e. agent-active and patient-active), he also found NP TOPs was used. In sentence (6.28), the underlined *'the blue fish'* is the NP TOP.

6.28 the blue fish the green fish eat the blue fish

Wang also found that learners who produced agentless passive did not necessarily produce agentive passive; whereas learners who produced the agentive passive did also produce agentless passive. This finding is indicative of acquiring agentless (see 6.29) passive before agentive passive (see 6.30).

6.29 The bird is hurt.

6.30 The bird is hurt by him.

In terms of linking of the processing procedure to the patient-SUBJ mapping, Wang found that learners at the phrasal level or below did not produce any passive structure. Learners at the sentence-procedure level seemed to coincide with the emergence of the passive structure. Based on the limited evidence, it is only indicative that the sentence-procedure is the prerequisite, but not an absolute indicator that learners are able to produce English passives.

To sum up the major findings from the three studies (Keatinge & Kessler, 2009; K. Wang, 2009, 2010):

- (1) When learners were not able to produce the English passives, they produced such interlanguage forms: agent-active; the semantic concept (a patient role) not matching the syntactic form (use of active form of predicate); patient-active; topicalization
- (2) Agentless passives were acquired before agentive passives
- (3) Sentence procedure is the prerequisite, but not sufficient to produce target like passives

In the current study, similar acquisition phenomena of acquisition of L2 Chinese passive

structure were also observed. Before the passive structure emerged, learners used different forms in the contexts where a passive structure was more appropriate. They either ignored the patient prompt and used what Wang terms the ‘agent-active’ strategy (e.g. 5.67), or they picked the patient role, but produced interlanguage forms in which the semantic concept (a patient role) does not match the syntactic form (no passive marker, as in 5.66), or they use NP TOPs (e.g. 6.33, from Picture 6-1) or they used the OSV structure to give prominence to the patient role, but without a passive marker to indicate the adversary meaning (e.g. 5.87).

6.31 Researcher: What’s happened to this green car?

Leo: 红车 的 车 撞 了 绿色 的 车
 hongse de che zhuang le luse de che
 red GEN car hit PF green GEN car
 ‘The red car hit the green car.’ (Leo, T14)

6.32 Researcher: 这个 绿 车 怎么 了?

zhege lü che zenme le
 this green car how PF
 ‘what’s happened to this green car?’

Aiko: 绿色 的 车 撞 红色 的 车
 lüse de che zhuang hongse de che
 green GEN car hit red GEN car
 ‘The green car hit the red car. (the green car was hit by the red car)’ (Aiko, T7)

6.33 Researcher: 你 看 这个 小 鱼 怎么 了?

ni kan zhege xiao yu zenme le
 you see this small fish how PF
 ‘Please see what’s happened to this small fish?’

Mitsu: 小 鱼 大 鱼 想 吃 小 鱼 然后 中 鱼 也 想 吃 小 鱼
 xiao yu da yu xiang chi xiao yu ranhou zhong yu ye xiang chi xiao yu
 small fish big fish want eat small fish then middle fish also want eat small fish
 ‘Small fish the big fish wants to eat small fish, then the middle fish also want to eat the small fish.’ (Mitsu, T6)

Picture 6-1



- 6.34 Researcher: 这 个 猫 怎 么 了?
zhe ge mao zenme le?
this CL cat how PF?
‘what’s happened to this cat?’
- Mitsu: 猫 的 尾 巴 他 踩 了
mao de weiba ta cai le
cat GEN tail he step PF
‘He stepped on the cat’s tail.’ (Mitsu, T3)

In line with Wang’s (2010) indicative finding of the agentless passive being acquired before the agentive passive, it was found in the current study that the only token produced by the beginner, Ross, was an agentless passive (see 6.35). He tried to produce an agentive passive at T13 (see 6.36). However, the agent *bei ren* ‘someone’ was not placed at the preverbal position after the passive marker BEI. It seemed that Ross used the Initialization-Finalization Strategy (IFS) (Clahsen, 1984a) to exchange the two NPs of the sentence in order to place the patient of the sentence in initial position, as posited by Kessler and Keatinge (2009). This may indicate that the placement of agent into the less salient preverbal position adds processing cost to the passive structure, as the placement of the OBJ TOP into the preverbal position in the SOV and SO_{BA}V structures do.

- 6.35 苹 果 被 吃 完 了
pinguo bei chi wan le
apple BEI eat finish PF
‘The apple was eaten (by someone).’ (Ross, T15)

- 6.36 *橙 子 被 切 别 人
*chengzi bei qie bieren
*orange BEI cut someone
‘The orange was cut by someone.’ (Ross, T13)

As for the link of patient-SUBJ mapping to the processing procedures, both studies (Keatinge & Kessler, 2009; K. Wang, 2010) suggest that the sentence procedure is a prerequisite for processing L2 English passive structures. In the current study on the L2 Chinese passive structures, the OBJ TOP structure (the OSV structure), which requires

the sentence procedure, may serve as a reference. One similarity that the OSV structure and the passive structure shares is that they both have a patient role at the initial position receiving the prominence. This may suggest that giving prominence to a patient role, regardless of its syntactic function, requires the sentence procedure.

The above discussion reveals that although acquiring different L2 passive structures, Chinese and English, the acquisition process is similar. The similarity can be accounted for by the universal lexical mapping process of patient to SUBJ, which needs the sentence procedure to process.

6.2.3 The causative structure

The Chinese causative structure is a subtype of the serial verb structure (see 5.68). The first verb has a causative meaning and its OBJ assumes two thematic roles, the patient of the first causative verb and the agent of the second verb. Common Chinese causative verbs are *rang* 'let', *jiao* 'made', *yao* 'want', and *qing* 'invite'.

6.37 SUBJ_{AGENT}+Causative verb_{RANG/JIAO/YAO/QING}+OBJ_{PATIENT/AGENT}+Verb+(OBJ)

The mapping of a- to f-structure is complex, because one syntactic function, the OBJ, assumes two thematic roles. It was found in the three beginners' data that the causative structure emerged later than the existential structure and earlier than the passive structure. The structure emerged in Aiko's data at T7, in Leo's at T12 and in Ross' at T13. The late emergence of the causative structure was also reported in Kawaguchi (2009), which is the first PT-based empirical study to investigate the L2 acquisition of Japanese causative structures.

Kawaguchi (2009) conducted a cross-sectional investigation on the acquisition of L2 Japanese causative structures by 24 intermediate-advanced learners of L1 Chinese and English speakers at an Australian university. 16 informants were L1 English speakers, including nine intermediate and seven advanced learners. Eight informants were L1

Chinese speakers, including six intermediate and two advanced learners. She used a picture-based story-telling task to elicit the causative structures.

The results show that the learners who were at the phrasal procedure level or below were not able to produce the causative structures. It was found that these learners used canonical sentence or coordinated canonical order sentences as an alternative to express causative events. Some attempted causative structures but either with wrong argument mappings or wrong verb phrase structure, thus they fell back on canonical mapping. The learners who were at the phrasal-sentence procedure level or clear sentence procedure level could produce the causative structures. Based on these findings, Kawaguchi concluded that the phrasal procedure is a necessary but not sufficient precondition for the production of causative structures.

In the current study, instances of using canonical or coordinated sentences as an alternative to express causative events were also found. In comparison, instances of wrong argument mappings were not found in the current study. This might be due to the different forms of Chinese and Japanese causative structures. In Chinese, there are two verbs which form a causative event. In Japanese, however, there is only one main verb with the causative morpheme attached to it. If the morpheme is not attached properly, the argument mapping problem will arise. Despite the different structural forms, the late emergence of the causative structure indicates more processing demands involved in mapping two thematic roles onto one argument.

Another interlanguage feature of the causative structure in the current study was presented in Chapter 5. In the initial productions of the causative structures in the three beginners' data and in one intermediate (Bret) learner's data, *xiang/yao/xiangyao* 'want', *wen* 'ask', *gaoshu* 'told' were the favourite causative verbs. In comparison, the typical Chinese causative verbs are *rang* 'let', *jiao* 'made', *yao* 'want', and *qing* 'invite'. Considering the fact that Chinese and English structures are similar, there is a possibility that the learners may 'borrow' the causative verbs from English before they

received the input of typical Chinese causative verbs. Aiko produced a token with the verb *wen* ‘ask’ (see sentence 6.38), which a native Chinese speaker would not choose to use as a causative verb. The translation seems to indicate that she might borrow the English causative verb ‘ask’ and translate it directly to its Chinese counterpart ‘wen’. The typical Chinese causative verb *rang* ‘let’ only appeared in Aiko’s data in the last session T15.

6.38 我 问 我的 朋友 买 啤酒
wo wen wode pengyou mai piju
I ask my friend buy beer
‘I ask my friend to buy beer.’ (Aiko, T7)

Similar instances of possible borrowing English causative verbs into the Chinese causative structure were also found in Ross’, Leo’s and Bret’s production. The overlapping causative verb in both Chinese and English is *xiang/yao/xiangyao* ‘want’, which appeared in early Chinese causative structures that the learners produced. What is significant is not the fact of borrowing in itself, but the time the learners started to ‘borrow’, which did not take place in early interlanguage, but rather in late interlanguage. The structure emerged in Aiko’s data at T7, in Leo’s at T12 and in Ross’ at T13. These findings also lend support to the Developmentally Moderated Transfer Hypothesis.

With regard to the link between the processing procedure and the agent/patient to OBJ mapping in the causative structure, Kawaguchi (2009) suggests that the phrasal procedure is a necessary but not sufficient precondition for the production of L2 Japanese causative structure. The current study suggests the sentence procedure might be the prerequisite for the processing of L2 Chinese structure. Following the argument for the SOV structure that two functional links may increase the processing demands, assignment of two thematic roles to one syntactic function may also increase the processing demands. This explains why the causative structure emerged later than the existential structure, which involves one thematic role assignment. The passive structure

also involves one thematic role assignment, but it emerged later than the causative structure. It has been argued that the placement of the agent role to a less salient preverbal position, as hypothesized in Chlashen' (1984) Initialization-Finalization Strategy, may lead to more processing costs.

6.3 Conclusion

The current chapter, based on the data analysis of the previous chapter, discusses two key issues of the L2 acquisition of Chinese syntax within and beyond the framework of the Processability Theory. The first issue concerns the applicability of PT-based processing principles (Pienemann, 1998b; Pienemann, Di Biase, & Kawaguchi, 2005) to the L2 Chinese word order (i.e., the canonical SVO structure, the XP+SVO structures, and the OSV, SOV and SO_{BA}V structures). The results of the current study are consistent with those in Gao (2005) and Zhang (2007). The consistency implies both principles are applicable to L2 Chinese syntax and the two principles can be linked through the processing procedures. The NP TOPs and the OSV structure are hypothesized to utilize the simplified-sentence procedure in Gao (2005). In the current study, it is argued that in both terms of the information exchange and c- to f-structure mapping, the NP TOPs and the OSV structure are different in a major way. Therefore it is proposed that the two structures access different processing procedures, with the former requiring the phrasal procedure and the latter requiring the sentence procedure. The SOV and SO_{BA}V structures are found to emerge later than the OSV structure, which may be caused by processing or non-processing factors.

The second issue concerns the applicability of the Lexical Mapping Hypothesis (Pienemann, Di Biase, & Kawaguchi, 2005) to the acquisition of L2 Chinese complex structures, including the existential structure, the passive structure and the causative structure. The results of the passive structure and causative structure are consistent with other PT-based studies structures (Kawaguchi, 2005, 2009, 2010; Keatinge & Kessler, 2009; K. Wang, 2010) and the results of the existential structure are consistent with two non-PT based empirical studies (Wen, 1995; S. Yang et al., 2007). It was found that

when a non-agent role (a less prominent thematic role, i.e., a patient or locative role) is mapped onto the most prominent grammatical function (i.e. the SUBJ) in the passive and existential structures, or one grammatical function (i.e. the OBJ) assumes two thematic roles (i.e. the patient and agent) in the causative structures, processing demands increase. The current study, as well as the PT-based studies (Kawaguchi, 2005, 2009, 2010; Keatinge & Kessler, 2009; K. Wang, 2010) suggest that the phrasal procedure is a necessary, but not a sufficient prerequisite for the non-default mapping of argument structure to the functional structure.

Chapter 7 Conclusion

This study explores L2 Chinese acquisition at syntactic level with Processability Theory (PT) (Pienemann, 1998b; Pienemann, Di Biase, & Kawaguchi, 2005) as its theoretical framework. Under the theoretical guidance of PT, the current study achieved its aim to document the acquisition process of six word order patterns and three structures with complex lexical operations over a one-year longitudinal investigation in a second language setting by six L2 Chinese learners of three proficiency levels (beginning, intermediate and advanced). Two PT-based processing principles, i.e. information exchange and the mapping of three parallel levels of structure (i.e., argument structure, constituent structure and functional structure) were employed to hypothesize two processing hierarchies for the acquisition of word order and complex structures respectively. The following are the main findings.

First, the results revealed that both observed sequences for the two L2 Chinese structures were consistent with the PT-based processing hierarchies.

Among the six word order patterns, the canonical SVO structure emerged the earliest in the beginners' data. This is consistent with the default c- to f-structure mapping that sentences in initial interlanguage are assembled in the least processing costly way that the most prominent argument function, SUBJ, is mapped onto the most prominent sentence initial position. The syntactic outcome is the canonical word order. The statistical results from three representative sessions from the beginners and two sessions from the three non-beginners show that the SVO structures account for around 75%-80% of the total utterances. Both the early emergence and the high frequency of the canonical structures indicate that the canonical structures are among the easiest forms to be acquired in early interlanguage. Shortly after the emergence of the canonical structures, additional elements started to appear with the canonical structures. The time and location ADJ TOPs emerged the earliest and gradually nominal elements emerged as NP (external) TOPs attached to the canonical structures. This is one step further the

default c- to f-structure mapping, because the default link between the first sentential position and the SUBJ is broken, a deviation from the unmarked alignment. The remaining constituents of the sentence remain canonical. The three non-canonical OSV, SOV and SO_{BAV} either emerged late or did not emerge. In terms of information exchange, these structures all involve an information exchange of the f-structure value of the discourse function TOP and the clause-internal function OBJ, which requires the sentence procedure.

As far as the three complex structures are concerned, they all emerged later than the active structure. The existential structure emerged before the causative structure. The passive structure emerged last. According to the argument structure to functional structure mapping in the Lexical Mapping Hypothesis, the three structures all involve non-default mapping, either a less prominent role, i.e. a patient in the passive structure and a locative in the existential structure, is mapped onto the most prominent grammatical function or the OBJ assumes two argument roles: the PATIENT of the main verb and the AGENT of the second verb.

Second, the findings reveal that a combination of the two principles of information exchange (Pienemann, 1998b) and the mapping of c-structure to f-structure based on the Unmarked Alignment and the Topic Hypothesis (Pienemann, Di Biase, & Kawaguchi, 2005) would provide the more powerful explanation for L2 Chinese word order acquisition.

The information exchange does not explain the difference between the canonical SVO structures and the ADJ_{TOP}+SVO structures. In the two structures, no information exchange between sentence constituents takes place. The mapping of c- to f-structure distinguishes the two structures, because the ADJ TOPs breaks the default link between the most prominent initial position in c-structure and the most prominent syntactic function of SUBJ.

The unmarked alignment does not explain the late or non-emergence of the two Chinese non-canonical structures with preverbal TOPs, i.e., the SOV and SO_{BA}V structures. In both structures, the most prominent syntactic function of SUBJ occupies the most prominent initial position in c-structure. The functional information exchange of the discourse function of TOP and the syntactic function of OBJ, a sentence-procedure, in the two structures explains their late or non-emergence. Moreover, the number of functional information exchange via functional links also seems to make a difference in terms of processing demands. The results from the current study, as well as two other PT-based studies (Kawaguchi, 2015; Zhang, 2007) show that the SOV structure, with the preverbal OBJ assigned a discourse function of TOP/FOC either emerged later than the OSV structure or did not emerge at all. Among other possible causes, the double functional links of the primary TOP to SUBJ and the secondary TOP to OBJ in the SOV and SO_{BA}V structures seem to increase processing costs in comparison with the single functional link of the TOP to OBJ in the OSV structure.

Third, an attempt was made in the current study to explore the interface of the Topic Hypothesis and the Lexical Mapping Hypothesis. The phrasal-procedure seems to be a prerequisite for acquisition of the existential structure. This hypothesis is based on the reference to the processing of the location ADJ TOPs. A locative NP can serve as ADJ TOPs in the ADJ_{TOP}+SVO structure and SUBJ in the existential structure. The latter emerged later, in the beginners' data, than the former, which requires the phrasal-procedure. With regard to the passive and causative structure, sentence-procedure seems to be their prerequisite. Due to the limited empirical evidence from the current study and other PT-based studies, the links were highly tentative, awaiting for further empirical support.

The above findings provide further empirical evidence that L2 learners tend to travel along a similar path of L2 acquisition. The findings also have implications for teaching Chinese as a second language. Processability Theory advocates teaching processable grammar, which means teaching will be beneficial if it focuses on structures that are

processable or ready to be processed by L2 learners. The observed sequences of word order and complex structures may serve as a reference for the design of teaching syllabus and for drawing attention to some sentence structures that are easy to process but may emerge late because of other factors. For example, the NP TOPs require the same phrasal procedure as ADJ TOPs do. However, these TOP structures appeared later. Constraining L1 effect is recognized to impose on L1 English learners. It is recommended that language teachers give special attention to these structures to reduce the L1 effect to the minimum.

Some limitations are identified in the current study. The first one is that the input schedule was not investigated. Gass and Mackey (2007) pointed out, “in all approaches to second language acquisition, input is an essential component for learning in that it provides the crucial evidence from which learners can form linguistic hypotheses’ (p. 177). Input does not alter the acquisition sequence. However, it may act as a variable that affects the observation of the acquisition sequence when it is null or late. In the current study, the late or non-emergence of the SO_{BAV} and passive structures may be subject to the input schedule. The two structures were introduced very late in the classroom instructions, almost toward the end of the second semester for the beginners. The classroom instruction is one of major sources of input. If the structures, especially those requiring high processing procedures, like the SO_{BAV} and passive structures, receive later instruction, the emergence of the structures will be late. However, given the fact that the current investigation was conducted in the target language environment with multiple sources of input, examining the input schedule is hard to operationalize.

Another limitation is that a lack of tasks for a specific target structure may affect the emergence. For instance, the SOV structure requires a contrastive context, while the OSV structure does not. In the current study, no specific tasks were designed for the elicitation of the SOV structure under contrastive contexts. Elicitation focus was given to the OSV structure, with patient OBJ prompts in different tasks and no contrastive meaning was involved. Interested researchers could further explore the contextual

requirements for the SOV structure and design specific tasks to apply to L2 Chinese beginners to find out whether the OSV structure and SOV structure belong to two distinct stages. Further research could also enlarge the number of L1 Japanese learners to further explore the L1 effect on the acquisition of the SOV structure.

Finally, the current study mostly examined isolated sentences without looking into the wider context they appear, which would not give a full picture of L2 Chinese syntax acquisition. For example, Ross, the beginner, produced the sentence (7.1) at T6. If we do not look into its preceding context, the sentence is a grammatically well-formed SVO structure. However, if we have a look at the preceding context, which was provided by the researcher in a question form ‘*What’s happened to this apple?*’, we’ll find that Ross’s response to the question was against the information structure that old information should precede the new information (Lambrecht, 1994). The old information established in the researcher’s question, i.e., ‘*apple*’, should receive the prominence, instead of the new information ‘*he*’. Therefore, the sentence is grammatically well-formed, but it is not in pragmatic terms. The pragmatically ill-formed sentence indicates that Ross was not ready to produce the OSV structure at T6.

7.1 他 吃了 苹果
ta chi le pingguo
he eat PF apple
‘He ate the apple.’ (Ross, T6)

In the following session T7, in respond to the same question, Ross was able to give prominence to the old information ‘*apple*’ and topicalize it (see sentence 7.2). The sentence is well-formed grammatically and pragmatically.

7.2 Researcher: what’s happened to this apple?
Ross: 这个 苹果 有人 吃了
zhege pingguo youren chi le
this apple someone eat PF
‘This apple, someone ate it.’ (Ross, T7)

Therefore, grammatical well-formedness is only one aspect of syntactic development. This aspect of information-structuring constraints have been already incorporated in the Prominence Hypothesis proposed by Bettoni and Di Biase (2015) as a new development of the Topic Hypothesis. The Prominence Hypothesis sets an agenda for future L2 Chinese syntactic study with a focus on the effect of contexts and information structure.

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